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Faculty of Management Technologies and Humanitarization
Department of "Philosophical Teachings"

A.I. Loiko

Big Data Ethics

A textbook on the academic discipline "Philosophy and Methodology of Science"
for master's students of all specialties

Electronic learning material

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Author:

A.I. Loiko Sciences, Professor, Head of the Department "Philosophical Teachings" of the Belarusian National Technical University

Reviewers:

Kandrichina I.N., Head of the Department of Management of the Belarusian National Technical University, Candidate of Sociological Sciences, Associate Professor

Uzgorok M.Yu., Associate Professor of the Department of Philosophy and Ideological Work of the Educational Institution "Academy of Internal Affairs of the Republic of Belarus", Candidate of Philosophical Sciences, Associate Professor

The textbook complements the lecture material with topical issues of data ethics. This applied material is important for specialists in management, marketing, logistics and engineering and economic specialties.

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INTRODUCTION

Data ethics is an exploration of the moral, social, and cultural issues that arise in the context of the use of digital technologies. The philosophical aspects of digital ethics help to understand the fundamental principles, values, and norms underlying human interaction with digital technologies.

Data ethics is becoming an important area that provides a basis for understanding and regulating the interaction between humans and digital technologies, and its philosophical aspects help to deepen the understanding of the ethical issues facing modern society. The topic of Data ethics has become especially relevant in the context of rapid technological progress that affects various areas of people's lives. Justifying the relevance of digital ethics in the context of technological progress emphasizes the need to develop ethical standards and principles that will guide both technology developers and society as a whole towards responsible and sustainable use of digital resources.

Data ethics covers a wide range of issues related to the use of computers, the Internet, artificial intelligence, big data, cyber security and other aspects of the digital environment. Data ethics is especially in demand.

Privacy in Data ethics means the right of an individual to control their own personal information and protection from unwanted interference in their private life. Data ethics insists on the need to respect user privacy in the online environment by limiting the collection and use of their personal data.

Data ethics calls for the development of technologies that take into account the interests and needs of different social groups and for reducing the digital divide. It involves the development and use of technologies that guarantee data security, as well as transparency and responsibility in the processing of information. It prescribes respect for the autonomy of the individual, the requirement of consent for the collection and use of data, and ensuring clarity and transparency regarding digital processes. Data ethics insists that users are aware of how their data is used and give their informed consent.

Data ethics includes the principle of honesty in information interactions and responsibility from the developer, operator or user. It emphasizes the importance of providing access to digital literacy education to improve understanding and skills in using digital tools.

The principles of Data ethics serve as a basis for the development of norms, standards and policies aimed at creating an ethical digital environment.

Data Ethics

The main ethical dilemma is the choice between observing the rights of citizens, the interests of social groups, society, the state, on the one hand, and creating new products, services, opportunities directly or indirectly related to the use of data, on the other hand. The maximum number of risks arise when collecting, analyzing and using the results of analyzing people's data, and these risks are concentrated in three areas: data processing using AI, video surveillance, and online surveillance. The most widespread risk is the violation of privacy.

The development of some technologies, primarily AI systems, depends on the availability of certain types and sets of big data. Big data and technologies for processing them are used to create not only commercial, but also social research projects. The need to protect personal data present in data sets often limits the ability of scientists and developers to use big data in the field of healthcare (health data is considered sensitive), public and personal transport, if facial recognition and citizen surveillance are provided.

The most experienced technologically advanced participants in the data market are data corporations. They make super profits by collecting, processing and selling user data. Data is their main resource and source of income. Most ethical issues related to data arise due to the enormous value of citizens' data and the enormous interest of corporations. In order to increase profits, corporations violate the rights of citizens when processing their data.

Data corporations collected and processed millions of audio recordings, which in addition to verbal commands to voice assistants and smart speakers, in-

cluded fragments of conversations and other sounds. The recording was done automatically, without warning users, and the data was used to train AI to recognize human speech. To develop AI technologies, it is necessary to use data collection and processing technologies. The relationship between AI and data is almost 100%. The main question is: how to use the maximum amount of data with a minimum of risk? Thanks to modern computing power, AI technologies can analyze huge amounts of data and find complex and deeply hidden connections.

By collecting and analyzing big data with the help of AI, technology giants are able to build correlations that a person cannot yet understand. At the same time, complete data, even if they are conditionally anonymized, can indicate a specific person, their relatives and profession. Completeness of data is critical for the successful development of intelligent systems, but is potentially dangerous for privacy and human rights. By collecting and analyzing big data with the help of AI, technology giants are able to build correlations that a person cannot yet understand and build, for example, based on their search queries.

Excessive restriction of access to data complicates and slows down the development of AI technologies based on both machine learning and other methods. Thoughtful legislation and careful law enforcement would allow maintaining a balance in regulating the volume and degree of anonymization of personal data without introducing numerous prohibitions. Data collection is carried out by default when a person uses mobile devices and the Internet. It is believed that the data that users post on free social networks, in correspondence in messengers and leave as a digital trace, belongs to the people themselves.

Data corporations manage this data only because they own the sites on which this data was left. But in practice, this is not the case. For data corporations, user data has become a free and unlimited resource for making a profit.

The standard mechanism for obtaining consent for data processing and storage is gradually becoming irrelevant due to the impossibility of controlling this process, and under the condition of a long period of 10-20 years or more of data use, it is invalid in its essence. Data is stored for so long that at the time of obtain-

ing consent, it is impossible to notify a person about what data and how exactly will be processed and used in the future. Data leaks have become a mass phenomenon all over the world. No data operator is immune from it.

Direct targeted hacking occurs rarely. The reasons for data leaks are errors in legislation; insufficiently thought-out work of regulatory and supervisory authorities; errors of direct database developers. For example, incorrectly configured servers, due to which third-party analysis specialists can obtain data that should be closed to them by default.

These may be the actions of unscrupulous employees who copy data for subsequent sale. Even more critical are leaks of data collected on people's movements, social connections, and daily activities through the infrastructure of a smart city. Even individual smart wearable devices can cause harm to their owners and entire countries due to unintentional disclosure of information. Due to a misunderstanding or irresponsibility of employees, important government data, including that which may constitute a state secret, becomes public.

Data Augmentation and Ethics

Additional information makes the results more accurate at all stages of the work. Additional information will help clarify the results obtained, test hypotheses, and build models. Data enrichment is used in marketing research. This is a tool for more accurate work with the consumer.

Search engines create detailed portraits of users: age category, gender, approximate income, interests, and area of employment. It is not so much the volume of information that is important as the number of sources involved. As a result of this work, the Internet user sees advertising that matches his interests. The interface also adapts to the user: the language, time zone, and previous search queries are taken into account.

The ethics and licensing of data enrichment should be taken into account. In such cases, the data is transferred within the framework of a single agreement. This is a matter of internal security policies and commercial objectives. Another scenar-

io allows for the transfer of data to another organization, which is specified in the agreement. In this case, the enrichment logic is the same as if it were within the same organization.

If processing by agreement is only possible in an anonym form, then enrichment at the individual level is impossible, since it requires unique identifiers. The normal scenario is used in academic research. This is the enrichment of aggregated data. For example, you can combine data on individuals at the level of a municipality or some organization, such as a school or employment center, and then enrich it at this level. In this case, the data is used in an anonym form, so there is no violation of the agreement.

It is possible not to use unambiguous individual identifiers (name, contact information or document numbers), but to rely on indirect signs. In the case of digital data, we talk about a digital trace: a combination of browser and operating system characteristics, device technical characteristics (resolution) and IP address. Using such a combination usually allows us to identify different actions of an individual accurately enough to combine them. In this case, there may be no violation of the law, but there are risks of violating the law.

Ethical requirements consist of the impossibility of using and publicly demonstrating the personal data of an individual, even if for some reason they were transferred to them. It is also clearly ethically impossible to use stolen and published data, including leaks from services, for research purposes.

This is a question, among other things, of the personal responsibility and ethics of each individual researcher. When publishing results and anonym data, it is necessary to keep in mind that they can be used for enrichment. It would be best to immediately prescribe the conditions for their use and make it as difficult as possible to use the data to enrich other data. This may include restricting access to individual attributes and observations.

AI Ethics: A Systems Approach

IT ethics covers a wide range of principles, from honesty and fairness to respect for privacy and intellectual property. It emphasizes the importance of transparency in data processing and a responsible approach to the development and use of technologies. These principles are aimed at protecting the rights of users and preventing abuses in the field of information technology.

The principles of IT ethics include responsibility and accountability for decisions made and products created. In this context, special attention is paid not only to what is technologically possible, but also to what is morally acceptable and socially responsible. This entails the need to continually assess the ethical implications of innovations, including potential impacts on user privacy, security and well-being. Ethics in IT is thus becoming more than just an add-on to technology, but a fundamental aspect shaping the future of technological development.

Ethics plays a key role at all stages of the development and implementation of new technologies and software. It helps shape development approaches that take into account the social, legal and moral implications of technological innovations, striving to create a fairer and safer digital world.

Ethical criteria in the development and implementation of new technologies also ensure that innovations take into account the diversity of needs and perspectives of different user groups. This includes ensuring that technologies are accessible and usable for people with different abilities and from different social and cultural backgrounds. This approach contributes to the development of products and services that are not only technologically advanced, but also promote social inclusion and respect for diversity. This increases the value and effectiveness of technologies, making them more acceptable and useful to a wider range of users.

Privacy and the protection of personal data are at the heart of ethical debates in IT. Given the volume of data that companies collect and process, it is important to maintain strict security and privacy standards. This includes ensuring consent for data collection, protecting data from unauthorized access and use, and ensuring transparency about how data is used and processed.

The importance of protecting privacy and personal data in IT highlights the need to embed ethical principles into the design and development of technology. Data protection should not be simply an add-on to existing systems, but an integrated part of the development process from the very beginning. This is an approach known as privacy by design, which requires that privacy be considered at all stages of the data lifecycle, from collection to destruction, thereby ensuring that personal data is protected at every step.

The use of biometric data such as fingerprints, facial recognition and other unique human characteristics raises special ethical issues. It is important to ensure that such sensitive data is not used without the consent of users and does not become a tool for violating their privacy. Biometric data requires special attention to the issues of its storage and processing. It is important to ensure that the systems that process such data have a high level of security and are not subject to vulnerabilities that could lead to their leakage or misuse.

It is also necessary to consider the potential irreversibility of the consequences if biometric data is compromised, since, unlike passwords or credit card numbers, a person's biometric characteristics cannot be changed. This raises questions about liability and the need to develop compensation or protection mechanisms for users in the event of a breach of their biometric privacy.

The development and use of artificial intelligence and neural networks pose complex ethical issues. It is important to ensure that algorithms are not biased and do not promote discrimination. In addition, the potential consequences of automation, including the impact on employment and social relations, must be considered. In addition to the issue of bias, ethical issues related to AI and neural networks also include the transparency and interpretability of algorithms. It is important that users and stakeholders understand how these systems work and what data is used to make decisions.

This requires that AI and neural networks be designed in a way that is not only efficient but also explainable. It is also important to consider issues of ac-

countability for decisions made with the help of AI and determine who is responsible in case of errors or unintended consequences.

A comprehensive approach is needed to address ethical issues in IT. This includes developing and enforcing strict codes of ethics, conducting educational programs for professionals, engaging the public in discussing ethical standards, and collaborating with regulators to create effective legal and regulatory frameworks. Such an approach will help ensure that the IT industry develops responsibly and in the interests of all participants.

Effective problem solving in IT requires active engagement and feedback from end users. Understanding their perspectives and concerns will help shape technologies that more closely meet their needs and ethical standards. It is also important to implement mechanisms for continuous monitoring and revision of technologies to improve their security, privacy and ethical compliance.

All this helps to create trust and transparency in the relationships between IT companies, users and society as a whole, which is a key factor for the sustainable development of the IT industry.

Computer Ethics

The formation of the research field of computer ethics is associated with the release of a special issue of the journal "Meta philosophy" and the publication of the anthology "Ethical Issues in Computer Use", as well as the monograph by D. Johnson "Computer Ethics" (1985) for students of Rensselaer Polytechnic Institute. The theoretical sections on computer ethics explain what consequentialism and deontology, utilitarianism and altruism, virtue ethics are.

The field of computer ethics research includes the quality of web resources, the ethical aspects of subscriber behavior in social networks, and possible access to gaming sites. Moral aspects of the Internet functioning are touched upon in the "Declaration of Responsibility" of specialists in computer technologies, in the "Code of Ethics and Professional Activity in the Field of Software Engineering", finally. There is a "hacker ethic", called techno meritocratic by M. Castells.

The formation of virtual ethics is a dynamic and relevant process. The first attempts to formulate the basic principles of virtual ethics date back to the eighties of the twentieth century. In 1986, R. Mason limited the problematic field of ethics in the information age to four principles: privacy or confidentiality (privacy), accuracy (accuracy), availability (accessibility) and private property (property). Privacy includes secrecy and anonymity.

Accuracy is related to the requirements for the storage and processing of technical, social and other types of information. The principle of private property is designed to protect property rights to information and copyrights. A systematized, universal set of rules consisting of ten principles is often used.

The set of rules prescribes not to use a computer for the purpose of harming people. Do not interfere with or disrupt the work of other users of computer networks. Do not use files that are not intended for free use. Do not use the computer for theft. Do not use your computer to spread false information. Do not use stolen software. Do not appropriate someone else's intellectual property.

Do not use computer equipment or network resources without permission or appropriate compensation. Think about the possible social consequences of using programs or systems. Use your computer with self-restraint that shows courtesy and respect for others.

The information explosion that has occurred has shown the ambivalent nature of the Internet's capabilities. There is a need to develop virtual ethics. It is designed to regulate the area of social relations with the help of a moral value system.

Data Privacy Ethics

This is a branch of ethics that deals with the moral and legal consequences of collecting, storing, sharing and using personal data. It is a developing field that affects the interests and rights of individuals, organizations and society as a whole.

Data privacy is a human right. According to the Universal Declaration of Human Rights, everyone has the right to privacy and protection of their personal data. Data privacy ethics respects this right and ensures that people have control

over and consent to their own data, and that their data is not used for harmful or discriminatory purposes.

Data privacy is a competitive advantage. Companies that respect and protect their customers' data can earn their trust and loyalty, and differentiate themselves from competitors. Data privacy ethics can also help businesses comply with relevant laws and regulations and avoid legal risks and reputational damage.

Data privacy ethics can foster a culture of transparency and accountability, and promote the ethical use of data. It can prevent data from being misused or abused by bad actors, and protect the public from threats such as identity theft, cybernetics attacks or surveillance.

Data privacy ethics also poses some challenges and trade-offs for both businesses and consumers. The balance between privacy and the usefulness of data is important. Data privacy often requires limiting or anonym data that is collected or shared, which may reduce its value or quality for analysis or decision-making. Data privacy ethics can help find the right balance between protecting data and maximizing its usefulness for legitimate purposes.

Data privacy can sometimes limit or hinder the development and adoption of new data-driven technologies or services, such as artificial intelligence, machine learning, or cloud computing. Data privacy ethics can help ensure that data innovations respect the rights and interests of data subjects and that the potential benefits outweigh the potential risks.

Data privacy can sometimes conflict with the need or desire to share data with others, such as partners, employees, or third parties. Data privacy ethics can help create appropriate conditions and safeguards for sharing data, such as obtaining consent, ensuring security, and ensuring accountability.

Data privacy ethics includes the principles of data privacy. These are the core values and norms that define what data privacy means and why it is important. Examples of data privacy principles include: fairness, transparency, accountability, security, and minimization.

A data privacy policy contains specific rules and guidelines that govern the collection, storage, distribution, and use of data. Examples of data privacy policies include: data protection laws, data governance standards, data breach protocols, and data retention policies.

Data privacy practices include specific actions and behaviors that ensure and demonstrate the privacy of data. Examples of data privacy practices include: data auditing, data encryption, data anonym, and data deletion.

By following data privacy ethics, businesses and consumers can balance business goals and privacy values and reap the benefits of data while respecting the rights and interests of others in the conversation.

Causal AI

Causal AI is focused on identifying cause-and-effect relationships that are needed to solve a given problem or question. It is an attempt to bring artificial intelligence closer to the way humans think and to go beyond statistical predictions based on machine learning, as is done in existing neural networks. This is a desire to create technology that can reason and make choices like humans do, so that it can be integrated into human decision-making. The goal is to move beyond predictions based on statistical correlations to AI systems that can better predict possible outcomes, and therefore act more effectively.

Machine learning technologies were aimed at predicting things, such as the next word in a text. Causal AI can also predict. But it can go one step further, allowing you to answer questions like: “What will be the effect of changing a certain input variable or parameter?” or “What is the most effective course of action in a situation?” Traditional neural network models cannot answer these questions. This opens up new possibilities for modeling situations, such as evaluating treatments.

Artificial intelligence must comply with legal and ethical requirements. It must be explainable. But neural network models are black boxes, and attempts to explain them have so far failed. Causal artificial intelligence aims to create neural network models that are convenient and transparent for humans.

People will be able to carefully examine and change the assumptions underlying the models before they lead to any conclusions and forecasts. Experts can use their unique knowledge of the area under study can determine specific relationships and their form. Causal artificial intelligence at this stage of its development is an expensive project. For training, it is necessary to organize a constant flow of data from different sources in order to create a relevant causal model. This means the need for comprehensive digitalization of the enterprise in any area where artificial intelligence is used.

The theoretical understanding of neural networks lags significantly behind practice, many new methods are emerging that work, however, why they work, how they work and what problems this entails, no one understands. Neural networks are vulnerable to various types of attacks. The complex mechanism of a neural network is easy to break. A special term Adversarial Machine Learning (AML) has appeared which is translated as "adversarial machine learning".

This implies a targeted impact on a neural network that can cause errors in its behavior. The first publications date back to 2004. In 2013, engineers from Google AI, trying to understand how neural networks think, discovered a common property of the ML method.

Neural networks turned out to be unstable to conscious influences and deception as a result neural networks can be used to control the crowd. This raises questions about the correctness and safety of using neural networks to build recommender systems and other applications, since the recommender systems used by YouTube, Google and Yandex use neural networks. The use of neural networks to solve applied problems is limited to a prompt system. At the same time, decision making is not completely given to neural networks.

Training modern models requires a lot of computing power and resources. Modern models with a huge number of parameters and their training require complexes of supercomputers with powerful video cards. Large corporations have the necessary computing power. Global AI developers have started producing their

own chips, as their prices have risen sharply. This direction is necessary for businesses to develop their infrastructure, for example, cloud providers.

These chips will differ from their usual counterparts. They are focused on AI, designed for narrow tasks and are more affordable. The trend should be divided into chips developed by large cloud providers and other companies. Large cloud providers produce chips for the tasks of executing and training models to sell them as part of their cloud services.

Classic LLMs (large language models) have tens or hundreds of billions of parameters and require serious resources for development and training. At the same time, they do not always cope well with highly specialized and applied tasks. Their main advantage is versatility. Language models with several tens of billions of parameters and even with only a few billion have been developed.

These are SLMs (small language models). They require less computing power and resources for development. With the right fine-tune, they can prove themselves in customer support or financial reporting analysis. SLM training requires tens of times less computing power.

AI is changing the approach to robot programming. It allows robots to make decisions based on the analysis of data about the surrounding world and context recognition. Robotics has moved from the highly specialized use of AI algorithms to working with multimodal neural networks that combine video, text, audio, and other information. Researchers have replaced the robot's programming in a sequence of actions with reasoning processes at an abstract language level.

Such robots will be in demand in logistics and warehouses, in the manufacturing industry, in remote production, as well as in emergency situations, the nuclear industry, and northern regions.

AI Hallucinations

This is one of the most common problems with new generative neural networks. AI still cannot be trusted to independently make complex decisions on which a person's life depends. Often, auditing on social networks and other plat-

forms is left entirely in the hands of bots, and this is where the danger of hallucinations lies. Hallucinations can have various causes, for example, training AI systems on inaccurate or insufficient data.

There may also be flaws in the algorithms that cause the AI to generalize data incorrectly, given that chat bots, for example, are aimed at generating stories without logical inconsistencies - this is how very coherent lies appear. Sometimes AI hallucinations are useful, like human fantasies - for example, they open up a lot of scope for creating entertaining content, including visual.

However, if the purpose of using them is to obtain reliable information, problems are possible. A cascade of hallucinations is also potentially dangerous. This is when conclusions are made based on one false fact, which form the basis for the next decision. A chain arises in which it is difficult to get to the initial error.

One way to combat hallucinations is to focus the AI only on verified data. Another way is to have people check the AI results and provide feedback. After several cycles, the number of errors decreases significantly. Another method is to make chat bots discuss the topic among themselves and give an answer only after they come to a consensus. Cleaning and carefully preparing the data used to train and tune AI models is a key step in preventing hallucinations.

This involves not only removing irrelevant or erroneous information, but also ensuring that the data is diverse and represents multiple perspectives. Taking a rigorous approach to training data improves its quality and provides an opportunity to test and identify issues, including biases that may contribute to hallucinations.

From the outset, it is important to plan the development of AI models with an emphasis on their interpretability and explain ability. Ensemble models, which are one approach in the field of AI/ML, are well suited to achieving interpretability, explain ability and accuracy.

This approach involves combining predictions from multiple models to form more accurate, comprehensive, and transparent results.

Rigorous testing should include not only testing the model on standard queries and handling common input formats, but also analyzing its behavior under ex-

treme conditions and when handling complex queries. Testing the AI's response to a wide range of inputs allows you to predict how the model will behave in a variety of situations and provides an opportunity to improve the data and model architecture before end users encounter inaccuracies or delusional results.

If the AI model supports working with data in different formats, it is necessary to test with text and numeric data as well as audio and visual data. It is also recommended to use adversarial testing methods, the purpose of which is to deliberately mislead the model to identify its vulnerabilities. Most of these tests can be automated using appropriate tools, which simplifies the testing process and increases its efficiency.

A key element in the process of improving AI models is regularly collecting feedback from end users, especially after the model has already been implemented and is actively used. Users of AI models often provide valuable information about AI hallucinations and other deviations in the model's performance that may not be noticed during the development process. To make this process effective, it is important to create convenient and accessible feedback channels. This allows users to easily report any issues or anomalies they encounter when using AI.

The information gained in this way about real-world use cases of the model can be incredibly useful for developers and AI providers. Using this data, developers can not only correct individual errors, but also identify general trends and patterns in the model's errors. This allows them to improve the model's training data and its response to such queries.

For companies developing AI or using AI technologies, it is important to choose to partner with vendors that adhere to high ethical standards and provide transparency in the processes of data collection, training, development, and deployment of AI models. Ideally, vendors can clearly articulate their approaches to achieving ethically sound results and create products that combine accuracy and scalability. Factors can contribute to the emergence of hallucinations.

If the training dataset is limited or does not fully cover possible scenarios, the model may not respond adequately to requests that are beyond its training

scope. If the data used to train the AI contains bias, this can lead to erroneous or biased model conclusions.

Models over trained on specific data may lose the ability to adequately respond to new, unexpected situations, especially if they lack contextual information. Incorrectly selected model parameters can lead to unpredictable AI behavior, especially in complex or non-standard situations. Ambiguous or overly general user queries may result in unpredictable or irrelevant responses from AI.

AI hallucinations may lead to incorrect decisions and diagnoses, especially in precision-critical fields such as medicine and healthcare. This may cause harm to patients and customers. Hallucinations may generate discriminatory or offensive results, which may damage an organization's reputation and raise ethical and legal issues. If AI generates inaccurate data, it may result in unreliable analytical results. Organizations may make decisions based on incorrect information, which may impact their business.

Hallucinations that reveal sensitive information or create offensive content may lead to legal issues. Ethical dilemmas may arise from the use of such models. AI that generates misinformation may contribute to the spread of false information and negatively affect public opinion. Hallucinations may lead to user frustration, loss of customers, and a decrease in audience. The risk of generative artificial intelligence (AI) injecting fake packages into real code has been exposed.

Major companies including Alibaba, Tencent, and Baidu have included a non-existent package in their documentation. Bar Lanyado of security firm Lasso Security created a non-existent Python library (package) called hugging face-cli. Libraries are a collection of ready-made functions, classes, and objects for solving developer problems. He noticed that generative artificial intelligence (AI) models repeatedly “hallucinated” (the researcher's term) this library name when asked by users, i.e., they recommended them.

To test how this would play out in the real world, Lanyado posted a fake package to the Python Package Index. An attacker could use the AI's made-up name for a malicious package uploaded to a repository, in the hopes that others

would download the malware. Someone might ask the models for code advice, then write down fictitious packages that the AI systems repeatedly recommend. Then inject those dependencies so that other programmers using the same models and receiving the same suggestions end up using those libraries, which could be poisoned with malware. Hackers could upload malicious packages with the same names to the appropriate registries, and from there they just wait for people to download those packages.

The tendency of AI models to confidently cite non-existent court cases is well-known, and has left lawyers unaware of the trend confused. Generative AI models will do the same with software packages. Bar Lanyado posed four AI models (GPT-3.5-Turbo, GPT-4, Gemini Pro aka Bard, and Cohere Command) with programming tasks in five different programming languages (Python, Node.js, Go, .Net, and Ruby), each with its own packaging system. Some of the names these chat bots extract persist across models. And persistence – repeating a fictitious name – is key to turning an AI quirk into a functional attack. An attacker would want an AI model to repeat the names of hallucinated packages in its responses to users so that malware created under those names would be found and downloaded.

Bar Lanyado randomly selected 20 hallucination questions with zero results and asked them 100 times to each model. His goal was to evaluate how often the hallucinated package name remains unchanged. His test results showed that the names persist often enough to be a functional attack vector, though not always, and more often in some packaging ecosystems than others.

The packaging ecosystems in Go and .Net are built to limit exploitation by denying attackers access to certain paths and names. Vulcan Cyber researchers have described a new malicious package distribution technique they call “AI package hallucination.” This technique stems from the fact that Chat GPT and other generative AI platforms sometimes respond to user queries with hallucinations of sources, links, blogs, and statistics. Large Language Models like Chat GPT can generate such hallucinations – URLs, links, and even entire code libraries and

functions that do not actually exist. Chat GPT even generates dubious patches for CVEs and can suggest links to non-existent code libraries.

Companies should never upload and execute code they do not understand and have not verified, such as open-source GitHub repositories. When a program receives a complex query that it does not know the answer to, it begins to invent facts. Moreover, the model insists on its correctness if a person tries to correct it. For example, it can provide links to non-existent scientific studies.

The main reason for hallucinations is the lack of data. AI does not contain its own knowledge, but only generates the most probable answer from the loaded content. However, the laws of probability impose limitations. Not every result can be correct. Therefore, any answer from a neural network must be checked according to the general rules of fact-checking.

Verify all key information mentioned in the generated content using search engines: names, studies, geographical names. Monitor the authority of the sites where the information is published. Test the originality of the generated images. To do this, use image search in large systems such as Google or Yandex, on well-known photo stocks. Look for phrases that look like axioms. You can recognize them by the words “recognized,” “considered,” and “everyone knows.” Check such axioms for authenticity or ask the neural network to elaborate on superficial statements. Use several independent neural networks for the same task so that you can compare their results.

All generative AI models, from Google’s Gemini, Anthropic’s Claude, to the latest version of Open AI’s GPT-4o, hallucinate. In other words, the models make mistakes. Sometimes it’s funny, and sometimes it’s not so funny. But not all models do it in the same way. And the lies they produce depend on what sources of information they were trained on.

AIs hallucinate less often; GPT-4o and Open AI’s GPT-3.5 showed roughly the same results in the percentage of questions they answered factually correctly. However, GPT-4o was slightly better. Open AI’s models were the most truthful, followed by Mixtral 8x22B, Command R, and Sonar. Celebrity and finance ques-

tions were the most difficult for the models, while geography and computer science questions were the ones the models were best at, perhaps because their training data contained more references to these topics.

When the answer source was not Wikipedia, all models were less truthful on average, especially GPT-3.5 and GPT-4o, suggesting that they all rely heavily on Wikipedia. Even models that can search the web, like Perplexity's Command R and Sonar, were able to handle answers that weren't in Wikipedia. Model size didn't seem to matter much. Small models, such as Anthropic's Claude 3 Haiku, hallucinated about as often as larger, supposedly more capable models, such as Claude 3 Opus.

The Relationship between AI and Human Hallucinations

Understanding this connection can help us build more advanced AI systems that will ultimately help reduce human error. Humans make up information. Sometimes this is done intentionally. Sometimes it is a memory error. These errors result when a person replaces a long line of reasoning with a shortcut that is born from compressing faulty data. Often these shortcuts are born out of necessity. The brain must use learned associations to fill in the gaps and quickly answer any question or difficulty. The brain guesses the right answer based on limited knowledge. This phenomenon is called confabulation and is an example of human bias.

Biases can lead to incorrect judgments. There is an "automation bias". This is the tendency to favor information from automated systems (like Chat GPT) over human-generated information. It is believed that AI cannot take sides in an argument, that it is completely objective. This bias can lead to a mistake not being noticed. Another type of bias is called the halo effect. This is when an initial impression influences the perception of a phenomenon so strongly that further interactions with it do not change anything.

There is fluency bias. People always prefer information presented in an easy-to-read and understand form. The AI's "hallucination" reflects erroneous attempts to predict, for example, the next word or sentence in a text. "Fluency bias" also

works. AI tries to write as simply as possible. Biases in AI can remain, and they are difficult to detect. Three methods have been developed to prevent LLM from hallucinating: RAG, reasoning, and iterative query.

Preventing AI Hallucinations

Setting the temperature parameter to 0 can produce more accurate results. Temperature controls the randomness in the model's response generation. A lower temperature means the model can select the most likely words and phrases to produce more predictable and reliable results. This setting is especially valuable for tasks that require factual accuracy and consistency.

Using external data sources for validation can significantly reduce generative errors. It can reference this external data when generating responses, providing the model with relevant and verified information. This approach turns a purely generative task into a simpler retrieval or generalization task based on the provided data. Learning models using domain-specific data improves their accuracy and reduces hallucinations. This process reveals patterns and examples in the model that are relevant to a particular domain or topic. This way, you can align its output with the target domain. This fine-tuning allows the model to generate more contextually relevant and accurate answers. This is important in specialized applications such as medicine, law, or finance.

Hint design plays a key role in mitigating hallucinations. Clear, context-specific cues guide the AI model more effectively. They can reduce AI misconceptions and ambiguities and guide the model to generate relevant and accurate answers. The model is less likely to produce irrelevant or incorrect results.

Retrieval Augmentation Generation (RAG) combines the generative capabilities of LLM with a vector database that acts as a knowledge base. When you enter a query, the model converts it into a semantic vector and retrieves documents with similar vectors. LLM then uses these documents and the original query to generate a more accurate and contextually relevant answer. RAG essentially feeds LLM a form of Long-Term Memory. This allows LLMs to access and integrate external

data. Thought chain cues help LLMs break down multi-step problems into more manageable steps. This improves their ability to solve complex logical problems. This method is enhanced by incorporating examples from a vector database, which provides additional context and examples for the LLM. The answers returned are accurate and include rationale, which is then stored in the vector database to improve future answers.

The iterative query process involves an AI agent that provides iterative interaction between the LLM and the vector database. The agent queries the database with a question, refines the search based on similar questions returned, and then summarizes the answers. If the summarized answer is not satisfactory, the process is repeated. This method, exemplified by Forward-Looking Generated Active Retrieval (FLARE), improves the quality of the final answer by gradually refining the query and answer over multiple iterations.

Integrating mitigation techniques can significantly improve the accuracy and reliability of AI answers. These strategies address the problem of AI hallucinations. The vast majority of machine learning engineers report experiencing issues with production models on a daily or weekly basis. This important statistic highlights the critical need for effective monitoring and control tools to ensure smooth operations. The constraints feature for Amazon Bedrock allows customers to implement security measures based on their application needs and responsible AI policies. Constraints now include contextual validation checks and a new Apply Guardrail API to help build robust generative AI applications.

Customers use the inherent capabilities of base models to provide reasonable (confident) answers based on the company's source data. However, base models can mix different pieces of information, producing incorrect or new information, which impacts the reliability of applications. With contextual confidence checks, the constraints feature can now detect hallucinations in model responses for RAG and conversation-based applications. This protection helps detect and filter out factually incorrect answers based on the reference source that are irrelevant to the us-

er's query. Customers can configure confidence thresholds to filter out answers with low confidence or relevance.

To enable protection of applications using different base models, we have implemented support for the Apply Guardrail constraints API, which enables analysis of user input and model responses for any custom and third-party FM, in addition to those already supported by Amazon Bedrock. Apply Guardrail is now a centralized solution for securing and managing all your generative AI applications.

The constraints feature is a unique solution from a major cloud provider that simultaneously addresses security, privacy, and trustworthiness. Contextual trustworthiness and the Apply Guardrail API are supported in all AWS regions where the Amazon Bedrock constraints feature is supported.

Existing solutions for resolving hallucinations generally require introducing increasingly more detailed instructions so that the model can re-analyze the request using more specific data. This is problematic in cases where the user does not realize that a hallucination has occurred and that the data they are being given is incorrect. A more global solution used by some startups is to completely retrain the models using more refined data. This can be resource-intensive, and again, does not work for hallucinations that are not revealed to developers during testing.

Woodpecker offers a no-training method that corrects hallucinations based on the text the model generates. The system performs AI correction after a thorough diagnosis, which includes, as the developers explain, a total of five stages: extracting the key concept, formulating questions, checking the system's visual knowledge, forming visual statements, and correcting emerging hallucinations.

Each step of the pipeline is transparent and clear, which ensures interpretability, which is valuable for the development of the technology. The stages simply follow one another, checking and correcting any discrepancies between the content of the image and the text generated from it. First, the main objects mentioned in the text are identified.

Then, "Woodpecker" asks questions about the extracted objects, such as their number and attributes. After that, it transforms the question-answer pairs into

a visual base of its knowledge about a specific image, consisting of statements at the object and attribute levels (what is in the picture, what color it is, what action is being performed). "Woodpecker" compares this base with the answers received from the AI. And, using textual edits, it modifies the hallucinations by adding missing features. It does this in formats that AI models can recognize: with specific pixels where something is wrong, as well as the correct color and other relevant features. Woodpecker uses three separate AI models in addition to the MLLM in which it corrects hallucinations. These are GPT-3.5 Turbo, Grounding DINO, and BLIP-2-FlanT5. Together, these AIs act as evaluators, identifying errors and instructing the "test" model how to generate output data in accordance with the updated information.

Diffusion models create new data by iteratively introducing controlled random changes to the original data set. They start with the original data and gradually reduce its similarity to the original by adding minor changes (noise). This noise is carefully controlled to ensure that the generated data retains integrity and realism. After adding noise over several iterations, the diffusion model reverses the process. It gradually removes the noise, resulting in a new data sample that is similar to the original. GAN models train two neural networks in a competitive manner. The first network, known as the generator, creates fake data samples by adding random noise to them. The second network, called the discriminator, tries to distinguish real data from the fake data created by the generator. As the training process progresses, the generator continually improves its ability to create realistic data, and the discriminator gets better at distinguishing real data from fake data.

This adversarial process continues until the generator produces data so convincing that the discriminator cannot distinguish it from real data. GAN models are widely used in problems of realistic image generation, style transfer, and data augmentation. Variation auto coders (VAEs) are trained on a compact representation of the data called a latent space. The latent space is a mathematical representation of the data. It can be thought of as a unique code that represents the data based

on all of its attributes. For example, when learning faces, the latent space contains numbers representing the shape of the eyes, nose, cheekbones, and ears.

VAEs use two neural networks, an encoder and a decoder. The encoder neural network maps the input data to a mean and variance for each dimension of the latent space. It generates a random sample from a Gaussian (normal) distribution. This sample is a point in the latent space and is a compressed, simplified version of the input data. The decoder neural network takes this sample from the latent space and transforms it into data that resembles the original input. Mathematical functions are used to measure how closely the reconstructed data matches the original.

The Transformer-based generative AI model builds on the concept of the VAE encoder and decoder. Transformer-based models add new layers to the encoder to improve performance on text-based tasks, including comprehension, translation, and creative writing. Transformer-based models use a self-attention mechanism. They evaluate the importance of different parts of an input sequence when processing each element of the sequence.

The key feature of these AI models is the implementation of contextual embedding. The encoding of an element of a sequence depends not only on the element itself, but also on its context in the sequence.

Self-attention helps the model focus on the importance of words when processing each of them. In order to convey different types of relationships between words, the Transformer-based generative model uses multiple layers of the encoder, called attention heads. Each head learns to perceive different parts of the input sequence so that the model can account for different aspects of the data at once. Each layer also refines the contextual embeddings. Layers allow the contextual embeddings to become richer and convey different meanings, from grammatical syntax to complex semantics.

The cornerstone of generative AI is deep learning, a type of machine learning that mimics the way the human brain processes data and creates patterns for decision making. Deep learning models use complex architectures known as artifi-

cial neural networks. Such networks include multiple interconnected layers that process and communicate information, mimicking the neurons in the human brain.

One of the most famous moral dilemmas in the world is the “trolley problem,” formulated by philosopher Philippa Foot in the late 1960s: five people are tied to a train track, an oncoming train is about to crush them, and the only way to save them is to switch the switch and send the train down a different track. However, there is also a person tied to the track, albeit one. Of course, there is no right answer to this thought experiment. However, society expects one from artificial intelligence when it comes to the use of self-driving cars.

Ethics in the Age of Big Data

One of the central ethical issues in the use of big data is transparency in data collection and obtaining consent from data subjects. In the digital age, data is collected everywhere - through social media, mobile devices, the Internet of Things and other sources. Often, users are not aware of what data is being collected, how it will be used and by whom. There is a lack of clear information for users about what data is being collected and how it will be used. There is also the use of data without explicit consent, especially in cases where consent is embedded in long and complex user agreements.

The solution is to develop clearer and more transparent consent mechanisms, with a clear explanation of the purposes of data collection and how it will be used. Another solution is to implement informed consent practices, which means that users really understand what they are agreeing to. Big data analysis can lead to decisions that impact people, and in some cases, these decisions can be unfair or discriminatory. Algorithms used to analyze data can unknowingly inherit biases that exist in the source data.

Big data analysis can lead to decisions that impact people, and in some cases, these decisions can be unfair or discriminatory. Algorithms used to analyze data can unknowingly inherit biases that exist in the source data.

Algorithmic discrimination occurs when automated systems make decisions based on biased data. Existing inequalities are magnified when big data is used to make decisions that negatively impact vulnerable groups.

The solution is to conduct regular audits and testing of algorithms to identify and eliminate bias. Another solution is to create ethics committees and working groups that will evaluate and monitor the use of data and algorithms for fairness. In the era of big data, there is a tendency to collect as much information as possible, even if it has no apparent purpose. This creates a risk of data misuse or leakage.

The solution involves using the principle of data minimization. The principle prescribes collecting only the data that is necessary for a specific purpose. Another solution is to implement strict protocols for storing and deleting data to avoid excessive accumulation of information.

Even anonymous data can be used to identify individuals through comparison with other data sets. This poses a serious threat to privacy. The solution is to use more robust methods of anonymization and pseudonymization of data, as well as regularly assessing the risks of anonymization and taking measures to mitigate them.

As the volume of data increases, the risks of its leakage or hacking increase. Hackers can gain access to huge amounts of information, including personal data, which can lead to serious consequences for privacy.

The solution is to implement cyber security technologies, including data encryption and multi-level authentication. Regular updates and testing of security systems play an important role in protecting data from new threats.

The collection and analysis of big data can be used for mass monitoring and surveillance, which raises serious concerns about the invasion of privacy.

The solution is to establish strict legal norms and regulations that limit the use of data for surveillance and monitoring. Protecting individuals' privacy rights by imposing stricter requirements on the use of their data is also important.

Realizing the full potential of big data analytics requires the existence of a big data ecosystem, which in turn includes systems that support and facilitate the collection, analysis, sharing and dissemination of data and information by partici-

pating entities. Human behavior is influenced by many factors that cannot be quantified, predicted or mitigated.

This raises questions about what is reasonably private and what constitutes an unjustified intrusion. There is also a lack of clarity about who exactly owns this new type of data: the individuals or organizations that produce this type of information; those that collect and store it; those that compile, analyze or otherwise add value to this information or acquire it? Or is it society as a whole?

The lack of clarity is compounded by the fact that some laws treat big data as property, while others treat it as information. The ethics of using big data are also unclear, as their analysis may lead to unfair discrimination, limitations in life choices, stereotyping failure to define personal boundaries, unfair judgment or persecution. Research needs to focus on how big data may pose a threat to human interests and values; where these threats may come from; and what their nature is in terms of the destruction of individual integrity and social cohesion.

Most data are not stored in statistical agencies with clearly regulated rules for their use, but in commercial or administrative institutions. Since digital data can be stored forever, ownership may be claimed by unborn relatives whose privacy may be threatened by the disclosure of information about their blood relationship with their ancestors.

Data ethics refers to the moral principles and guidelines that govern the collection, analysis and use of data. It covers a wide range of issues including privacy, consent and responsible use of data in various fields such as data science, statistics and data analytics. As organizations increasingly rely on data-driven decision making, understanding the ethical implications of data use is paramount.

Data privacy is a critical aspect of data ethics. This involves protecting people's personal information from unauthorized access and misuse. Organizations must ensure that they collect data transparently and with the informed consent of individuals. This includes being clear about how the data will be used, stored, and shared, which is important for building trust with stakeholders and complying with legal regulations. Informed consent is a fundamental ethical principle in data col-

lection. It requires that people are fully aware of what they are agreeing to when their data is collected. This means providing clear information about the purpose of data collection, the potential risks, and individuals' rights over their data. Ethical data practices require that consent is not only obtained but also respected throughout the data lifecycle.

Data bias is another major ethical issue in data analysis and data science. Bias can occur at various stages, from data collection to algorithm development, leading to unfair results. It is critical for data scientists to recognize and mitigate bias to ensure their analysis and models are fair and unbiased. This includes using diverse data sources, regularly auditing algorithms, and being aware of the social implications of biased data.

Accountability is a key component of data ethics. Organizations must take responsibility for their data practices and the consequences of their data-driven decisions. This includes being transparent about how they use their data, addressing any ethical violations, and taking steps to prevent future violations. Establishing a culture of accountability helps promote ethical behavior within organizations and builds trust among stakeholders.

Data sharing is common across many industries, but it raises ethical issues around ownership and privacy. Organizations must navigate the complexities of data sharing agreements, ensuring that shared data is used ethically and in accordance with the original consent provided by individuals. Ethical data sharing practices include anonymizing data when possible and being transparent about how shared data will be used. The ethical implications of data use extend beyond individual organizations and into society as a whole.

Data-driven decisions can significantly impact communities, influencing everything from public policy to healthcare outcomes. It is critical for data scientists to consider the broader societal implications of their work and strive to use data for the greater good by promoting social justice and equality.

Ethical data practices are governed by a variety of legal frameworks and ethical standards. Laws such as the General Data Protection Regulation (GDPR) in

Europe set strict rules for data protection and privacy. Organizations must be aware of these rules and ensure compliance with them to avoid legal repercussions and maintain ethical standards in their data practices.

Emerging trends such as artificial intelligence and machine learning introduce new ethical dilemmas, including questions around algorithmic transparency and accountability. Data scientists must remain vigilant and proactive in addressing these issues, constantly adapting their ethical framework to technological advances. Most of the ethical issues related to the circulation of data belonging to citizens arise due to the enormous value of data and the enormous interest of data corporations in it. In order to increase profits, corporations violate human rights when processing citizens' data.

Ethics in Data Science

Ethics in Data Science covers a wide range of issues, from the protection of personal data to the fairness of algorithms. It is important not only to comply with laws and regulations, but also to adhere to moral and ethical principles to ensure that users and the public trust the results of data analysis.

Data privacy is one of the key aspects of ethics in Data Science. Users must be confident that their personal data is protected and will not be used without their consent. This includes protecting data from unauthorized access and ensuring anonymity. It is also important to consider that even anonym data can be de-anonym if there is enough additional information. Data privacy requires the implementation of various technical and organizational measures. For example, data encryption, restricting access to data to authorized users only, and regular security checks. It is also important to inform users about what data is collected, how it will be used, and what measures are taken to protect it.

Consent to use data is an important ethical issue. Users must be informed about how their data will be used and give their consent to this. This is especially important in the context of data collection via the Internet and mobile applications. Consent must be voluntary, informed, and unambiguous. The consent process must

be transparent and understandable for users. This may include providing detailed information about the purposes of data collection, the methods of processing it, and the storage periods. It is also important to give users the opportunity to revoke their consent at any time and delete their data from the system.

Algorithms and models used in Data Science must be fair and not discriminate against certain groups of people. This includes checking models for bias and ensuring that all users are treated equally. Bias in algorithms can arise from uneven data distribution or the wrong choice of metrics to evaluate models.

To ensure fairness and non-discrimination, it is necessary to regularly test and audit models. This may include analyzing data for bias, using de biasing techniques, and engaging independent experts to evaluate models. It is also important to consider social and cultural aspects when developing and implementing algorithms. Transparency and explain ability of algorithms and models are important aspects of ethics. Users and stakeholders should understand how algorithms work and what data they are based on. This helps to avoid misunderstandings and mistrust of the results of data analysis. Transparency also helps to increase the responsibility of developers and users of algorithms.

Various methods can be used to ensure transparency and explain ability, such as data visualization, providing detailed reports on the performance of algorithms, and using interpretable models. It is also important to educate users and stakeholders on the basics of data science and how algorithms work so that they can better understand the results of data analysis.

Data anonym is one of the methods to ensure privacy. It involves removing or changing personal information so that a specific individual cannot be identified. Data anonym helps reduce the risk of privacy breaches and protect users' personal data. There are various methods of data anonym, such as removing identifying information, using pseudonyms, and aggregating data.

It is important to choose an anonym method depending on the specific tasks and requirements. It is also necessary to regularly check the effectiveness of anonym and update the methods if necessary. Regular audits and reviews of algo-

rithms and models help to identify and address bias and other ethical issues. This can include both internal reviews and independent audits. Audits and reviews help ensure that algorithms and models comply with ethical norms and standards.

Various methods and tools can be used to conduct audits and reviews, such as data mining, model testing, and involving independent experts.

It is important to regularly update algorithms and models in accordance with new requirements and standards. Audits and inspections help to create a culture of ethical data use in an organization.

Educating and raising awareness among employees about ethical issues in Data Science are important measures. This helps to create a culture of ethical data use in an organization. Educating employees may include conducting trainings, seminars, and webinars on ethics and data protection. It is important to regularly update employees' knowledge in accordance with new requirements and standards. Raising awareness helps employees better understand ethical issues and make informed decisions when working with data. This helps to increase user and public trust in the results of data analysis.

Using ethical frameworks and standards, such as the GDPR helps to ensure compliance with ethical norms and requirements. This includes both technical and organizational measures. Ethical frameworks and standards help to create uniform rules and principles for working with data.

To ensure compliance with ethical frameworks and standards, it is necessary to implement various measures and procedures. For example, developing and implementing a privacy policy, conducting regular audits and inspections, training employees, and using data anonym methods.

It is also important to regularly update the ethical framework and standards in accordance with new requirements and technologies.

Ethics as a Method of Analysis

Ethics in this case is used not as a system of value judgments “good” or “bad”, but as a method of analysis. It allows you to highlight the problems of

building relationships between the analyst and the data. Ethics shifts the emphasis from criticism of concepts to criticism of these relationships.

Ethics is presented as a way of reflecting not on the correctness of intentions and their consequences, but on the objectivity of the situation. It is important to pay attention to the types of data - that is, what area it belongs to, where the data sets are from.

When an analyst turns something into data, he must understand that data is what is produced. Data ethics begins with respecting people's privacy. Data-driven algorithms can perpetuate biases present in historical data. Understanding and mitigating bias is critical. For example, an AI-based hiring tool that favors certain demographic groups because of biased training data can perpetuate discrimination.

The pursuit of fairness involves assessing disparate impacts. Metrics such as demographic parity, equal chances, and disparate impact factors help assess the fairness of algorithms. A startup developing credit scoring models must ensure fairness across groups. When a startup uses machine learning models to recommend content, accountability ensures that decisions are traceable. Startups should document data flows, model the architecture, and model the decision criteria. Transparency helps users understand how their data impacts the results.

Reliability of Report Data

Reporting is a key element of business, project, and scientific research. It provides information for analysis and informed decision-making. Factuality is a fundamental principle that requires the provision of only factually correct information without distortion and embellishment. It is important to distinguish facts from interpretations. Facts are verifiable and irrefutable data, while interpretations are conclusions that can be drawn from them.

Factuality requires the absence of personal judgment and emotional coloring in the presentation of information. The use of unverified information can lead to incorrect conclusions and decisions. It is necessary to include all necessary information, even if it does not confirm the hypothesis or meet expectations. The ab-

sence of any data can distort the overall picture. It is important to clearly structure the report so that it is easy to read and understand. Use headings, subheadings, lists, tables and graphs to visual the information.

Transparency requires openness in describing the data collection methodology and analytical methods used. This will allow other experts to assess the reliability and validity of the information presented. To ensure an in-depth analysis without embellishment, it is necessary to understand the potential sources of data distortion. These include bias, sampling error, insufficient statistical data and deliberate distortion of information in order to achieve some interests.

Working with data requires responsibility and professionalism, since the final result affects the decisions made. Ask questions, check the data and sources, consider possible alternative explanations and do not be afraid to acknowledge uncertainty. Only in this way can we achieve maximum objectivity and reliability in reporting and factual reporting.

Ethical difficulties can arise during the process of data integration and transformation, and are related to fundamental data management processes, including: limited knowledge of the original source and origin of the data; poor data; unreliable metadata; lack of a documented history of data correction. Requirements for ethical data handling include compliance with applicable laws.

They should cover procedures for collecting, analyzing, and interpreting data, and issues related to improving the efficiency of their use. Components of the strategy should include a statement of values; principles for ethical data handling; a compliance framework; risk assessment; training and communication. Employees must sign a statement that they have studied the code of ethics and are aware of the consequences of unethical data handling.

Tools include wikis, knowledge bases, corporate intranet blogs, and other means of internal communication.

Data Management and Security

Treating data as a valuable asset requires responsible management. Startups should define data ownership, access control, and retention policies. For example, a health tech startup working with patient records should prioritize data security.

Protecting data from hacking and unauthorized access is paramount. Encryption, secure APIs, and regular security audits protect sensitive information. Data ethics extends beyond legal compliance. Startups should consider broader societal impacts. For example, an education tech platform using student data should ensure that its algorithms do not exacerbate educational inequalities.

Data use can have unintended consequences. A ride-sharing startup optimizing routes may inadvertently worsen traffic congestion. Anticipating and addressing such externalities is critical.

Startups should be transparent about how they collect, process, and use user data. When users sign up for a service or share their information, they should receive clear explanations about the purpose of data collection, the types of data collected, and how it will be used. For example, a health app should inform users that it collects location data to provide personalized fitness recommendations.

Transparency is critical when startups use algorithms or machine learning models to make decisions. Users should know when algorithms are influencing their experience (e.g., personalized content recommendations, credit score, or job search). Startups should disclose the factors considered by the algorithms and provide opportunities for appeal or explanation.

In the event of an unfortunate data breach, startups should promptly inform affected users. Transparency ensures that users can take necessary precautions (e.g., change passwords, monitor accounts) and understand the implications of a breach. Startups should establish a clear data governance policy that outlines roles, responsibilities, and decision-making processes related to data. Accountability means consistently enforcing this policy. For example, a startup can appoint a chief data officer (CDO) who is responsible for data ethics and compliance.

When building AI models, startups should consider the ethical implications. Accountability requires monitoring model behavior, eliminating bias, and ensuring fairness. If an AI system unintentionally discriminates against certain groups, a startup should take immediate corrective action.

Startups often partner with third-party data providers or processors. Accountability involves vetting these partners, ensuring they are ethical, and holding them accountable for any mishandling of data.

Informed Consent and Privacy

Informed consent is a fundamental ethical principle that governs the collection, use, and sharing of personal data. It ensures that individuals have a clear understanding of how their data will be processed and gives them the autonomy to make informed decisions. Informed consent means an individual's voluntary agreement to participate in data-related activities. It involves transparency, disclosure, and understanding. Startups should obtain explicit consent before collecting or processing personal data.

Startups should provide clear and concise information about their data processing practices, including the purpose, scope, and potential risks. People should have the opportunity to opt in or out, and consent should be detailed (e.g., separate consent for different purposes). Consent forms should be written in plain language. Individuals can revoke consent at any time.

Privacy is closely related to informed consent. It includes an individual's right to control their personal information. Startups should consider privacy issues when innovating. Startups should incorporate privacy into their product development process. Consider privacy impact assessments, data minimization, and pseudonym. Data anonym protects privacy. Startups use data for unforeseen purposes. Transparency and consent are critical. It is important to consider the impact of artificial intelligence, the Internet of Things, and biometric data on privacy. There are ethical dilemmas associated with the balance between public benefits, such as medical research, and individual privacy rights.

Informed consent and privacy evolve with technology and social norms. Startups that prioritize these principles build trust, foster innovation, and contribute to a more ethical data ecosystem.

Mitigating Bias

Bias can creep into data and models at the data collection stage. It can be biased sampling or underrepresentation of certain groups. It can arise at the feature selection stage through the inclusion of discriminatory features. It can come from algorithmic design that uses biased training data or biased model goals.

Mitigating bias is done through pre-processing of the dataset. It is also done through algorithmic fairness. This involves modifying algorithms and adjusting model predictions to achieve fairness. This places an emphasis on fairness and accuracy. Achieving perfect fairness is often at odds with accuracy. Finding the right balance is not easy. Data minimization is the practice of collecting, processing, and storing only the data needed to achieve a specific goal. Startups are often tempted to collect huge amounts of data, believing that more data means better insights. However, this approach can lead to a number of problems:

Collecting too much data increases the risk of privacy breaches. The more data, the more attractive a startup becomes to attackers looking to exploit vulnerabilities. Storing and managing large data sets can be expensive and resource-intensive. Startups should focus on collecting only what is needed for their core business functions.

Data protection regulations place a strong emphasis on data minimization. Failure to do so can result in large fines. Effective data retention policies strike a delicate balance between preserving data for operational purposes and minimizing risk. Some data becomes irrelevant over time, so it is important to regularly review the data you collect. This involves data lifecycle management, which sets out clear steps for collection, processing, storage, and deletion for each type of data.

It is important to obtain informed consent from users regarding data collection and storage methods. It is also important to use tools to automatically delete

data when it is no longer needed. By minimizing data and adopting smart retention policies, startups can thrive while respecting privacy and legal boundaries.

Data Security and Protection

Ensuring data privacy and integrity involves strong encryption mechanisms. Startups must decide on encryption algorithms, key management, and secure data transfer protocols. Choosing the right encryption method impacts both performance and data protection. Privacy considerations should be built into the product development lifecycle. Startups should proactively address privacy risks by minimizing data collection and storage. Startups can use pseudonym, anonym and target limitation principles.

Startups face threats from cybercriminals, insider attacks, and accidental data breaches. Anomaly detection and rapid response are critical. It is important to combine proactive intrusion monitoring with incident response through breach containment. Startups often rely on third-party providers, such as cloud hosting and payment gateways. Assessing their security practices is critical. Due diligence involves assessing vendor security policies, data handling practices, and compliance.

Startups can benefit from ethical hacking, particularly white hat testing, to identify vulnerabilities before attackers can exploit them. Collaborating with ethical hackers helps identify weaknesses in systems, applications, and APIs. Developing ethical data ecosystems is important. Collaboration between data scientists, legal, ethical, and business stakeholders ensures a holistic approach to data ethics.

Ethical Principles of Decision Making

The utilitarian approach aims to maximize overall happiness and well-being. Decisions are evaluated based on their impact on the greatest number of people. Deontological ethics emphasizes adherence to moral rules and duties. Actions are evaluated based on their alignment with ethical principles, regardless of the consequences. Virtue ethics focuses on character traits and virtues. Decisions are driven by qualities such as honesty, empathy, and integrity. Rights-based ethics is based

on respect for individual rights and freedoms. Decisions are assessed in light of their impact on fundamental rights.

Rights-based ethics is based on respect for individual rights and freedoms. Decisions are assessed based on their impact on fundamental rights. Pragmatism emphasizes practical solutions. Decisions are made based on what works best in a given context. Data is different from information. Information can be presented not only as data, but also as other information. Big data of the Internet of Things contains standardized signals coming from sensors of smart devices. Open data refers to information posted on the Internet in the form of systematized data, organized in a format that allows its automatic processing without prior human modification for the purpose of repeated, free and unrestricted use.

Data science describes how to automatically extract information from data through analysis, and includes a range of technologies - from finding patterns using traditional analytics methods to predictive technologies based on machine learning. One of the data problems generated by digital technologies is the issue of depersonalization of medical data. Anonym involves actions that remove the link between a set of identifying data and the data subject.

Pseudonym means depersonalization with the addition of a link between a set of depersonalized data and one or more pseudonyms. The main ethical dilemma is the choice between observing the rights of a citizen, the interests of social groups, society, the state, on the one hand, and creating new products, services, opportunities directly or indirectly related to the use of data.

The maximum number of risks arise when collecting, analyzing and using the results of analyzing people's data, and these risks are concentrated in three areas: data processing using AI, video surveillance, and online surveillance. The most widespread risk is a violation of privacy.

Thanks to the collection and analysis of big data using AI, technology giants are able to build correlations that a person cannot yet understand. Complete data, even if they are conditionally depersonalized, can indicate a specific person, their

relatives and profession. Data integrity is critical to the successful development of intelligent systems, but it is potentially dangerous for privacy and human rights.

Therefore, practical data use cases with examples of business practices, decisions and actions of code participants aimed at the safe handling of information play an important role.

Data has no concept of moral standards. There is no good data or bad data. It just exists. The difference is determined by human choice. This is the essence of data ethics. Most of the relevant relationships are in the gray area. This is largely due to the fact that the relevant legal norms have not yet been defined.

Reliable Data Protection Methods

Most often, users use passwords without two-factor authentication. But when there is an alternative, they prefer biometrics, because they consider it the most reliable method of protection. Each person has unique fingerprints, so fingerprints are often used in smartphones, mobile applications and banking systems. Recognition technology identifies a person by the structure of his or her face.

The pattern of the retina is unique to each person. This type of biometric key is more common in government agencies, banks, and other highly secure businesses. The pitch and timbre of the voice help identify the user. This type of biometrics is most often used in voice assistants. Biometric signature identification contains information about hand movement. To record this data, you need to use a special pen and a pressure-sensitive surface.

Smartphones, tablets, and laptops often use biometric data to unlock. Concerns about biometrics focus on privacy; informed consent; and the risk of unauthorized use. People worry about storing their data because they want to control it.

Types of Privacy

Bodily privacy is related to the human body. Wearing clothes to hide certain parts of the body, using sanitary rooms to satisfy physiological needs, and protecting yourself from unwanted touching and violence are related to bodily privacy.

Spatial privacy concerns the territory of personal space. It could be a house, an apartment, a personal locker or a car. No one has the right to invade a person's personal space. This is guaranteed not only by national laws, but also by the Universal Declaration of Human Rights.

Communication privacy protects the secrecy of mail, telephone conversations, electronic correspondence and other means of communication. Information privacy is associated with the concepts of honor, dignity and their impact on life. The right to liberty and security of person is one of the fundamental human rights guaranteed by international legal acts on human rights.

Guarantees are provided by Article 9 of the International Covenant on Civil and Political Rights, adopted in New York on 16.12.1966 and Article 5 of the Council of Europe Convention No. 5 "For the Protection of Human Rights and Fundamental Freedoms (ETS No. 5)", concluded in Rome on 04.11.1950.

Digital Footprint

A digital footprint is information that remains on the Internet or computer systems as a result of human actions. There are two types of digital footprint: active and passive digital footprint.

An active digital footprint consists of information that a user publishes online on their own initiative. These are posts on social networks, applications for participation in competitions, completed forms and questionnaires.

A passive digital footprint contains information that is collected by websites, applications or "smart" devices. This may include personal data (name, age, gender); behavioral data (search history, pages viewed); financial data (purchase history, bank card information); geo location information (location, IP address); technical data (device type, operating system).

By analyzing user actions on the Internet, you can influence their behavior, offer them services and products that they actually need. Such data is used by companies to better target (address) advertising, as well as to collect analytics needed for decision-making.

The most common way to collect information about users is through cookies. This is the name of a tool that allows website owners to track activity on their pages. They record what actions the user has performed and what settings they have set. If a user logs into an account through a social network account, the website owner sees not an anonymous visitor, but a specific person with a set of personal information.

This information can be used to personalize the content that the user sees. Consent to the processing of cookies is voluntary, and the user can refuse it. But in reality, many sites stop working correctly if you refuse to use cookies, because their transmission speeds up authorization, saves personal page settings.

There are other ways to track online activity through permissions that users give to mobile applications. Applications most often transmit information about the user's location. Such information helps advertisers target ads more accurately. Applications can receive information about the history of online orders and searches, as well as financial transactions. More than 15 billion Internet of Things devices are already operating in the global network, which the user can control through the global network.

They aggregate information about their owner and their user habits. Therefore, a fitness tracker knows everything about a person's health and location, and smart home devices know about the owner's daily routine: when and how deeply he sleeps, in which park he runs, at what time he leaves for work and returns from it. Users can leave traces most often in social networks, music and search applications, and the least often in delivery services.

Some data is generated immediately after a person opens an application, while others are generated during use. This may include a name, bank card details, address and contact list. On average, each of these types of data is used by seven applications. In the US, more than 500 companies sell user data available on the Internet. The largest data broker

Acxiom stores information on more than 2.5 billion people from 62 countries and its data is used for marketing purposes by the largest social networks. It

and several other large data brokers are criticized for their lack of transparency. One of the main complaints is that such companies are not interested in interacting with the people whose data they collect and sell. The main problem that can arise when collecting information about a user is a violation of privacy and unauthorized access to personal information. If the security measures of the company collecting the information are insufficient, the data can be stolen or compromised.

Data collection can be used to create user profiles and potentially discriminate, manipulate people's choices and behavior, for example through intrusive advertising. Users can also suffer financial losses if sensitive information ends up in the hands of fraudsters. The psychological consequences of losing a sense of privacy should not be underestimated either. It is important for companies collecting user information to use encryption, multi-level authentication to access data, and conduct regular security audits.

Companies have invented data management methodologies that have consistently proven their reliability. A lot of time and effort is spent to instill in each new employee an understanding of the risks associated with leaks and to explain the basic rules of digital hygiene. This gives excellent results in combination with a tool such as the “second key”: when being a top Google manager is not enough to access data, two or more employees must be present in the office who are required to confirm each other's rights for certain operations.

It is also important for the user to take care of the safety of sensitive information about themselves. This involves using complex and unique passwords, enabling two-factor authentication, regularly updating software, carefully sharing personal information publicly, deleting browser history and clearing cookies.

It is also better to delete old accounts and posts on social networks that can cause harm today.

The spread of a digital trace can be influenced. About a hundred countries in the world have adopted laws on data protection and privacy. For example, one of the strictest and most comprehensive data protection laws is the GDPR (General Data Protection Regulation), which is in effect in the European Union. Thanks to

the GDPR, the processing of user data has become more transparent, it is now easier to unsubscribe from unwanted emails and subscriptions that are no longer relevant, and to prohibit companies from using personal data without permission.

It is easy to file a complaint for violations of the law. This can be done at your place of residence, work, or the place of the violation.

Browsers can be set to regularly delete traces if you clean cookies and browsing history. Browser extensions such as uBlock Origin and Privacy Badger help block trackers and ads that collect user data. Delete Me services help delete user information from various online sources. It is almost impossible to completely erase a digital footprint, but you can significantly reduce its size and impact on your privacy.

Digital Shadow

A digital shadow refers to a category of personal data that a person does not control the distribution of. Another definition of this term is used in engineering. A digital shadow is created based on data obtained from an object that is already in operation. The data is supplied by sensors. As a result, Big Data is formed, which must be stored and processed, that is, to extract meaningful data in order to determine the state of the object and to be able to analyze its operation in various modes in the long term.

The concept of digital twins was proposed in 2002 by Michael Greaves, a professor at the University of Michigan. A digital twin as a technology allows you to enter the development stage when the product does not yet exist. At the same time, it is possible to take into account all its functional, technical, cost, environmental and other requirements and characteristics. This is extremely important, because it is at the development stage that the competitive advantages of the future product are laid down.

The result of digitalization will be the widespread use of digital models of real objects (digital twins), the quality of which will completely determine the competitiveness of a particular economic structure. For this reason, all data on the

digital twin automatically becomes a commercial secret. In such a situation, external researchers can only analyze the visible manifestations of doubles - digital traces, fingerprints and shadows.

AI and Data

Artificial intelligence is an engineering development that aims to create an analogue of human consciousness in the format of thinking (intelligence). Why this format was chosen, because through logic it is formalized into the language of mathematical logic and inference rules, as well as into logical operations, which became the basis for information technology and computer science (information theory). The development of computer programs with features of artificial intelligence is based on the principle of feedback and dialogue of a computer program with clients of social networks.

The digital language of a computer program is associated with the syntax, semantics and pragmatics of natural languages thanks to the achievements of semiotics (the science of sign systems). One of the features of artificial intelligence is feedback. It shows how adequately a specific computer program conducts a dialogue in the form of a question and answer and whether it is capable of independent learning through machine learning. Computer programs with the functions of weak and strong artificial intelligence are integrated into technical devices and technical complexes. This can be a machine with numerical software.

These can be robots, autonomous aircraft and taxis without a driver. Within the framework of the systemic approach, the Internet of Things strategy and such areas as big data and machine learning are implemented.

In the energy and industry, automated systems for collecting, processing, storing data and making decisions are used. A person is present in these systems as an operator. The features of human-machine interaction in professional conditions are studied by ergonomics and engineering psychology. Data processing and control centers for technical parameters of systems, as well as timely payment by customers for services (single centers for calculating and controlling the payment of

utilities, electricity and water) have been created. For these purposes, the digital periphery of sensors and meters is used.

In digital logistics, marketing and management, voice assistants, consultants, virtual influencers are used, who carry out a dialogue with current and potential clients, prepare decisions through data and information processing, and implement advertising strategies in the field of trade.

For these purposes, neural networks, deep machine learning, pattern recognition, expert systems are used. The trend has become the convergence of classic and digital devices and technologies. This is evident in the technological evolution of mobile phones. They have become multifunctional devices for communication, banking, photography, television, libraries, show industry, operational access to transport, logistics and tourism services, search engines.

There is a special area of using artificial intelligence in systems engineering. It is associated with the strategies of the fourth industrial revolution called "Industry 4.0", "Industry 5.0" and "smart industry". Digital transformations are taking place in logistics and marketing, as well as in corporate structures. Their result was the economy of digital platforms, digital ecosystems and metaverses.

Another area of development of artificial intelligence technologies has become the development of invasive and non-invasive neural interfaces. These devices play an important role in restoring the coordination of patients after a stroke, and they are also important for people whose brains are affected by Alzheimer's disease. Neural interfaces are used by managers to quickly respond to business information. Whatever characteristics are used under the term "artificial intelligence" in the strict sense of the word, we are still talking about computer programs that can imitate individual features of human consciousness, mainly in terms of logical thinking. Real risks for people will come from artificial intelligence when developers reach the point of technological singularity. This is the point of no return to previous models of human-machine interaction.

At present, artificial intelligence developers are focused on upgrading its digital periphery not only in the form of sensors, but also computer vision, as well

as virtual and augmented reality. These technologies are especially in demand in the gaming industry and in the space of metaverses.

Artificial intelligence technology involves hardware in the form of special equipment that creates conditions for communication, an operating system and an application software system. These systems make the computer a functional device integrated with the hardware of server centers and digital ecosystems. In the engineering profession, artificial intelligence technologies such as natural language processing and machine learning are used to automatically extract requirements from text sources such as documentation, user feedback, and social media.

This reduces the time required to manually define and analyze requirements and improves the accuracy and completeness of the requirements collected.

Artificial intelligence techniques such as generative adversarial networks and reinforcement learning are used to automatically create system models based on high-level specifications. This reduces the time required to manually create models and increases the level of abstraction and generality of the models created.

Rule-based expert systems and machine learning algorithms are used to automatically check models against requirements and identify potential problems and anomalies. This reduces the time required to perform manual verification tasks and improves the accuracy and reliability of the verification results obtained.

Deep reinforcement learning is used to train autonomous agents to make decisions in complex and uncertain environments. This is useful in safety-critical systems where timely and accurate decision making is essential to prevent hazards and accidents. Artificial intelligence has automated requirements analysis, model creation, and validation, allowing engineers to focus on the more complex and creative aspects of system design. This has resulted in more reliable systems and a reduced risk of errors and defects.

Artificial intelligence helps engineers make more informed decisions by analyzing large amounts of data and identifying patterns and trends that are difficult to detect. This helps engineers avoid costly errors and rework. This allows systems to better handle unexpected situations and adapt to changing conditions.

The accuracy and completeness of the data used for modeling is critical because different models and simulations may be based on incomplete or inconsistent data. This can lead to inaccurate predictions and unreliable results. As systems become more complex, the amount of data required for modeling and simulation increases exponentially. This can make it difficult to effectively manage and process large amounts of data. It can be difficult to understand and interpret the results of models and simulations.

There is currently a lack of standardization in AI modeling. This means that different AI tools and systems may use different approaches to modeling and simulation, making it difficult to compare results and ensure consistency across systems. As a result, integrating AI tools and systems into existing workflows can be challenging. This requires expertise in integrating different tools.

AI technology can raise ethical and security issues. AI systems can be biased, discriminatory, and vulnerable to cybernetic attacks. AI tools and systems are only as good as the people who develop and use them.

Natural language processing techniques are used to extract requirements from text sources such as contracts, regulations, and standards, and then automatically map them into system models. Simulation modeling with machine learning algorithms is used to automatically create and optimize system models based on input data such as performance metrics, environmental conditions, and user feedback. To ensure that AI tools integrate into existing workflows, standard interfaces and data formats are established for exchanging information between different systems. This ensures the consistency of the results generated by AI.

To ensure that machine learning algorithms are trained effectively, priority is given to collecting and managing high-quality data on system requirements, designs, and performance metrics, as well as establishing clear guidelines and standards for collecting and sharing data.

To address the ethical and legal challenges associated with the use of AI, priority is given to the explainability and transparency of the results generated by AI. Techniques such as model interpretability and explainable AI are used. Ensuring

ing that AI models are developed and validated using ethical and transparent methods is implemented.

AI tools are designed to complement human decision making, not replace it. In this situation, it is important for engineers and designers to develop the skills and knowledge needed to work effectively with AI tools.

The software provides support for predictive analytics to minimize rework, optimize costs and performance, and enable data-driven decision making. It also provides a process for automatically generating test cases based on system requirements, which helps identify potential errors in requirements and ensures the completeness and accuracy of requirements and their generation.

The process of analyzing the quality of requirements, which is a painstaking task for specialists that requires experience and attention to detail, is simplified. Potential errors and inconsistencies in requirements are automatically identified.

To ensure compliance with the development project, it is essential to adhere to industry standards. Artificial intelligence technologies recommend appropriate standards for the system to which it must comply, depending on the specific industry. A certain infrastructure of engineering specialties is associated with ensuring the operation of intelligent systems. An intelligent system is understood as a computer system that is capable of learning new types of activities, able to find solutions to problems not only using predetermined solution methods, but also by setting problems, including in cases where they are not clearly formulated.

Intelligent systems are the subject of a scientific discipline called "Artificial Intelligence". The subject of its research are models, tools and methods for designing intelligent systems. Professional competencies of digital engineers include knowledge and skills in the field of system analysis and problem setting, specification of algorithms, formalization of information and knowledge, programming and debugging of programs as part of a complex system, organization of production, operation and modernization of intelligent systems for various purposes, implementation of experimental research in the field of artificial intelligence.

The objects of professional activity of a systems engineer are computer and information systems; software and hardware and software and hardware complexes; technologies for designing information systems for various purposes; intelligent systems. The following are associated with intelligent systems: software engineer, research engineer for the implementation of new equipment and technology, commissioning and testing engineer, technical supervision engineer, information security engineer, business analyst, systems analyst, software support specialist, software testing specialist.

Social Philosophy and Data

Social philosophy (philosophy of society, sociology) studies the structure and dynamics of society based on a systems approach and subject areas. These areas are related to the topics of axiology, political philosophy, comparative philosophy, philosophy of history, philosophy of culture. They also focus on the topics of philosophy of law, philosophy of religion, philosophy of technology, futurology, economic philosophy, aesthetics and ethics.

The theoretical level of social philosophy (sociology) was developed by Plato, Aristotle, Hobbes, Locke, Smith and Rousseau. A new stage of theoretical research was actualized by Comte, Durkheim, Simmel, Weber, Spencer, representatives of Marxism and neo-Marxism, pragmatism, structuralism, postmodernism, philosophy of life and existentialism.

The empirical level of social philosophy was developed by representatives of positivism, who stood on the positions of empiricism. The main methods of sociological research were observation, survey and interviewing. Mathematical methods and computer technologies are used to process data. The empirical base also includes data from demography, history, law and economics, as well as cultural anthropology and ethnography.

The main task of social philosophy is to study the dynamic equilibrium of society as a dynamic diversity of humanity with its characteristic institutions, activities, communication and interaction with the biosphere.

Structurally, society is represented by the population, its characteristic forms of social activity in the form of activity, communication and business relations. Society is also represented by social institutions of the state, law, morality, science, religion, family, economics and the geographical environment, which is part of human economic activity. Society is an open system since it consumes the natural resources it needs from the biosphere and returns these resources back to the biosphere in the form of waste. For a long time, the issue of the dynamic equilibrium of society was not discussed. It became relevant in the twentieth century, when the topic of ecology became central.

Society has a base (social being) and a superstructure. The economic basis of production acts as a base. The material goods created in the conditions of a market economy become commodities. These goods have consumer and exchange value. This means that any product has a monetary equivalent. The manufacturer seeks to sell the product in order to make a profit in the form of money.

This money goes to the wage fund, to tax deductions to the state budget, to depreciation and modernization of technological processes. Working time has a monetary equivalent in the form of wages. Having received wages, the employee gets the opportunity to satisfy his personal needs and pay for the services of municipal and village utilities. Wages go to the family budget, where they are redistributed to the needs of all its members.

The superstructure of society is represented by civil society with historical features of social stratification and class structure. The main source of income for civil society is economic activity, which is represented by the institutions of entrepreneurship and hired labor.

The superstructure is also represented by institutions of state power closely connected with the institutions of law. The main source of existence of these institutions are tax deductions, customs and border fees, transit payments, legal services. Another source of income is state enterprises and companies that produce and sell goods. It is important for any state that the expenditure side of the budget is proportionate to the expenditure side of the budget.

The content of the superstructure is also formed by institutions of public consciousness. Among them is religion, which performs the function of cultural tradition. In Belarus, this function is performed by Christianity of the Eastern and Western rites. Every society has spiritual features that are associated not only with religion, but also with folk culture. Belarus is no exception.

Philosophers, sociologists, political scientists, lawyers and economists are interested in issues of systemic stability of society (structuralism), the connection of society with its cultural heritage (hermeneutics). Also relevant are issues of the relationship between individual existence and social dynamics (personalism, psychoanalysis and existentialism), gender issues (feminism).

The term "society" at the applied level of consideration is used to denote local and historical features of civilizations, nations, national cultures with their inherent archetypes and mentality. At the level of civil society, this term refers to civil initiatives to provide social and medical assistance free of charge (Red Cross Society, charitable organizations, volunteer movement).

These may be associations of hunters and fishermen, designers, ecologists. This term is also used in economic activity, for example, a limited liability company, open and closed joint-stock companies.

The dynamic balance of society is affected by crises and wars. They accompany society and manifest themselves in the form of great destruction, loss of life, degradation of economic activity. The most severe consequences remain conflicts of civilizations, which are accompanied by regional and world wars.

Belarus, against its will, constantly found itself in the epicenter of the clash of civilizations and suffered great human losses from external threats. The Second World War was characterized by the greatest cruelty. During the occupation of the country's territory in 1941-1944, the German occupiers carried out a strategy of genocide of the Belarusian people. Social philosophy analyzes the role of internal contradictions that create risks for the dynamic equilibrium of the dynamic diversity of humanity. Often, due to conflict confrontations, humanity loses sight of the

deterioration of the global environmental situation caused by the anthropogenic impact of industrial activity of humanity on the biosphere.

Data and philosophy of economics

If economic philosophy is based on the principle of economic determinism, then it considers economic processes as basic in relation to civil society, political institutions, institutions of spiritual culture and the state of the biosphere. From the fact of the economic power of the state, its geopolitical dominance in the system of international relations follows.

If economic philosophy is based on the principle of spiritual determinism, then following M. Weber, it recognizes the leading role in the organization of effective economic activity of society of religion, for example, the Protestant work ethic and the related philosophy of pragmatism.

If economic philosophy is based on the principle of dominance of institutional structures (institutionalism), then it believes that effective economic activity is formed by institutions of routine, social evolution and modernization.

If economic philosophy is based on the principles of the natural course of economic history, then it believes that the natural course of history cannot be the subject of criticism. It is necessary to be able to work in the economic system that has formed naturally and may contain components of poverty, unemployment, vagrancy, slave trade, social conflicts, and crisis phenomena that are difficult for the population. Slave-owning and feudal traditional societies contained similar components. Capitalist industrial society also contains similar components.

If economic and related political philosophy give preference to the criterion of social justice (Marxism), then according to the scenario of this philosophy, the history of unjust formations should end with the efforts of humanity itself on capitalism. If economic philosophy is based on environmental priorities, then it gives priority not to the natural evolution of the economic system of humanity, but to the need to transform this system to the detriment of current commercial benefits and

the rise in the cost of living of the population. This strategy for adjusting the economic system of activity is designated as the green agenda.

If economic philosophy is based on the principle of technological determinism (T. Veblen), then it proposes to transfer the management of production processes to engineers and managers with an engineering education. These people are called technocracy. In the system of economic management, technocrats are valued for the fact that they give priority to ensuring the sustainable functioning of industrial, municipal and transport infrastructure and maintaining technological discipline. Their role is especially great during periods of political uncertainty associated with the change of governments and the dissolution of parliament.

But technocrats can be criticized for an instrumental attitude to social processes and for distancing themselves from political events, as well as for underestimating the green agenda. According to economic determinism, any society has an economic basis (social existence). It is represented by economic institutions of activity in the spheres of agricultural and industrial production, energy, construction, utilities, finance, marketing, logistics and management.

Economic philosophy studies society from the point of view of the international division of labor that forms its basis. This philosophy is also interested in market factors of self-organization, self-regulation of the economy and its possible alternatives. A similar analysis was carried out in the fundamental publication called "Capital" by K. Marx. He identified such a concept as a mode of production. He specified it with the concepts of the productive forces of society and production relations between people.

The productive forces of society are represented by labor force (human capital) and the means of production. The means of production include the subject of labor (raw materials, semi-finished products), tools (equipment) and the product of labor. In a market economy, the product of labor must be a commodity. This means that it must have consumer and exchange value. These values are the basis of its usefulness for a potential buyer and the basis for receiving monetary income from

its sale. This income forms the employee's wage fund and the enterprise's profit, which is used for technological modernization and tax deductions.

Production relations between people have legal, technological and psychological aspects. Legal relations indicate entrepreneurial forms of ownership that create jobs and guarantee employment of the working population. The state can also act as an employer.

Technological relations between people imply possession of professional competencies, executive discipline and subordination within the framework of horizontal and vertical job responsibilities. Within the framework of professional competencies, an important role is played by the factor of professional growth and the corresponding qualifications, including specialized and higher education.

Psychological relations between people in production processes involve taking into account such concepts as the microclimate in the team, the resolution of labor disputes with the participation of trade unions, human relations and human needs (A. Maslow).

Digitalization of economic activity has created grounds for discussing the problems of the digital economy. In this context, the subject of philosophical understanding has become the strategies for the development of digital energy, the industrial Internet (Industry 4.0 and Industry 5.0), digital marketing, digital logistics and the financial sector. The topic of behavioral economics is actively studied, since it is related to the philosophy of consciousness. At the management level, the prospects for the transformation of business processes due to the formation of the digital platform economy are studied. The subject of study was the institutional environment of economic activity. Social aspects of new forms of remote work are studied. They required a legal interpretation of new forms of employment.

The strategy called "Industry 4.0" was initiated in the Federal Republic of Germany (FRG). It involved the introduction of digital technologies in energy and industry based on a systems approach. The main components of the industrial Internet were additive technologies, the Internet of Things, big data, cyber-physical systems, robotic systems, digital logistics and digital marketing.

The goal of the new strategy was to form a digital platform economy. Thanks to this methodology, large companies were formed that owned digital platforms, on the basis of which effective interaction between production, banking, marketing and consumer structures was organized based on digital network technologies. As a result, companies that owned digital platforms became intermediaries in the commercial dialogue between producers and consumers. A large bank, a cellular company, a trading company that owns a network of marketplaces can own a digital platform.

As the systems approach was implemented in the form of concentrating the entire range of goods and services on one digital platform, the technological functioning of digital ecosystems became possible. These ecosystems function in feedback mode through access to the user's mobile phone. They promptly respond to users' search queries and offer advertising, a range of products and a list of services through applications, which is not limited to the niche of food and industrial goods. Services include tourism, cultural programs, and organization of leisure time.

Another level of implementation of the systems approach to the economic space has become the use of digital platforms of metaverses, as well as virtual, augmented, hybrid and mixed reality technologies. Access to virtual reality services is provided by industrial production of a special headset. The combination of physical and virtual reality in the formats of augmented, hybrid and mixed reality is used in vocational training programs and in professional activities.

Economic criteria for efficient consumption of resources and efficient organization have formed the strategy of the smart industry, within the framework of which projects of a smart city, smart home, smart apartment, and smart household appliances have been implemented. The use of chat bots plays an important role in management and business administration.

A systems approach has been implemented to the labor market through the functioning of digital employment exchanges. Companies prefer remote forms of employment of workers. Epidemiological factors played a role in the formation of

this strategy in the labor market. The characteristics of digital generations became the basis for the formation of freelance practices.

The natural and social local ecosystem in the conditions of high dynamics of industrial development begins to accumulate internal problems related to ecology, social stratification and social mobility. The consequences of the problems are pollution, poor air and water environment indicators, crime and vulnerability of the labor market.

Industrial industrial centers under the influence of changing technological structures find themselves in a situation of deindustrialization (reduction or closure of production), which negatively affects employment and contributes to the formation of criminal clans engaged in activities in the shadow economy. Basically, criminal clans control drug trafficking and industrial urban slave trade.

Uncertainty and risks occur in professional activities. Synergetic will help a future specialist to work in such conditions. Logic as a section of philosophy plays an important role in decision-making, building arguments, writing a business plan. It is used in artificial intelligence technologies in mathematical modification. For students of design specialties, aesthetics is relevant. Communication competencies are formed by the ethics of business relations and digital ethics. Philosophy forms the skills of resolving conflict situations based on dialogue and dialectics.

In professional activities and in social networks, the role of security philosophy is growing. This is due to the growing role of digital technologies and the risks associated with them. Political philosophy gives a picture of world dynamics through the concepts of global turbulence, sovereignty and national security.

Futurology plays an important role in the formation of strategic management skills in the context of a growing number of risks and uncertainty in the context of solving problems of complex logistics. The role of philosophy in the formation of professional skills of scientific and innovative activities is great. The methodology of scientific research and the philosophy of technology are focused on this task.

Data and Philosophy

The term "philosophy" was introduced by Pythagoras. The subject of philosophy became the patterns of functioning and development of nature, man, man-made culture and the joint evolution of the biosphere and technological sphere within the Earth. At the beginning of the 21st century, humanity is still within the Earth, so the subject of philosophy is closely related to ecology, sustainable development of civilization, and its dynamic equilibrium.

Philosophy as a platform for the intellectual culture of humanity was formed by thinkers of the Mediterranean, South Asia and the Far East, primarily the ancient Greeks. It was based on logical thinking and had a rational basis. In its original form, the subject of philosophy included topics inherent in modern mathematics, natural sciences, humanities and social sciences. The first philosophers of the Mediterranean were mathematicians and representatives of natural science.

This topic was designated as natural philosophical topic. In modern times, experimental philosophy became its applied part. It was associated with physics and natural scientific materialism. Famous philosophers and mathematicians included Thales, Pythagoras, Descartes, Pascal, Leibniz and Newton. Famous philosophers and physicists included Heraclitus, Leucippus, Democritus, Zeno of Elea, Aristotle, Descartes, Pascal and Newton.

Protagoras, Socrates, Plato and Aristotle formed the subject matter of the humanitarian and social sections of philosophy. The applied focus of these sections is associated with anthropology, logic, ethics and political philosophy.

Fundamental and applied sections of philosophy were already established in ancient times. The fundamental sections of philosophy (metaphysics) include ontology, anthropology and philosophy of consciousness, cognitive philosophy, social philosophy and philosophy of history.

Ontology has built a categorical apparatus that concretizes the subject field of material (physical, natural, cultural) and non-material (virtual) reality. In this context, the categories of being, substance, matter, space and time, movement, in-

teraction and information are used. Theories of linear (dialectics) and nonlinear (synergetics) dynamics of natural and social systems have been developed.

Applied modifications of ontology are the philosophy of nature, the philosophy of culture, subject ontology, which is used in digital twin modeling technologies and environmental philosophy with its green economy, green energy and circular economy projects.

Philosophical anthropology studies humanitarian topics related to the phenomenon of man as a generic being. Through categorical structures, including anthropocentrism, humanism, anthropological and social genesis, gender, extended man and cyborg, the value topics and risks of technological progress for man, associated with the implementation of the international transhumanism movement, are discussed. The subject of consideration at the individual level of man as an individual are the current topics of life and death immortality and corporeality. The applied topics of philosophical anthropology are formed by cultural anthropology, philosophy of cyborgs, philosophy of feminism, digital anthropology, visual digital anthropology and digital ethnography.

The topics of the philosophy of man include the philosophy of consciousness, logic and philosophy of language, since speech and thought culture is part of man. This substantive part includes the worldview of man (semantics of consciousness). The topic of consciousness is one of the most relevant for philosophy and one of the most difficult. This difficulty is called the hard problem of consciousness. It was formulated by R. Descartes and is still being solved. In practical terms, the solution to this problem is relevant for developers of artificial intelligence technologies.

Cognitive philosophy (gnoseology and epistemology) studies the culture of cognition inherent in man, in which various modifications of cognitive activity have been formed from the point of view of the criteria of clarity, accuracy, evidence, validity and consistency. Science meets these criteria to the greatest extent.

At the applied level, it is the subject of study of the philosophy and methodology of science. In an even more specific applied application, we are talking about

the methodology of scientific research, the methodology of dissertation research and the methodology for implementing innovative activities within the framework of R & D.

The methodology of scientific research is focused on the reconstruction of the main stages and components accompanying the writing of a term paper, diploma project, master's and candidate's dissertation.

A special topic of cognitive philosophy is the reliability of data and information. This topic is generated by the rapid development of digital civilization and the use of fake technologies by social engineers. As a result, the philosophy of information cybernetic security has become relevant in applied terms.

The subject matter of the philosophy of society is realized by social philosophy, which studies the structure of society, and the philosophy of history, which studies the linear and nonlinear dynamics of society based on the categories of the past, present and future (futurology). Applied modifications of social philosophy are axiology, political philosophy, sociology, philosophy of culture, philosophy of law, philosophy of technology, economic philosophy, aesthetics and ethics.

"Sociology" is an applied modification of social philosophy. It is focused on the study of the social structure of society, social groups and social management. This is an empirical modification of philosophy, which actively studies public opinion and its dynamics using special methods of questionnaires and mathematical processing of questionnaire data.

"Political science" is an applied modification of social philosophy. It studies the features of the formation and functioning of such an institution of society as the state and the associated forms of political dialogue and political representation in government bodies.

"Philosophy of Law" studies the features of legal consciousness, lawmaking and the application of law in the social tradition. "Economic Philosophy" studies the impact of economic determinism on society. It takes into account the specifics of human economic activity in different civilizations and formations, which is relevant in the context of accelerating social dynamics. Since man does not live by

bread alone, such an applied section called "philosophy of religion" studies the role of national and world religions in the social dynamics and evolution of society. These are important issues of religious tolerance.

At the same time, state law clearly stipulates the norms within which religious organizations should operate. "Philosophy of Technology" examines the growing role of technology in modern society and studies the risks associated with this growing role. The methodological part of the philosophy of technology is focused on the development of effective methods for search and management activities. A striking example of such a technique is the brainstorming technique.

The digitalization of modern society is studied based on a systems approach through the analysis of the fourth industrial revolution, industry 4.0, society 5.0, digital generations, new normality and new sociality. The subject field of philosophy of history examines the phenomena of historical memory, cultural continuity, as well as the prospects and risks of modern civilization. Formational and civilizational approaches to the description of social dynamics are used.

In the framework of the applied study of the philosophy of culture, an important role is given to the comparative analysis of the characteristics and dynamics of the cultures of the East and West. In practical terms, this is important due to the growing industrial role of the East, in particular, China and India. In this regard, the global status of the ideology of Western European centrism is being revised and the logistics of contacts between national economies is changing, as well as the infrastructure of commodity distribution networks.

In this regard, the role of intercultural communication is growing, which actualizes the philosophy of dialogue. Thus, philosophy performs a number of applied functions. It is integrated into the structure of the professional activity of a modern specialist through science and methodology.

Data in the structure of people's worldviews

Philosophy studies how people think in the social space of civilization, state, economy and culture, and what values they adhere to. This is a question about the

content of public consciousness of people in different local spaces and how they find ways of dialogue and understanding between cultures.

The content of public consciousness of citizens of a civilization and a state is designated as a worldview. It has general and individual features. General features of communication are actively formed by digital technologies that have created the technological environment of social networks. Local features of human communication are formed by a cultural code.

The concept of a cultural code came to philosophy through semiotics from the exact sciences. "Code" implies a correspondence between the expression plane and the content plane of a sign, symbol. The cultural code is located not only in individual and public consciousness. Any cultural artifact can be considered a cultural code. This allows us to establish a correspondence between the designated phenomenon and the meaning or content that is put into it, and to decipher the meanings of cultural phenomena. The cultural code can be both verbal and non-verbal.

The worldview of the people is a collective historical memory, which records archetypal ideas that manifest themselves in discourse. The cultural code may include units that are not cultural signs, but since they are part of the mental space of the code, they become such units.

The cultural code contains a set of basic concepts, attitudes, values and norms. It is part of the mentality structure of a specific social community. It is contained in myths, religious beliefs and traditions. Mythology has historically formed in the public consciousness as a special institution for conducting a dialogue between a person and the outside world. To facilitate a dialogue with natural phenomena and spiritual forces, practices of endowing the elements with humanoid forms were used. Hybrid forms of conjugating the human body with the forms of bodies of natural and artistic design were also used.

Myths are represented by texts. The most famous myths are those created by ancient mythology. After the transition of the worldview of mankind to the substantive foundations of religion in the forms of polytheism (polytheism) and monotheism (monotheism), mythology lost its influence and was transformed into such

forms of culture as the epic, legend, fairy tale, legend. Plots taken from ancient myths are actively filmed. Gradually, the institution of religion began to play a major role in traditional societies. It is focused not only on the dialogue of man with external natural forces, but also on the problems of the inner world of man himself. At the initial historical stage of religion, represented by polytheism, the dialogue of man with external natural forces dominated.

These forces and elements were endowed with the appearance of man and his way of life. But the gods lived separately from people. In Ancient Greece, this was Mount Olympus. There were intermediaries between the gods and people. They were called titans. One of the gods, Hermes, conveyed messages from the gods to people. Subsequently, this practice of dialogue began to be called hermeneutics. Polytheism was historically characteristic of the culture of Belarus.

Natural elements had specific names. The dialogue of the local population with them was carried out through special sanctuaries. Most of all, people were concerned about issues related to the harvest, the change of seasons and relations with ancestors.

Historically, human interests increasingly focused on their own inner world and questions that only one God could answer or, as in Buddhism, a special spiritual teaching about the universe and ways for a person to achieve mental balance.

The population of the Mediterranean chose the path of monotheism. Within the framework of this new historical modification, each person had the opportunity to conduct a dialogue with the creator of the world. God's disposition to the fate of man was evidenced by the ascent to Golgotha and the resurrection of Christ from the dead. Thus, a new chronology began in the Christian world, which many countries adhere to to this day.

Seven hundred years after the emergence of Christianity on the Arabian Peninsula, the formation of Islam began. This is a monotheistic religion. It has spread to the Near and Middle East, India, Southeast Asia and the African continent. Hinduism is influential in terms of the number of believers. In addition to the religious

component, the worldview of the population of many countries contains secular components.

Religious components of people's worldviews are designated in philosophy as idealism. Such a definition means that humanity is inclined to see an immaterial principle at the foundation of the universe, which is designated as spirits, gods (polytheism), God (monotheism), soul and absolute idea. Idealism has objective and subjective modifications.

Religion is a modification of objective idealism. Prominent representatives of objective idealism are Pythagoras, Plato, Aristotle, Hegel, as well as thinkers of religious philosophy associated with Christianity and Islam.

If the worldview of people is dominated by the accents of scientific argumentation and secular components of law and ethics, then most likely these people adhere to materialism, since they believe that the basis of the universe is formed by physical processes and matter (substance). Historically, the spontaneous pre-scientific materialism of Thales, Heraclitus and the atomists (Leucippus, Democritus and Epicurus) is distinguished. Then, in modern times, the metaphysical materialism of F. Bacon and I. Newton was formed on the basis of mechanics. In the 19th century, the principle of the development of nature and society was introduced into the context of materialism (K. Marx, F. Engels).

No matter what differences accompany the worldview of people on the planet, there are common components in its structure. These common components are represented by values, traditions, ideals, needs and ideas. The universal components of the worldview also include interests, norms, mentality, identity and archetypes. Values are the subject of study of axiology.

Values reflect in the worldview of people the significance of someone or something for people. Since different spheres of life and people themselves are significant for people, material, artistic and spiritual values are distinguished, as well as value attitudes towards friends, loved ones, parents, native places and country, the surrounding natural and social environment.

Manifestations of value attitudes are value perception and value representation. From the value attitude follows the assessment of people and the products of their creativity and activity. Professional assessment is called expertise. It is used when accepting objects, identifying original works of art. Revaluation of values may take place (F. Nietzsche). Usually it is accompanied by practices of nihilism and devaluation of humanism.

Values that are passed down from generation to generation are called traditions. At the initial stages of human history, the status of values was not questioned, so civilizations on the planet were traditional. In industrial civilizations, the status of traditions is not so stable. There are supporters of the traditional way of life, faith, holidays and family. These are conservatives and neoconservatives.

But there are those who oppose traditions. They are called nihilists and marginal. Nihilists behave militantly and destroy traditional values. In the Western world, nihilism has become widespread, undermining the values of traditional family and marriage.

Ideals play an important role in people's worldviews. These are standards that reflect ideas about the state, family, the beautiful and the sublime, economics, happiness, fashion (the ideal of haute couture). In relation to engineering, the ideal is a perpetual motion machine. Individuals can be considered by other people as ideals, as role models in their personal lives. At the level of individual consciousness, there is an I-ideal. Ideals can be so disproportionate to the capabilities of an individual that this disproportion can lead the personality to internal crises. Popular wisdom in this case says that a bird in the hand is worth two in the bush.

The needs in a worldview reflect the ratio of the primary and secondary intentions (motivations) of an individual. Primary needs are formed by physiological characteristics of the human body (eat, drink, dress, have one's own family). Secondary needs are actualized when primary needs are satisfied. These are the needs of self-actualization in communication, professional activity. One of the models of human needs was developed by A. Maslow. It is associated with the concept of the pyramid of needs.

Ideas are born in people's worldviews under the influence of values, traditions, ideals and needs. They have a creative (heuristic), political and economic specialization. An idea contains a strategy and an action plan for achieving specific goals and includes a description of how to achieve these goals. In political science, there is such a section as the "ideology of Belarusian statehood". This section reveals the constructive role of state ideology in various spheres of life of Belarusian society. The role of the institution of the presidency is especially noted. This institution is the guarantor of state stability.

Interests reflect the focus of individual and public worldviews on specific spheres of life of society. In this context, economic and political interests are distinguished. Some of people's interests fall into the category of creative interests and hobbies, which they use to fill their free time.

Norms in the worldview perform a regulatory function of self-organization and self-control of the individual. If an individual want to use all the possibilities of the social space, then he must comply with the legal and moral traditions characteristic of this space, as well as technical standards. Otherwise, he will limit his own capabilities. Thus, violating traffic rules can deprive him of the right to drive. An individual will limit his personal freedom by illegal activity.

Norms play an important role in the professional activities of engineers in the construction and industrial spheres, as well as economists. This is a whole area of metrology associated with standardization and certification, as well as diagnostics of technical systems and devices. In the field of management (control), quality management systems are actively used.

The term "mentality" in the content of people's worldview denotes the features of the national psychology and thinking of the nation (territorial community of people within the state). The key features of the mentality of the Belarusian nation include tolerance, peacefulness, hard work, love for the native nature. Identity reflects the degree of stability of the worldview of the individual and society to possible changes formed by external factors of information impact, migration and

military threat. Belarusians have been tested by history according to the criterion of military threat for many centuries.

At the same time, they preserve their national identity and have developed ways to resist military threats. One of these methods was the mass partisan and underground movement during the Great Patriotic War. The partisan and underground movement was directed against the German occupiers who committed genocide against the Belarusian people.

Archetypes constitute a cumulative resource of traditions. This resource is stored in people's worldview and manifests itself in special forms of dialogue, temperament, character. Archetypes became the subject of study of C.G. Jung. In the structure of people's worldview, the levels of worldview, world perception, world understanding and world exploration are distinguished. Pragmatism is characteristic of people's worldview. This means that people transform information and knowledge into actions that contribute to the implementation of their ideas about life in a specific social space.

In the structure of the worldview, an important role is played by the features of the psychological makeup (character, temperament, emotions, feelings, memory, mentality), as well as ideological components in the form of statehood ideology. This means that people think in terms of national interests, which are implemented by their national state.

These national interests include ensuring sovereignty, favorable conditions for national producers, and good neighborly relations with states. This is a priority for the population of the Republic of Belarus, since the country was a battlefield of two world wars in the 20th century alone.

The territory of Belarus was invaded by armies of various European states. Moreover, the German occupiers committed genocide against the Belarusian people in 1941-1944. Thousands of Belarusian villages were burned by the German occupiers. Many civilians died in concentration camps. The Republic of Belarus calls on humanity to change the practices of modern geopolitics towards dialogue and peaceful relations.

The worldview of individual people cannot be mechanically summarized in terms of content, since each individual is formed according to a separate social program, in which factors of family, school, temperament, character, religion, secular lifestyle, and historical memory play an important role. It is important to take into account age and gender characteristics, as well as the influence of social networks on modern digital generations.

Despite globalization, humanity continues to differ in cultural characteristics of the East and West, African and Latin American regions. It is important to consider the features of these philosophical cultures, since for professional reasons Belarusian specialists work in a number of countries within the framework of agreements of the Republic of Belarus with states.

Data in the system of Indian philosophy

The Hindustan Peninsula became one of the world centers of philosophical reflection in antiquity. This was facilitated by the developed engineering culture of local civilizations, as well as the proximity to the Great Silk Road.

The Aryan tribes that settled on the Hindustan Peninsula in ancient times were at the origins of the philosophical traditions of India. They created a social structure of society on the Hindustan Peninsula based on varnas (castes).

The Brahmins became the highest caste of Indian society. They became the founders of the philosophical tradition on the Hindustan Peninsula. They used Sanskrit writing and relied on the authority of ancient texts called the Vedas. The basis of the Vedic canon is the Rigveda, Yajurveda, Samaveda and Atharvaveda. They contain hymns dedicated to deities, solemn chants, prayers and magic spells.

On the basis of the Vedas, religious rites of the Brahmin caste ("Brahmans") and the "Upanishads" were created, which became some of the first philosophical texts. The Upanishads mention such concepts as "Brahman" and "Atman".

Brahman is interpreted as God. Atman is in Purusha and is associated with the breath of life. Self-knowledge through immersion in Atman leads to merging with Brahman (objectified spiritual principle). As a result, true knowledge is

achieved, the opposite of ignorance, dividing Brahman and Atman and the diverse illusory world of material things. One of the parts of the epic poem Mahabharata, called "Bhagavad Gita", describes the philosophical concepts of "samsara", "dharma" and "karma", which became one of the key concepts in the philosophical and spiritual teachings of the inhabitants of ancient India.

Samsara speaks of the immortality and reincarnation of the human soul. Karma is the law of posthumous retribution that governs the reincarnation of the human soul. Dharma denotes the natural and social order. "Dharma" consists in fulfilling caste duties.

Neglect of caste duties worsens "karma" and the aura, which serves as the center of karma. For the sins accumulated during life, people have to pay in the next births. When a good person is haunted by life's failures, this means that in the past physical incarnation he accumulated negative karma. It can be improved by enduring adversity, adhering to high moral rules. The format of the attitude to the Vedas became the main criterion for dividing the philosophical schools of ancient India into orthodox and unorthodox schools (darshanas).

The orthodox philosophical schools committed to the authority of the Vedas are represented by the philosophy of Brahmanism. These are such philosophical schools as "Mimamsa", "Vedanta", "Sankhya", "Yoga", "Nyaya" and "Vaisheshika".

The founder of the "Mimamsa" school was Jaimini. The goal of spiritual life was declared to be the state of "moksha". It means the cessation of the reincarnations of samsara through merging with the world spiritual origin. This is facilitated by such cognitive methods as inference, comparison, the influence of the authority of the Vedic canon, postulating one's own judgments, understanding the absent, divine emptiness.

Dharma is defined as a combination of utility and Vedic cult prescriptions. The source of the correct understanding of the essence of dharma for the Brahmin caste are the Vedas. The founders of the Vedanta school were Badarayana, Shankara, Ramanuja. They called on the representatives of the Brahmin caste to devel-

op the spiritual side of the personality on the basis of asceticism, to tear it away from the connection with the illusory material world ("maya"), to lead to genuine higher knowledge ("brahmavidya"), reflecting the substantial unity of all the diversity of things. In order to comprehend the deep meaning of the Vedic canon and the Upanishads, the methods of listening, penetration into the content, reflection and overcoming of internal contradictions, meditation, connecting human consciousness with the substance of Brahman, were substantiated.

On this basis, the path of knowledge, the path of action, the performance of religious rites and rituals, the path of love for the god Vishnu and his earthly incarnation Krishna are built.

The founder of the Sankhya philosophy is Kapila. This philosophical school deepened the concept of purusha in terms of its spiritual aspects. It linked the category of purusha with the material principle of prakriti. In the theory of knowledge, the representatives of Sankhya analyzed the cognitive functions of human consciousness associated with the tendency to think, activity, inertia and indifference.

First, power, abundance, material quality ("mahas") arise. It is spiritualized by reason, the world soul ("buddhi"). When the element "sattva" predominates in the structure of "buddhi", the desire for knowledge, virtue and selflessness arise. The elements "rajas" and "tamas" give rise to vice, material interest, laziness, misunderstanding and suffering. The goal of spiritual development of the personality of the Brahman is to increase the element "sattva". The founder of yoga is Patanjali, who wrote the book "Yoga Sutras". His book was supplemented by the commentary "Vyasa-bhashya". The main goal of yoga is to purify the mind ("manas") from the meaningless activity of the guna "rajas".

Purification involves curbing feelings and emotions, moral purification, physical exercises, breathing exercises, control over aspirations, concentration, spiritual reflection and focus ("samadhi"). Jnana yoga emphasizes theoretical and cognitive methods. Bhakti yoga controls emotions. Karma yoga is aimed at action. Hatha yoga regulates physical exercises - asanas. Raja yoga uses the means of mental meditation.

The Nyaya school (founded by Gotama) emphasized rational and logical thinking. This thinking allowed representatives of the Brahmin caste to comprehend the deep meaning of the sacred books of Hinduism. The main ideas of the school are set out in the book "Nyaya Sutra".

The founder of the philosophical school "Vaisheshika" was Kanada (Uluka). In this school, an important role was given to ontology and such categories as the fundamental principle, the substance of being, inherence, the general and the particular. The dynamics of being is formed according to the laws of karma, forming a transition from non-being to physical being.

As a result, a variety of things arises in space and time, combining, in different proportions, the elements of earth, water, fire and air. The universe develops cyclically, appears and disappears, in order to be reborn again. True knowledge consists in realizing the differences in their diversity.

Heterodox philosophical schools of India (nastika) are represented by the materialistic school of Lokayata - Charvaka, Buddhism and Jainism. The materialistic school of Lokayata-Charvaka (founded by Brihaspati) denies immortality and transmigration of the soul (samsara, dharma and karma).

It calls for enjoying life (the principle of hedonism). Brihaspati spoke of the equality of human nature, regardless of caste. He considered the study of the Vedic canon and the performance of religious rituals to be a meaningless occupation, invented by the Brahmin priests so as not to engage in physical labor. The human soul is mortal, as is his material body. After death, human consciousness completely disappears, since his physical body disintegrates.

Jainism (founded by Vardhamana) is close to modern environmental philosophy, since its supporters emphasized a humane attitude towards all living things. To this end, it was prescribed to travel only in daylight, sweeping the road in front of you and covering your breathing organs, so as not to accidentally harm an insect and not worsen your karma. Jainism is based on the mystical cult of twenty-four righteous tirthankaras. It is represented by ascetic (living on alms) and moderate directions. An important role is given to the principles of truthfulness, prohibition

of theft, detachment from the material world. Studying the Vedas is not necessary for Jains. Correct knowledge (teachings of Mahavira), correct view (faith in tirthankaras) and correct behavior (asceticism, ahimsa, dhyana) help to achieve liberation from samsara through asceticism and meditation.

Jainism is cultivated in India to this day. The founder of another philosophical school called Buddhism was Siddhartha Gautama (Buddha Shakyamuni). The essence of Buddhism is the realization of nirvana. It stops the action of samsara in the form of a cycle of bodily reincarnations. Anyone can achieve enlightenment and become a Buddha in one of their next reincarnations, regardless of nationality, gender, age or caste. To do this, one must learn and realize the four noble truths.

These truths state that every life in a physical incarnation is suffering and that there is a cause for suffering. It consists of base passions that bind the human soul to the illusory material world ("maya"), prompting it to seek a new body after death in order to realize its remaining desires. There is a way to get rid of suffering. To do this, one must achieve complete dispassion, free oneself from all desires. There is a path that leads to enlightenment.

The stages of the eightfold path of salvation involve spiritual and physical purification, the fulfillment of moral precepts not to kill, steal, commit adultery, lie or use intoxicating substances and drinks. Detachment from the illusory world of material things leads to enlightenment. Determination, absence of rudeness in communication, good deeds, strong-willed efforts, meditation and immersion in one's inner world are welcomed.

The main source of Buddhism is the Sutra Pitaka, which contains a description of the life of Buddha. The Vinaya Pitaka describes the rules of the monastic community of ashrams. The Abhidharma Pitaka is considered the basis of Buddhist philosophy and cult practice. The texts are supplemented by sutras of later representatives of Buddhism. The main modifications of Buddhism are Mahayana and Hinayana. In the Mahayana modification, Buddhism spread to China, Korea and Japan. It preaches the idea of sudden enlightenment. It preaches the idea of sudden

enlightenment. In the modification of Lamaism, this Buddhism was spread to Tibet, Buryatia, Mongolia and Tuva.

Schools such as Vaibhashika and Sautrantika are associated with Hinayana Buddhism. The philosophical schools of Madhyamika and Yogachara are associated with Mahayana Buddhism. Buddhism could not gain a foothold in the traditional society of India and became part of the cultures of the Far East and Southeast Asia. In India, it could not compete with Hinduism and Islam. In modern conditions, the philosophy of Buddhism continues to develop and finds a response among Western intellectuals concerned about the aggravated man-made problems and the growth of international tension.

The history of the industrial society of India began in the 19th century. The Hindustan Peninsula was part of the British Empire. The English language and the educational system associated with it for the elite of local society spread to the peninsula. At the same time, Europeans began to become acquainted with Indian culture and philosophy. The work of Rabindranath Tagore played an important role in shaping the interest of the British in India.

Under British rule, traditional Indian philosophical schools, in particular yoga, retained their influence thanks to Ramakrishna and Vivekananda. The goal of this school was to achieve samadhi through meditation.

In Indian philosophy, there was also a tendency to combine the achievements of traditional philosophical schools with the categorical structures of Western philosophical schools. Thus, D. Atma developed a modification of philosophical naturalism. D. Chattopadhyaya was close to the philosophy of Marxism.

The desire of the population of British India to free themselves from colonial dependence was expressed by the political philosophy of non-violence of M. Gandhi. It proved effective in practice and in 1947 Great Britain recognized the independence of India, which was soon divided into the Islamic Republic of Pakistan, the Republic of India, Sri Lanka and Bangladesh. An important role in the implementation of M. Gandhi's political philosophy in the Republic of India was played by its first Prime Minister J. Nehru.

At the beginning of the 20th century, L. N. Tolstoy was influenced by Indian philosophy (the philosophy of "non-resistance to evil by violence"). Nikolai Roerich ("Living Ethics" or "Agni Yoga") settled with his family in India.

Data in the structure of the philosophy of the East

The East is geographically divided into the Near, Middle and Far East. The starting point for the category of proximity is Europe and the Mediterranean region. In antiquity and the Middle Ages, the Near and Middle East were territorially part of the zones of state influence of the empire of Alexander the Great and the Roman Empire, the eastern part of which, called the "Roman" (Byzantine) Empire, existed until 1453. Aristotle's philosophy had a special influence on the regions of the Near and Middle East. It influenced Arabic-language philosophy, which was part of Islam. Aristotle's ideas were used by Al-Farabi, Al-Kindi, Al-Biruni, O. Khayyam, Avicenna (Ibn Sina).

Arabic-language philosophy was developed by people from Azerbaijan, Iran, southern Spain (Cordoba Caliphate). People from Kazakhstan, Syria, Tajikistan and Uzbekistan participated in its development. The spread of philosophy was facilitated by the logistics of the Great Silk Road, in which Arab merchants played a major role. Thanks to China's trade with the Roman Empire, such cities as Alexandria, Baghdad, Bukhara, Damascus, Constantinople, Samarkand, Urgench and Khiva reached architectural and cultural prosperity.

Marco Polo, who spent many years in China (the Far East) and knew the logistics of the Great Silk Road well, told Europeans about the peculiarities of Rome's trade with China. In the oases of Fergana, Bukhara, Samarkand and Khiva, Al-Farabi, Al-Biruni, Ulugbek, Ibn Sina, O. Khayyam were formed.

They carried out a synthesis of the ancient philosophy of Aristotle with rational Islam. In this system of intellectual convergence, an important role was played by cultural oases in the territory of Kazakhstan. These are the cities of Ottrar, Taraz, Syganak, Turkestan and Merkez.

Al-Farabi considered the concept of reason. He substantiated the need for the art of chemistry. He outlined the classification of sciences. This classification included the science of language, logic and its subdivisions, mathematics (arithmetic, geometry, optics, astronomy, music, the science of weights and skillful techniques), physics and metaphysics, civil sciences, jurisprudence and dogmatic theology. Translations of texts from Greek, Syriac, Farsi, and Hindi into Arabic played an important role in creating conditions for access to the ancient heritage of the inhabitants of the Caliphate.

Among the translators were Hunayn ibn Ishaq, Ishaq ibn Hunayn, Hubaysh Sabit ibn Qura, Yahya ibn Adi, Ishaq ad-Dimishki, Noubakht, ibn Mukaffa, ibn Manka, ibn Wahshia. The logistics of the Great Silk Road connected the East into a single economic and information space. The most ancient philosophical cultures of the East are India and China. Original spiritual cultures were created by the peoples of Korea, Southeast Asia and Japan.

Data in the system of Chinese philosophy

In its modern form, China is represented by the People's Republic of China. This state has the second largest economy in the world. The PRC plays an important role in international politics through the implementation of unique projects. One of them is called "Belt and Road".

The traditional society of Ancient China had a developed engineering culture. Evidence of its high level is the Great Wall of China. It was built to protect China from the north from the raids of nomadic tribes. It was also used for the safe logistics of the Great Silk Road. The philosophical schools of Ancient China, represented by Confucianism, Taoism, Legalism, Mohism, the school of names, and natural philosophy are based on the Pentateuch (Wu-jing) and the Four Books (Si-shu). The Pentateuch consists of the Book of Changes, which describes the main provisions of cosmology and natural philosophy, a collection of religious hymns called the Book of Songs, a book of history, a book of rites, rituals, cult practices, and the Chun-qiu chronicle.

The Four Books include Confucius's Conversations and Judgments, associated with the philosophy of Confucianism, the doctrine of the mean, and the social philosophy of one of the followers of the Confucian school (Mencius). The Book of Changes describes the interaction of the substances Yin and Yang.

Conversations and Judgments (Lun-yu) reveal the content of Confucius's views. Confucius formulated the principles of social philosophy in the form of allegorical parables and edifying stories. These principles prescribe the need to follow rituals, honor the past, respect for an elder brother, and reciprocity. The moral ideal is an educated statesman, an enlightened connoisseur of customs and traditions, information about which he draws from ancient books and sacred texts.

The school of names means a name as a speech expression of the thought about the essence of objects, associated with hieroglyphic writing and the art of calligraphy. Gongsun Long and Hui Shi proposed to logically study the connection between names, titles with the ontological essence of the objects reflected in them. They substantiated the idea of correcting names ("zheng ming") to return the names to their traditional content.

Taoism (founder Lao Tzu) sees the goal of spiritual self-development of the individual in the mystical comprehension of Tao. A specific thing has a reduced version (de) of Tao. This is what the book about Tao and De called "Tao Te Ching" tells us.

Taoism emphasizes the spiritual development of people and their acquisition of higher abilities. With the help of special exercises, a Taoist follower learns to intuitively adapt to the natural course of events. Without doing anything, he achieves everything and thus implements the principle of non-action (wu wei). The philosophy of Mohism (founded by Mo Tzu) formulated the moral principle of universal love and mutual benefit. The moral ideal of the social philosophy of Mohism is a wandering noble warrior who fights against unjust laws and corrupt government officials by force of arms.

The philosophy of Legalism (Shang Yang, Han Fei Tzu) contrasted Confucian ethics with the severity of the law, which should be enforced by harsh meth-

ods. Only fear of the law makes it effective. If minor violations are severely punished, then people will not dare to commit major violations.

Until the 19th century, China adhered to the principle of internal self-sufficiency, geographical and economic isolationism, which allowed it to avoid direct contact with Europeans. But the situation changed in the mid-19th century, when Great Britain, having won the Opium Wars, insisted on opening the internal Chinese market to European trading companies and received a long-term lease of land for the construction of the British enclave of Hong Kong.

In the mid-20th century, Marxism became the main political philosophy of China (PRC). Mao and Deng Xiaoping played an important role in its development, taking into account Chinese characteristics. Mao was a supporter of classical Marxism. Deng Xiaoping oriented the PRC toward technological modernization, within the framework of which attractive conditions for Western investors were created. The PRC economy grew rapidly and at the beginning of the third millennium it became the second in the world after the United States in terms of gross indicators. The PRC leadership initiated the restoration of the land and sea logistics of the Great Silk Road called the Belt and Road. The Republic of Belarus plays an important role in this transcontinental project, which is evident in the example of the activities of the Great Stone industrial park.

Data and conceptual approaches to their use in science

Philosophy focused on the features of the constitution of science in modern times. Since philosophy itself also claimed scientific status, the concepts of empiricism and rationalism were developed to solve these common problems. The concept of empiricism was developed and is used to this day by British philosophy and analytical philosophy, one of the foundations of which was British philosophy. The methodological function of philosophy was manifested in the concepts of science.

F. Bacon stood at the origins of empiricism. According to his justifications, scientific knowledge is formed by the empirical basis of experimental research in the form of data that is processed using the method of inductive inferences. This is

a methodological model of laboratory science, which assumes the presence of a research base in this science in the form of special equipment and systems of artificially created conditions for experiment, measurement and observation. Without a laboratory base, it is difficult for a scientist to count on a significant scientific result. In the 20th century, the laboratory base of science was transformed into expensive technical complexes of particle accelerators, observatories, automated systems for collecting and processing information.

The concept of rationalism as applied to science was developed by R. Descartes. It is based on the method of deduction, which gives priority in scientific research to the description of physical processes by means of the mathematical apparatus of theory. To implement this model of science, Descartes created the apparatus of algebra and, on its basis, transformed Euclidean geometry into analytical geometry. Pascal, Leibniz, Newton, and Laplace took part in the formation of the conceptual apparatus of higher mathematics. As a result, the apparatus of mathematics, along with the apparatus of physics itself, began to be used in the implementation of the mathematical version of the description of physical processes.

When a scientific theory is built deductively, it is a purely logical process, the reliability of which is tested by logical criteria of clarity, accuracy, evidence, and consistency. But even a theory built on these criteria of reliability has the status of a hypothesis before its empirical justification. This feature of the development of scientific theory based on the hypothetico-deductive method is preserved at the present time, which was convincingly demonstrated by V.S. Stepin in the book "Formation of Scientific Theory".

I. Kant outlined the theme of the boundaries of scientific knowledge in the subject field of the philosophy of science. This theme was conditioned by the discussion between Herschel, Kant and Laplace about the nature of nebulae, which ended without results, and the subsequent discovery of the limited possibilities of scientific research of natural systems.

In modern times, empiricism and rationalism have actually become alternative methodological programs of scientific research. K. Marx and F. Engels tried to

transfer such a contradiction from the emphasis on fundamental difference to the emphasis on non-fundamental difference. Research science itself has come to a model of compatibility in its space of empiricism and rationalism through practical means. This collaboration looks like this. Mathematicians and physicists, using the hypothetico-deductive method, create theories and the mathematical models of physical processes that follow from them using computer technologies. These theories and models retain the status of a hypothesis until they receive empirical justification in the form of scientific facts.

Industrial laboratory science has shown by its functioning that science has not only a stage of scientific research, but also experimental design work with a practical result in the form of developments. And the practical application of developments meant their commercial use.

Analysis of books on the philosophy of science shows that the subject of description in them is to a greater extent the features of the functioning of research science. This is typical of positivism, the philosophy of Marxism, structuralism. But despite the asymmetry in the subject matter of the philosophy of science, the concept of science unites professional research and experimental design activities of scientists and engineers, aimed at discovering new natural phenomena and processes and using research results in developments. The full cycle of science is designated as R & D. This abbreviation stands for research and development and experimental design work.

As an institution of society, science is represented by a system of institutions and organizations. These institutions and organizations perform research, design and educational functions. The main source of their funding is the state budget. Academic and university science is financed from budget sources. Large companies finance their own research and design work and cooperate with universities. Science is a form of public consciousness. It differs from other forms of public consciousness by the criteria of objectivity, clarity, accuracy, evidence, consistency and justification.

But even a theory built on these criteria of reliability has the status of a hypothesis before its empirical justification. This feature of the development of a scientific theory based on the hypothetico-deductive method is preserved at the present time, which was convincingly shown by V.S. Stepin in his book "The Formation of a Scientific Theory".

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According to the criterion of the object of study, the disciplinary structure of science was formed. Nature is studied by natural sciences. Humanities study man, Society is studied by social sciences. Engineering and technology are studied by technical sciences. Based on the disciplinary structure, an interdisciplinary structure of science was formed. It is based on the integration of two disciplinary subject areas into one scientific direction. Examples are astrophysics, biophysics, biochemistry, geophysics. One scientific platform can be formed by more than two sciences. Such a methodological approach is especially in demand at the stage of experimental design work.

The main components of theoretical science were formed on the platform of philosophy. These components were conceptual knowledge. In the field of mathematics, they were created by Thales, Pythagoras and Euclid. In the field of physics, they were created by Heraclitus, Leucippus, Democritus and Epicurus. But the theoretical science formed by philosophers did not have an experimental basis for testing theoretical constructs.

The situation changed in modern times, when philosophers created the methodology of science as a section of philosophy. F. Bacon substantiated the thesis of empiricism as the basis of science. R. Descartes substantiated the thesis of

rationalism as the basis of science. These were different programs for organizing scientific research.

In the 20th century, the philosophy of science returned to the topic related to the boundaries of research and design activities of science. But the emphasis in this topic has changed. Now the focus of philosophers and the public is on the risks arising from the development of technologies. This is especially true for nuclear technologies and genetic engineering.

Also, the subject of philosophy of science has become issues related to intellectual property and the fight against plagiarism. These issues are relevant for experimental design science, the developments of which are the subject of industrial espionage. In this regard, a legal system for the protection of copyrights has been developed.

A system for assessing the contribution of scientists to the development of world and national science has been formed. At the international level, the Nobel Committee evaluates the work of scientists in a number of sciences. At the national level, the work of scientists is assessed by national academies of sciences.

The subject of the philosophy of science is not only the structure of science, but also its dynamics. When considering the dynamics of science, the term "scientific revolution" is used. The first scientific revolution is associated with the historical era of the Renaissance and the names of Copernicus, Brahe, Bruno, Galileo and Kepler. This revolution took place in the subject fields of astronomy and physics. To test Copernicus's mathematical model of the solar system, Galileo designed a telescope and carried out observations. Brahe, at the observatory he built, observed the starry sky and transmitted the data to Kepler, who formulated the laws of planetary motion.

Bruno substantiated the ideological status of the scientific revolution. Philosophers were interested in the question of how science functions between scientific revolutions. T. Kuhn suggested considering this period through the concept of paradigm. By paradigm he meant a conceptual system of knowledge accepted by all scientists as a result of an agreement, formed by the basic theory.

V.S. Stepin suggested calling this conceptual system of knowledge the scientific picture of the world. Its normative part consists of the ideals and norms of scientific activity. And the transformation of the scientific picture of the world occurs as a result of scientific discoveries. This means that the scientific picture of the world is not the result of an agreement between scientists.

I. Lakatos suggested using the concept of research program. K. Popper focused on the leading role of theory as the basic foundation of the knowledge system in the development of science and the changeability of theories through falsification and refutation. These studies of philosophers were more concerned with the dynamics of research science.

In addition to the scientific revolution, philosophers updated the format of the scientific and technological revolution in the dynamics of science. It is more applicable to the experimental and design applied part of science. This concept is based on the merger of the scientific and industrial revolutions that occurred in the 19th century. The result of this merger was the formation of applied technological modifications of the natural sciences based on physics and chemistry.

At the same time, the independent conceptual and practical status of the concepts of scientific revolution and industrial revolution is preserved. The concept of industrial revolution is especially in demand, which is evident from the actively discussed topic of the fourth industrial revolution.

Against the background of the discussion of the phenomenon of scientific and industrial revolutions, the question arose of how to designate, taking into account the dynamic features of their impact on the already functioning industrial infrastructure, the period of materialization of their technological capabilities.

And then this period of materialization began to be called the technological modernization of industrial infrastructure and communications. After the stages of the scientific and technological revolution and technological modernization were combined, the term "scientific and technological progress" began to be used to characterize the full cycle of the dynamics of science.

The Role of Data in the Analysis of Musicians' Creativity

The intercultural factor in the development of jazz is considered in the article using the example of Belarus, where integration into jazz culture was based on the migration of Jewish families to the United States and the arrival of talented musicians from Poland and China under the influence of political events in Europe.

Jewish communities found themselves within Belarus during the Renaissance, when they received permission from the authorities of the Grand Duchy of Lithuania to resettle within the state. These communities created their own multicultural environment, through which they preserved their identity.

After the territory of Belarus became part of the Russian Empire, Jewish communities were limited in their movements by a residence requirement. Jewish families had many children and needed a higher standard of living. Therefore, they began to use the practice of resettling to the United States in order to gain greater opportunities for material security.

Jewish youth of American jazz were socialized in a cultural environment that was new to their parents. They were introduced to African-American jazz music, among other things. Among those who underwent this socialization were Dave Brubeck and George Gershwin. Irving Berlin and Vernon Duke were born within the borders of Belarus. They and their parents left the Vitebsk and Mogilev provinces, which were characterized by a high level of population migration. The founder of the reverse process of Jewish youth arriving within the borders of Belarus was Eddie Rosner.

His childhood and musical education were connected with Prussia, in particular, with Berlin. Jazz entered his life in the twenties of the twentieth century. By this time, he already had a professional school of violin and trumpet. This allowed him to become a soloist of jazz orchestras. The main city of his creative activity was Hamburg. He became the best trumpet player in Europe.

His professional level allowed him to create his own jazz orchestra. But in 1933, the ethnic status of a Jew became dangerous in Germany, since the Nazis came to power in that country. Rosner changed his name from Adolf to Eddie and

migrated to Poland. Here he created a jazz orchestra, which toured Europe. Based on his personal acquaintance with the actress of the Jewish theater Ruth Kaminsky, he created a creative community of groups, which in 1939 was under threat of German occupation. The musicians and actors decided to go east to the city of Bialystok, which became part of the Belarusian Soviet Socialist Republic of the USSR. In addition to Jewish musicians, Polish composers moved to the BSSR.

Their creative development in the BSSR was facilitated by the support of the leader of the BSSR Panteleimon Ponomarenko, who was fond of jazz. In Bialystok, the creative biographies of Yuri Belzatsky, Jerzy Peterburgski, Genrikh Gold, Yuri Yurand and Eddie Rosner intersected. The symphony orchestra was conducted by Arkady Bessmertny, a representative of the Minsk music school. Yuri Belzatsky and Eddie Rosner created a separate state jazz orchestra of the BSSR. The orchestra had twenty-five musicians. Since 1940, the orchestra was based in Minsk. It took part in the decade of Belarusian art in Moscow. It was recognized as the best big band of the USSR. The orchestra's repertoire included African-American and Latin American melodies. Priority was given to swing.

Eddie Rosner became the second professional jazz trumpet player after L. Armstrong. Stalin listened to the concert of E. Rosner's jazz orchestra in an empty hall. During the Great Patriotic War, the musicians were constantly on tour in the frontline zone. They raised the morale of Soviet soldiers. After the beginning of the Cold War, jazz was defined as an enemy culture, since it was associated with the United States. E. Rozner planned to return to Poland, but was detained and sentenced to ten years in Kolyma. Even the fact that the musician was an Honored Artist of the BSSR did not help. Stalin's death allowed E. Rozner to be released early. In the GULAG, he maintained his commitment to jazz as much as possible. He created orchestras in Khabarovsk and Magadan.

But he also suffered from severe scurvy, which limited his performing abilities and reduced them to organizational and composing activities. After his release, E. Rozner returned to Minsk. But he was met with caution here, and he left for Moscow, where he created an orchestra that provided the musical part in the film

"Carnival Night". He became part of the blue lights. Since the era of vocal and instrumental ensembles began in music, jazz began to give way to this era. E. Rozner returned to the BSSR. He arrived in the city of Gomel. Since 1972, a new creative life of Soviet jazz began. Popularity and interest in jazz returned. This was demonstrated by tours in Minsk, Moscow and Leningrad.

The basis of the repertoire was formed by American jazz shows. The intrigue was created by playing the trumpet. But the family factor of inheritance and a conflict on this basis, connected with receiving an inheritance from the USA, intervened. As a result, E. Rosner migrated to the FRG. He never returned to the USSR. The Boris Raisky jazz orchestra arrived from the PRC to the BSSR in the fifties of the twentieth century. These were Russians who left the country at the beginning of the twentieth century.

The reason was the construction of a railway through the territory of Manchuria with a direction to Vladivostok. After the civil war, Russian railway workers continued technical maintenance of the railway, and their children became part of a unique phenomenon of Russian culture in Manchuria. The center of this culture was Harbin. There were many people from Russia here. They created the infrastructure of theaters and education.

Here Boris Raisky became acquainted with the culture of jazz. The Lundstrem brothers were also fascinated by this culture. The impetus for deepening their passion for jazz music was given by their stay in Shanghai, where the proximity of the Pacific region was felt and orchestras in cafes and restaurants performed jazz. Acquaintance with this performing culture played an important role in the professional development of B. Raisky and O. Lundstrem.

In connection with the outbreak of World War II in the Far East, on the initiative of Japan, military actions began in the northern part of China, which led to the occupation of Manchuria by Japanese troops. The question arose about the implementation of an international program for the evacuation of citizens of Russian origin to different countries of the world. After 1945, China embarked on the path of creating its own state with an ideology close to the USSR. Boris Raisky and O.

Lundstrem appealed to the USSR with a request to return to their historical homeland. They represented two jazz orchestras. The request was granted, and Boris Raisky's orchestra was assigned to work in Minsk. It received the status of a pop-symphony orchestra of the Belarusian radio. The orchestra demonstrated the talent of flutist Yevgeny Grishman. Mikhail Finberg showed himself among local talents.

He created a big band in the Minsk circus. Then he transformed it into a circus orchestra. The orchestra saw the formation of Arkady Eskin, a master of jazz improvisation. This musician influenced the formation of the vocal and instrumental era in Belarusian culture. This era is associated with the Pesnyary ensemble.

Another talent in M. Finberg's orchestra was Anatoly Gilevich. He was a pianist in the Pesnyary vocal and instrumental ensemble, and was also the musical director of the Verasy vocal and instrumental ensemble. Thus, intercultural migrations became an important condition for the formation of jazz culture in the USSR. This was shown by the history of Belarusian jazz. It was formed by migrations from the West and the East.

Data in the structure of cultural traditions of Southeast Asia

At the present stage of history, the states of Southeast Asia are represented by ASEAN. This regional organization unites Vietnam, Indonesia, Malaysia, Singapore, Thailand, the Philippines and other states of the region. It is a region of tourism, large banks, high-tech industries. One of the benchmarks was the Singapore model of industrialization of a traditional society. Its political philosophy was formulated and implemented by Lee Kuan Yew. On June 5, 1959, he became the prime minister of the new island state and remained the leader of the People's Action Party, created in 1954, until 1990. The economic philosophy he developed is based on the model of a market economy open to investment.

Thanks to this philosophy and an attractive geographical position for maritime shipping and the banking sector, the island state became not only industrial, but also began to meet the high criteria of an industrial society of mass consump-

tion. As a result, the state has become attractive for urban tourism, since Singapore has a developed infrastructure of shopping centers, modern architecture and parks.

Almost all the states of Southeast Asia are multicultural states. This means that the cultural diasporas of Indians (Buddhism), Chinese (Confucianism) and Arabs (Islam) play a large role in them. In Singapore, the creation of the economic miracle was led by a representative of the local Chinese diaspora. Lee Kuan Yew is an ethnic Chinese. Indians and Chinese left their historical homelands many centuries ago in search of more favorable living conditions. They became part of local cultures, represented by numerous nationalities and tribes.

In addition to Singapore, Malaysia has followed the path of modernizing a traditional society. In addition to the Malays, this country is home to significant communities of Indians and Chinese. More than 90% of the country's population professes Islam. The main principles of the political philosophy of Malaysia's industrialization were formulated by Mohammad Mahathir in his book "The Way Forward". The strategy he formulated was put into practice. Although the pace of implementation of the industrialization strategy was not so high, it turned out to be productive in the economic sector.

Indonesia is one of the large states in Southeast Asia in terms of population and territory. Buddhism and Hinduism were brought to this country from India. Islam spread across the country in the Middle Ages. Indonesia was a colony of the Netherlands. In 1901, the colonial authorities proclaimed an ethical course. It implied the development of education and the availability of European philosophy. By the time Indonesia gained independence, an elite of national interests had formed. Ahmed Sukarno became the spokes man for this political philosophy.

Buddhism and Thai philosophy play an important role in Thailand, which prescribes an emphasis on pleasure, regardless of existing material difficulties and inconveniences. Such a philosophy has made Thailand one of the most attractive countries for tourists. Tourism is facilitated by the tropical climate and the institution of royal power, which has been stable for many generations.

Vietnam has historically been influenced by Buddhism and Confucianism. During the colonial period of history, the Vietnamese gained access to European philosophy through the French colonial authorities. They chose the philosophy of Marxism. This philosophy became the state ideology of the Socialist Republic of Vietnam after independence. It remains so at the beginning of the 21st century.

The Philippine Islands were under the colonial patronage of Spain from the 16th century until their independence. The dominance of the Spanish was associated with the spread of the Spanish language, the Catholic religion, and the penetration of some elements of Spanish folk culture into the everyday life of the Filipinos. One of these elements was festivals and carnivals.

As a result, religious Catholic philosophy in the Philippines coexists with the carnival aesthetics of folk culture.

Data in the cultural traditions of Africa

The African continent is inhabited by different peoples and, within the historical period of traditional societies, generated unique civilizations that are the subject of archaeological study and objects of tourism. The northern part of the continent is especially attractive to tourists, where a civilization existed in the Nile River basin that left behind the pyramids.

After the conquests of Alexander the Great and the construction of the city of Alexandria, Egypt became one of the intellectual centers of the Mediterranean. A unique collection of manuscripts was created in the city of Alexandria. Many scientists of ancient times worked in the city. Among them were Euclid and Claudius Ptolemy, who substantiated the geocentric system of the universe. According to this concept, the Earth was at the center of the universe.

In the pre-Christian period of history, the main role in Alexandria was played by the Neoplatonic philosophical school of Ammonius. Hypatia, David of Alexandria, John Philoponus, Olympiodorus the Younger, and Aelius of Alexandria were associated with this school. This school existed until 485, when it was forced to submit to the dogmas of Christian doctrine and transform into religious philoso-

phy. The transition to religious philosophy was facilitated by the Jewish Alexandrian philosophical school of Philo of Alexandria, which prepared the basis for the publication of the Bible in Alexandria in Greek.

In ancient times, the Carthaginian civilization, created by the Phoenicians, was formed on the territory of modern Tunisia. It lost the war to the Roman Empire, and the city of Carthage became one of the intellectual centers where the Latin Christian philosophical culture was formed. It gave birth to the phenomenon of Augustine of Hippo. In the Middle Ages, the territory of North Africa was inhabited by Arab tribes. These tribes professed Islam.

A small percentage of the population of Egypt continued to profess Christianity. Christianity also retained its positions in Ethiopia, where Zera Yakoba created a philosophical school in the 17th century.

South of the Sahara Desert, the Negroid population dominated, which had a tribal organization of social life. This population did not have a written language, but it orally cultivated the folk philosophy of Ubuntu. The ethnic philosophy of the Bantu peoples was described in 1946 by the European Placido Tempels in his book "Bantu Philosophy". A native of Rwanda, Alexis Kagame, published the book "Bantu-Rwandan Philosophy of Being" in 1956.

During the Age of Discovery, European states began to colonize the African continent. The colonization of the continent was facilitated by the slave trade. The African continent became one of the main places for capturing people for the purpose of their subsequent sale to American landowners. The Portuguese, British, Spanish and French were engaged in the slave trade. The slave trade was banned in the United States only in the mid-19th century.

After losing the slave trade market, European states divided the African continent among themselves in order to exploit its natural resources. The largest territories were controlled by Great Britain, France, Portugal, Spain and Belgium. These territories began to use English, Spanish, Portuguese and French as the main means of speech communication.

With the mastery of European languages, the emancipation of African youth began. Thus, from the territory of modern Ghana in the 18th century, Anton Wilhelm Amo began his journey to the university environment of Germany. One of the results of the emancipation of African youth was political philosophy. Its representatives began to study the features of African culture, its history and identity. As a result, Leopold Senghor developed the concept of negritude, which postulates a fundamental difference in the thinking of the African population from Western thinking. William DuBois developed the concept of Pan-Africanism. In the political philosophy of Africa, the philosophy of Marxism in the modification of Ujamaa socialism (Julius Nyerere) became popular.

The collapse of the colonial system was accompanied by the proclamation of independent states. But these states did not have an industrial basis at the economic level. These states had at their disposal traditional societies with their characteristic tribal organization of social life. Industrial companies of European states controlled the extraction of minerals. They deployed military contingents in African states and interfered in their internal affairs.

Only South Africa has a more developed industrial infrastructure, which, thanks to settlers from the Netherlands (Boers) and Great Britain, was able to develop a strategy for broader participation in the international division of labor. But the local Negroid population had to fight against genocide for a long time. Nelson Mandela became the leader of the struggle for the rights of the African majority.

At the present moment in history, African states associate their political philosophy with the formation of a multipolar world, in which the states of the Global South play an important role.

Data in the cultural traditions of the Mediterranean

In ancient times, the Mediterranean included civilizations that had access to the Mediterranean Sea and occupied islands in this sea. Among these civilizations were Greece, Egypt and Rome. In these civilizations, engineering culture reached a high level of development. This is evidenced by marine shipbuilding, architecture,

sewerage systems and water supply through aqueducts. In ancient Egypt, there was a high level of pyramid construction. The Greeks were not only experienced sailors, but also builders of coastal cities with a developed seaport infrastructure.

Ancient Mediterranean philosophy initially developed thanks to Greek culture. In this culture, representatives of natural philosophy became famous: Thales, Anaximenes, Anaximander, Heraclitus, Pythagoras, Xenophanes, Zeno, Parmenides, Melissus, Empedocles, Anaxagoras and Democritus. Humanitarian themes in philosophy were developed by Protagoras, Gorgias, Socrates, Plato and Aristotle.

Thales of Miletus built an ontology based on materialism. He considered water to be the basic substance of the universe. Anaximander of Miletus considered apeiron (ἄπειρον in Greek means boundless) to be the primary basis of being. Anaximenes of Miletus considered air to be the primary substance of the universe.

Heraclitus of Ephesus considered fire to be the primary basis of being. Fire sets the universe in motion by measures that flare up and by measures that fade away. Therefore, the universe is characterized by high dynamics. You cannot step into the same river twice. This is one of the early examples of objective dialectics.

Leucippus and Democritus created the doctrine of atoms and emptiness. Atoms are invisible indivisible particles, the combination of which in different quantities, qualities and proportions forms material reality. Epicurus supplemented this teaching with the assertion about the deviating atom. In his opinion, initially all the atoms fell from top to bottom evenly and in a straight line, then one of them accidentally deviated and collided with neighboring atoms. As a result, from the resulting chaos, the cosmos was formed in the form of an order of objects.

The Roman philosopher Titus Lucretius Carus wrote a poem about atoms in Latin called "De rerum natura" ("On the nature of things"). Pythagoras, with his achievements in mathematics and philosophy, showed that there were bright thinkers in the Greek colonies on the coast of Italy. Pythagoras saw an immaterial digital principle at the basis of the universe. He is the founder of objective idealism.

Parmenides from the Eleatic philosophical school studied the problem of the relationship between being and non-being. In his opinion, the aporias against

movement are called "Achilles and the Tortoise", "Stadium", "Dichotomy", "Arrow". Aporias, as paradoxical reasoning, with their formal logical correctness, contradict the observed facts. Zeno of Elea is also credited with the "Liar's Paradox".

Empedocles, who represented Italian philosophy, considered the physical world as the result of mixing the primary elements of earth, water, fire and air under the influence of opposing forces. Anaxagoras considered "homeomeries" ("ὁμοιομερεια") as the primary basis of being. They contain four elements in different proportions. The ordered movement of homeomeries is controlled by "noos" (the world mind).

Mediterranean philosophers were also interested in humanitarian topics. It was the main one for the sophists Protagoras and Gorgias. For a fee, they taught citizens the art of public speaking. The sophists neglected the truth in order to gain the upper hand in a debate. Sophisms are called deliberate errors and deception for the sake of a result. Protagoras claimed that man is the measure of all things.

Socrates criticized the Sophists. This philosopher left no texts behind, since he cultivated philosophy in the oral form of dialogue. Socrates believed that moral principles lead a person to happiness (the theory of eudaimonism) and virtue (the doctrine of aretology). One of Socrates' statements was the expression "Know thyself." At the same time, when Socrates himself was asked whether he was satisfied with the level of his knowledge, he answered: "I know that I know nothing." With this answer, Socrates claimed that as a person acquires knowledge, he discovers the diversity of natural and social reality and becomes convinced that he is still at the very beginning of his cognitive activity.

Everything said about Socrates became available thanks to the philosophical dialogues written by his student Plato. In these dialogues, Socrates is one of the participants in intellectual conversations on various topics. There is a high probability that Plato himself may interpret Socrates' words.

Spending time on the street in dialogues with different people Socrates called the art of maieutics. These dialogues were risks for him, since not everyone liked his manner of asking questions that required reflection and mental effort. As

a result, under the far-fetched pretext that Socrates was corrupting the youth, the philosopher was brought to trial. As a result of the trial, he did not admit his guilt and publicly took poison thereby showing that he had become the victim of an unfair accusation.

Plato developed the categorical structures of objective idealism. He called the primary entities in relation to material things "idea" or "eidos". He endowed ideas with an independent existence and placed them in a transcendental immaterial world, where they exist forever.

Plato considered knowledge as recollection. The human soul is an immortal idea that migrates from one body to another ("metempsychosis"). In the interval between bodily incarnations, the soul enters the transcendental world, where it communicates with other ideas. But when the soul again enters the human body, sensory impressions prompt it to forget about the previous communication.

Plato developed the doctrine of the ideal state. He criticized the democratic form of government, since demagogues and deceivers trained by the sophists come to power. They pass laws in their favor and continue to maintain their power contrary to the public interest. Therefore, Plato believed that private property should be abolished and society should be divided into three classes so that everyone could freely realize their natural abilities and direct them to the benefit of society. The state should be governed by philosophers who are characterized by wisdom.

Warriors should protect society from external dangers. Their dignity is courage. The third estate is engaged in agriculture. It is characterized by hard work. Criminals and prisoners of war in an ideal state are enslaved. According to Plato, the practical embodiment of an ideal state was Atlantis, which perished as a result of a natural disaster. Modern underwater archeology has been searching for the site of the lost civilization for decades.

Plato was the first in the world to create a system of higher education based on the study of philosophy by students. The philosophical school was called the "Academy". The school functioned for more than nine hundred years. Plato's followers were Aristotle and the Neoplatonists Plotinus, Proclus, Iamblichus and

Porphyry. Aristotle founded a school called the "Lyceum". His followers are called Peripatetics. Among the Peripatetics were Andronicus of Rhodes, Aristoxenus, Clearchus and Theophrastus. Andronicus of Rhodes systematized the works of Aristotle. Aristotle presented his philosophy of nature in books entitled "Physics", "On the Heavens", "Meteorology" and "On the Parts of Animals".

Aristotle presented his fundamental philosophical knowledge in the books "Metaphysics", "Nicomachean Ethics" and "On the Soul". He presented his political philosophy in the books "Politics" and "Athenian Polity". He described the humanitarian topics of philosophy in the books "Analytics", "Topics", "On Sophistic Refutations", "Rhetoric" and "Poetics". Aristotle was a supporter of objective knowledge. This is evidenced by his expression: "Plato is my friend, but truth is more precious than friendship with Plato." In ontology, Aristotle developed the doctrine of the unity of matter and form in things.

The universe is in constant motion. To explain the driving force of motion, Aristotle introduced the concept of entelechy (the first mover). By developing the categorical apparatus of ontology, he described the structure of being. Aristotle examined the categories of essence and phenomenon, genus and species, quality and quantity. Aristotle in his book on logic described the basic forms of human thinking. He paid special attention to syllogisms.

In his book "Politics", Aristotle analyzed the forms of government. Aristotle characterized moral issues in his book "Nicomachean Ethics". In aesthetics, Aristotle relies on the category of kalokagathia (from "καλός" - "good")

The Cynic school, represented by Antisthenes and Diogenes of Sinope, cultivated asceticism. It implied complete inner liberation through renunciation of worldly goods. The Cyrenaic school, represented by Aristippus of Cyrene, Aretas and Aristippus the Younger, adhered to the principle of enjoying every moment of changeable and transient existence.

The Stoic school (Zeno, Cleanthes - the elder Stoa; Panaetius, Posidonius - the middle Stoa) flourished in the Roman Empire in the works of Seneca, Epictetus and Marcus Aurelius.

Epicurus adhered to moderate hedonism, giving preference to spiritual pleasures over physical pleasures. He considered philosophical conversations among friends strolling in the garden to be the highest of pleasures. The Epicurean school was called the "Garden". Epicurus considered peace of mind to be the ideal of philosophical life. Pleasures should not be avoided, but controlled with the help of reason within the limits of measure, so that they do not turn into suffering. In ontology, Epicurus developed the doctrine of the deviating atom.

The school of skeptics (Pyrrho, Sextus Empiricus) criticized philosophy for its lack of firm convictions and its inability to provide moral support in a difficult era. The school of eclectics (Plutarch, Cicero, Philo of Alexandria) sought to combine ancient Greek philosophy with the religious beliefs of Christianity. Religious mysticism manifested itself in the followers of the Gnostic school (Basilides, Valentinus, Marcion, Simon Magus and the Ophites). They positioned themselves as interpreting biblical wisdom in a philosophical sense.

In 529, the decree of the Roman Emperor Justinian legally prohibited the activities of philosophical schools, except for the Christian patristics of Augustine, Origen and Tertullian, since Christianity was legalized in the Roman Empire, the territory of which covered all the countries of the Mediterranean.

Data in the structure of world religions

In the 4th century, the Roman Emperor Constantine proclaimed Christianity the state ideology. The main book of Christians was the Bible. It consists of the Old and New Testaments. The Old Testament describes the ontology of the universe. The New Testament contains the moral commandments of the Bible.

Christianity became the main customer of construction engineering activities. Architects and builders were in demand for the construction of temples and monastery complexes. Also in medieval society, there was a high demand for the construction of castles. Their construction was linked to military tasks of defense and long siege. Christianity adheres to monotheism. God is the creator of the universe. Christian eschatology contains prophecies about the end of the world. Provi-

dential postulates faith in divine predestination. Fideism defends the primacy of faith over reason.

In addition to the dogmatic part, Christianity sought to form the intellectual part of patristic (the intellectual culture of the church fathers and the Catholic Church) and scholasticism the system of Orthodox and Catholic university education. Philosophy was used for these purposes.

Representatives of Latin Catholic patristic were Boethius, Origen, Tertullian and Augustine. Representatives of Greek Orthodox patristic were John Chrysostom (Chrysostom), Athanasius the Great, Michael Psellus, John Italus and Gregory Palamas. They adhered to a mystical irrational belief in divine commandments, and polemicized with ancient pagan rationalism. Augustine's book "The City of God" played an important role in Latin Catholic Christianity. The Roman Empire, which had been the main territory for the existence of philosophy for many centuries, was destroyed by the Germanic tribes as a result of the Great Migration of Peoples.

These tribes deprived the Romans of power and began to create their own states with the participation of the Catholic Christian Church. Cities arose in these states, the population of which strove for education and legal culture. Under the auspices of the Vatican, Catholic universities opened in the cities. In them, monks, using Aristotelian formal logic, discussed the dogmas of the Christian faith and taught students. Thus began the era of scholasticism. Representatives of this era included Thomas Aquinas, Anselm of Canterbury, Berengar of Tours, Roscellin of Compiègne, Pierre Abelard, Duns Scotus Eriugena and Roger Bacon.

Thomas Aquinas proposed to comprehend the Creator with the help of reason. He formulated five proofs of the existence of God. They logically deduce the existence of God from the orderliness of the natural universe. Raymond Lully created a logical machine (Lully's circles), with the help of which it was possible to analyze combinations of concepts. This is a mechanical analogue of a computer.

Jean Buridan formulated an argument called "Buridan's ass" against determinism. If freedom of choice did not exist, then a donkey between two identical bales of hay would die of hunger. William of Ockham formulated "Ockham's ra-

zor". This is a principle of knowledge that prescribes to cut off logical entities beyond measure. In logic, a discussion arose about universals (general concepts), which divided realists and nominalists.

The Arab tribes of the Arabian Peninsula, represented by the Prophet Muhammad, became the creators of the new world religion of Islam. This religion contained an intellectual part of philosophy. It was an applied philosophy related to medicine (Ibn Sina), mathematics (Al-Farabi), astronomy (Ulugbek) and logic (influence of Aristotle).

The religious philosophy of Islam was constituted by al-Kindi and al-Farabi. Abu Ali ibn Sina (Avicenna) wrote the "Book of Knowledge", in which he gave his own interpretation of Aristotle's books on logic and metaphysics. He is the author of a book called "The Canon of Medicine". In the book, the achievements of Galen and Hippocrates in the field of medicine are supplemented by the discoveries and medical ethics of Ibn Sina.

Ibn Rushd (Averroes) developed the concept of a single truth, to which philosophy and religion lead by different paths. He is the author of the book "Refutation of the Refutation". In it, he conducts a polemic with the Sufism of the ascetic dervishes. The founder of this Sufism was al-Ghazali, who wrote the books "Refutation of the Philosophers" and "Resurrection of the Sciences of Faith".

The philosophy of the Mu'tazilites (Wasil ibn Ata, Amr ibn Ubayd) and the philosophy of the Mutakallims turned out to be in demand among the Sunnis. The Shiites of Iran were popular with poems in the rubai style, the author of which was the philosopher Omar Khayyam. After the Middle Eastern countries came under British influence in the 18th - 19th centuries, many Islamic thinkers began to write books in English (Amr Khaled (Egypt); Ali Shariati (Iran), Muhammad Iqbal and Abul Ala Maududi (Pakistan)).

Christianity and Islam as world religions have become the fundamental spiritual basis of traditional societies in North Africa, Europe, the Middle East and Southeast Asia. This influence persists in the context of industrial society. It is more characteristic of North Africa and Asia. Islam has a system of spiritual edu-

cation. Christianity retains its position in Latin America and the Catholic countries of Europe, whose population is connected with the system of primary, secondary and higher education in Catholic universities created by the Vatican. These universities were opened in the Middle Ages. Among these universities were Cambridge, Oxford and the Sorbonne.

Thomas Aquinas, who was able to formulate universal approaches of theology to changing social reality, enjoys special authority in Catholic philosophy. His philosophy in the traditional society of the middle Ages was called Thomism. In the 20th century, it received a new development under the name of neo-Thomism.

In Latin America, liberation theology, which reflects the material and social difficulties in the life of a significant part of the Catholic population of the New World, turned out to be in demand. Personal, which emphasizes the close connection of the believer with God as the guarantor of his freedom and rights, has also become popular.

In Russia, the values of traditional society are preserved by Orthodox Christianity. This Christianity is associated with Russian religious philosophy and Russian cosmism. Russian religious philosophy was constituted when the Russian Empire faced the need to adapt to an industrial society. The efforts of its creator Vladimir Solovyov were aimed at solving this problem.

The relevance of this task was due to the fact that supporters of nihilism were gaining political strength in the Russian Empire. These people achieved political power in 1917, and Orthodox Christianity became an object of persecution. N. Berdyaev, S. Bulgakov, N. Lossky and S. Frank left the territory of Russia. The status of the Orthodox Church was restored in Russia after the collapse of the USSR at the end of the 20th century.

Russian cosmism on a religious mystical basis, thanks to N. Fedorov, formed the engineering direction of space technology development in Russia.

This direction was adopted by the USSR and made this state the first in the development of space technologies and rocket technology, which are used by the Russian military.

Data in the structure of non-classical philosophy of continental Europe

By continental Europe we mean the territory from Lisbon (Portugal) to the Urals (Russia). This territory does not include the British Isles, whose philosophers were not inclined to the topic of the crisis of culture, and for them the need to overcome the speculative and utopian philosophy, which they did not adhere to, unlike the philosophers of continental Europe, was not relevant.

One of the reasons for the difference between the philosophy of continental Europe and British philosophy was the inability of this philosophy to formulate an applied and realistically achievable strategy for the development of industrial society. Instead of economic priorities of industrial development, continental philosophy sometimes criticized itself, sometimes fell into the topic of the crisis of culture. In many ways, this was due to the fact that continental Europe was not able to complete the transition to an industrial society due to its own internal barriers.

And then, in order to overcome these obstacles, this philosophy either resorted to a total criticism of its own mind, or, following the example of Marxism, succumbed to revolutionary projects, but immediately did everything to stop their implementation. Britain's successes in the field of colonial policy also excited continental Europe, and it moved towards the First World War, created by the military confrontation of the Entente (Great Britain, Russia, France, the USA) against the military alliance of Prussia and Austria-Hungary. Against the background of the development of fundamental processes in the field of political philosophy, philosophical reflection of a humanitarian orientation was formed, the main subject of study and therapy of which was the average person of continental Europe.

In order to get closer to the world of these people, philosophy turned to a categorical reconstruction of the consciousness of these people.

The consequence of this appeal was a different picture of human consciousness. Thanks to it, the subject of philosophy became will (A. Schopenhauer), intuition (A. Bergson) and unconscious structures (Z. Freud). Existentialism has found that a continental European in an industrial society finds himself in a difficult bor-

derline situation between the dream of a comfortable, secure and peaceful life and the reality of his everyday life, which pushes this person to immoral and illegal actions (F.M. Dostoevsky).

The borderline situation creates constant psychological tension in the individual consciousness, which is aggravated by an inadequate assessment of rapidly changing conditions and an underestimation of the still-preserved well-being of the upper classes.

This inadequacy is demonstrated by literary characters in the novels of L.N. Tolstoy and in the plays of A.P. Chekhov. Collective stress, according to J. Ortega y Gasset, gives rise to the institution of the crowd in continental Europe, which can be used by radical political movements of nihilism, which they did with the support of the philosophy of life. The representatives of this philosophy, having comprehended the achievements of biology (the evolutionary teaching of C. Darwin) and the archeology of ancient civilizations, began to write books about the death of civilizations (The Decline of the West by O. Spengler).

F. Nietzsche concluded that in such extreme conditions of social life, an individual can rely only on the will to live. But since not all individuals have the resource of the will to live, then the only hope remains for the superman, who will become a transitional stage in the evolution of man as a generic being.

During this transitional period of revaluation of all values of traditional and industrial society, the superman will coexist with weak-willed people of the crowd, whom F. Nietzsche calls clay. This name is due not to a disdainful attitude towards these people, but to the fact that the superman can use these people to achieve his own goals. Clay people are easily subject to ideological transformation.

They are happy when their lives are given meaning and are given the status of a special historical mission. In this status, they find personal benefit. But in this status they can be aggressive and inhumane. This was demonstrated by the ideology of National Socialism in Germany, which cultivated the superiority of the Aryan race and which made Germany the state that initiated the Second World War.

During his medical practice in the hospitals of the Austro-Hungarian army (First World War), Z. Freud discovered that the structure of individual consciousness has a complex combination of logical (rational) and non-logical (irrational) functional components. He formalized his observations into the concept of psychoanalytic philosophy. When developing this concept, he was influenced by the lectures of the Austrian philosopher and psychologist F. Brentano, which he attended during his student years.

A representative of psychoanalytic philosophy, K. G. Jung, discovered that the transition of continental Europe to the industrial stage of development is accompanied by the disintegration of the collective unconscious, represented by archetypes. As a result, the forces of the crowd and nihilism, fettered by tradition, are released. In such conditions, an individual cannot cope with a new form of sociality, but he does not want to be part of a destructive collectivity.

This is a very difficult situation of freedom of choice between subsequent condemnation of the weakness shown and neutrality, which the forces of nihilism can neglect at any moment. It is difficult to remain on the sidelines in these conditions. Since the inhabitants of continental Europe rejected God ("God is dead, and we have killed him" - F. Nietzsche), there was nowhere to expect help from within the borders of their own continent.

It came in 1945, when in the presence of the command of the Soviet Army and the armies of the allies, representatives of the German command signed the act of surrender of Germany. Then a similar act of surrender was signed by representatives of the command of the Japanese army, which was an ally of the German army during the Second World War. Philosophers actively placed the blame for the crisis state of continental Europe and culture on technology as a key feature of civilization. O. Spengler, N. Berdyaev, M. Heidegger, K. Jaspers wrote about this.

The fault of technology was seen in the technological determinism it generated, which created a one-dimensional man (G. Marcuse) and his characteristic instrumental thinking (M. Heidegger). Against the background of this criticism, the futurists looked like masochists, since they interpreted the First World War as a

form of progress and went to the combat zone to show the details of this progress by visual means. K. Malevich proposed another version of the inevitable coexistence with technical progress.

He called this version the philosophy of non-objectivity. Against the background of the crisis theme, representatives of hermeneutics, neo-Kantianism, structuralism and phenomenology sought options for stabilizing the public consciousness of continental Europeans. Supporters of hermeneutics (W. Dilthey) appealed to the concepts of life and understanding social life in its historical features.

This was an emphasis on historical memory. Representatives of neo-Kantianism (Windelband, Rickert) placed their hopes on the philosophy of I. Kant and the main thesis of this philosophy about the a priori status of cultural values, which guarantees their inviolability.

Supporters of structuralism looked for institutions of its stability in culture itself. They found and studied these institutions through ethnography (Levi-Strauss) among tribes in the Amazon River basin, as well as in the structures of language (Barthes). Phenomenology offered the most abstract approach, which presupposed the rejection of psychologism (Husserl) and a return to pure logical thinking. The starting point of this thinking is intentionality (focus on the object).

But the efforts of supporters of the search for stable foundations of culture were devalued by representatives of the continental philosophy of postmodernism. They accused industrial culture of continuing to cultivate the main forms of social injustice that had passed to it from traditional society.

On this basis, J. Derrida proposed deconstructing industrial culture. It was supported by many philosophers of France. As a result, the main forms of social injustice were formulated, which became the subject of critical consideration of the philosophy of feminism, schizoanalysis, philosophy of discourse and philosophy of simulation (J. Baudrillard).

Not all philosophers of continental Europe were influenced by the theme of the crisis of industrial European culture. They proceeded in their reserved optimism from the thesis of positive science. They proposed (O. Comte, E. Mach, R.

Avenarius) to make philosophy itself positive. To achieve this goal, they proposed to carry out a logical and linguistic analysis of language (Vienna Circle, Lvov-Warsaw School of Neopositivism). L. Wittgenstein played a special role in the implementation of this program.

A protective screen for technology and technology was created by F. Des-sauer. He claimed that technology is God's plan. Therefore, criticism of technology cannot cancel its ontological status, which continental Europeans will still have to reckon with and coexist with in the mode of human-machine interaction. This thesis was confirmed by the dependence of Europeans on energy and industrial technologies, as well as their mass demand for cars. The society of mass consumption made technology part of the personal life of European ordinary people.

Data in the structure of political philosophy

The object of study of political philosophy is the political system of society, which in traditional and industrial societies is concentrated in the space of the state. The institution of the state arose after the transition of mankind to agriculture, a sedentary lifestyle and the construction of cities. The first states were city states. They united on the initiative of one of the cities by military means (Ancient East) or by trade through the creation of city-states by the Greeks along the coast of the Mediterranean Sea. The main issue for the state was the issue of strong state power, capable of conducting diplomatic dialogue with neighboring states, pursuing a policy of influence on other states and ensuring state power.

In traditional societies, states had different political modifications. These were eastern empires and despotisms, democracies, oligarchies, Mediterranean tyrannies, empires. There was high competition between states. As a result, the same territory throughout its history was part of different states. The largest in terms of territorial possessions were empires. States of traditional societies are the subject of archaeological research, since they left behind a unique infrastructure and technology. This is evident from the pyramids of Egypt and Central America.

The stability of states depended on both external factors of invasion and internal factors. Competition between groups within the ruling class or caste, rebellions and territorial fragmentation posed a particular danger to the structures of state power. The founder of political philosophy was Plato, who understood this philosophy as a rational construction of an ideal state. Plato saw the model of this ideal state in Atlantis. Aristotle understood political philosophy as a systemic description of the institutions of state power, state ideology, forms of exercising state power based on the institutions of democracy, aristocracy, tyranny and institutions of law. Political democracy in his understanding extended only to free citizens, who constituted an absolute minority of the city population. Slaves could not participate in political processes.

After the great migration of peoples from Asia to Europe and the collapse of the western part of the Roman Empire, the formation of the toponymy of European states began on the territory of the continent based on the Germanic and Slavic tribes. The Christian Catholic Church actively participated in these processes, which, based on the influence of the Vatican and its role in recognizing the power of kings, created a single geopolitical space of the civilization of the Medieval West. The influence of the Vatican was expressed in the dominance of canonical Christian law. The Vatican, through the infrastructure of the knightly orders, had significant military resources, which was demonstrated by the crusades it organized in the Middle East.

The blessing of the Pope meant not only the king's accession to the throne of power, but also his acquisition of the status of a servant of God. This status gave the king the authority to create a dynasty and transfer power to the heir. These practices of state administration and the participation of the Christian Church in them were justified in the works of Augustine the Blessed and Thomas Aquinas. The political philosophy of industrial societies was formed in the context of geographical discoveries, the development of manufacturing and weak territorial fragmentation of European state structures, which had difficulty resisting the expansion of their eastern neighbors from Asia.

These warlike neighbors were the Arab Caliphate, the Golden Horde and the Ottoman Empire, which ended the existence of the eastern part of the Roman Empire (Byzantine Empire) in 1453. Expansion into European territories was carried out by state formations of traditional societies that cultivated Islam. The political philosophy of industrial societies was created by representatives of the Renaissance. Three trends were represented in this philosophy.

One trend (T. Campanella, T. More) adhered to the tradition of Utopia. Within the framework of this tradition, scenarios of an ideal state were created. In fact, these were projects that were not feasible in practice. The second direction was a more practical direction (Machiavelli), since the subject of his study was a strong state and the role of the political personality in the long-term provision of the status of a strong state as a government based on strict requirements of state discipline. The sovereign, according to this model, was outside the scope of the law. He could use the entire permissible range of governance practices, since it was justified by the good of the people.

The third direction of political philosophy believed that the institution of state power should be combined not with canon law, but with natural law. Beginning with G. Grotius, the innate right of the individual comes to the forefront, which should be the goal of any legislation.

He considers respect for what belongs to individuals to be the basis of community life. The practical implementation of state legislation based on the philosophy of natural law, which states that the source of law is the people, was carried out in the Renaissance by Belarusian thinkers who had higher legal education and played an important role in the state administration of the Grand Duchy of Lithuania, Russia and Samogitia. Lev Sapieha, Andrei Volon, Mikhalon Litvin created a unique legal document that united all types of state and civil law and actually performed the functions of a constitution. This legal document was the Statute of the Grand Duchy of Lithuania, Russia and Samogitia in several editions.

An important role in the creation of this legal document was played by the philosophical poem "Song of the Bison" by Nikolai Gusovsky. It was written in

Italy in Latin. In it, the thinker discusses issues of strong state power, the role of the individual in governing the state, and the direct connection between the level of education of the people as a source of state power and the effectiveness of its influence on decision-making and the pacification of classes mired in internal strife. Internal political strife makes the state weak and unable to withstand external threats.

According to N. Gusovsky, it is important to create a political union of states that are close in values and historical memory in order to minimize internal weakness and avoid external aggression. The state authorities of the Republic of Belarus heeded these words of Nikolai Gusovsky when they created the Union State with the Russian Federation. T. Hobbes raised the issue of combating corruption in the political philosophy of the national state.

He believed that the state and the apparatus of officials associated with it are created by the people on the basis of a social contract. By this contract, civil society voluntarily transfers some of its functions to the state apparatus of officials. As a result, officials find themselves with greater powers and access to material resources. They begin to use their state position for personal material purposes. This means that they create an institution of corruption. The fight against corruption is one of the most important tasks for any state.

Leibniz, Wolff, Kant and Hegel developed political philosophy on the platform of natural law in Germany. Milton, Sidney and Locke developed political philosophy on the basis of natural law in England. In France, Rousseau developed political philosophy on the basis of natural law.

F. Engels in his book "The Origin of the Family, the State and Private Property" clearly defined the main features of the state. They include the territorial-administrative division of the state, the collection of taxes and the presence of officials who collect these taxes. The philosophy of Marxism linked the essence of the state with its economic basis. In all states, such a basis was private property, on the basis of which the ruling class was formed, which used the institution of the state for its own purposes. Therefore, K. Marx and F. Engels believed that in the absence of private property, the need for the institution of the state would disappear.

V.I. Lenin discovered a direct connection between the economic interests of private property of the capitalist class and the desire of capitalists to integrate themselves as much as possible into the structures of state power through the institution of lobbying their interests in order to use the army and police to protect their property, colonial seizures and suppress protests of workers and peasants. As a result of the integration of private capital and the state, state capitalism arose. And the colonial policy inherent in this capitalism made it imperialist capitalism. The imperialists initiated the First World War at the beginning of the twentieth century. Twenty years later, they initiated the Second World War.

Fundamental research in the field of political philosophy, which includes such areas as political ontology, political anthropology, political axiology, political praxeology, political ethics and political epistemology. They are based on interdisciplinary connections, which gave impetus to the formation of new areas of political science, such as chronological politics, environmental policy, global politics, political linguistics, biological politics and neural political science.

The subject of political ontology is the study of political space and time. Political space, demonstrating a variety of development, shows increased sensitivity to the passage of time. The development of a methodological apparatus for chronological politics, as a component of political philosophy, is an urgent task.

The subject of study is phase transitions, bifurcations, complications, hierarchical restructurings that generate political time. The principles of dynamics, systemic connections open up new possibilities for political forecasting. The sovereignty of small states, in particular, the Republic of Belarus, in the conditions of global turbulence is ensured by strong presidential power and the ability of these states to use the potential of military-political cooperation with states close to this state according to the criterion of common historical memory and culture.

Data in the structure of the philosophy of history

Philosophy, together with economic and legal sciences, studies not only the structure of society, but also its historical dynamics in the categories of the past,

present and future. This is the subject of study of the philosophy of history, the theoretical apparatus of which includes the concepts of the linear dynamics of human social systems (social dialectics) and the nonlinear dynamics of human social systems (social synergetic).

The concept of the linear dynamics of human social systems (social dialectics) reconstructs social history based on the principle of continuity of social processes. According to this concept, the past of humanity is a time duration of two million years. The starting point is the facts of human tool activity discovered by archaeologists in East Africa. It was cognitive artifacts that became the basis for the beginning of the countdown of human history. Cognitive artifacts reflect the presence of thinking, consciousness, knowledge in the form of experience in making tools and everyday life in a person when they are created.

The presence of a starting point for the historical dynamics of humanity presupposes a holistic view of this dynamics. Representatives of Marxism, based on the linear concept of history (social dialectics), substantiated the formational and civilizational approaches to the social history of humanity. The formational approach is based on the concept of formation, as well as on the historical dynamics of the change of formations.

K. Marx, within the framework of the past of humanity, identified successive formations. These are primitive communal, slave-owning, feudal, capitalist formations. The reasons for the change of formations were social injustice, the slave trade, non-economic coercion, alienation of labor. The communist formation, according to the plan of K. Marx and F. Engels, as well as their political followers in Europe, Russia, Asia, America and Africa, should eliminate all elements of social injustice and anti-humanism. Outside the political context, F. Engels substantiated the linear concept of the civilizational dynamics of mankind with the stages of savagery, barbarity and, in fact, civilization.

This concept is set out under his authorship in the book "The Origin of the Family, Private Property and the State". The idea of the integrity of human history

was supported in the 20th century by the concept of globalization. But at the beginning of the 21st century, signs of a crisis of globalization appeared.

Not all philosophers adhere to the linear concept of human history. O. Spengler, A. Toynbee believe that human history is represented by local civilizations unrelated to each other in space and time. Each of these civilizations has its own life cycle. Archaeologists have discovered evidence of the existence of civilizations on all continents.

K. Jaspers proposed the concept of axial time, according to which historical time synchronizes the life cycles of local civilizations. This means that they arise at approximately the same historical time. Interest in ancient civilizations and cultures has found expression in philosophical hermeneutics.

Whatever models of the past of humanity are discussed, the significance of history for people of the present is determined by how well they know the history of their people, especially the tragic aspects of their history, and how this knowledge allows them to avoid actions in the present that could return them to tragic events similar to those of the past.

For Belarus, historical memory is an important issue, since only in the 20th century did the country's civilians find themselves in the epicenter of the fighting in two world wars. The German occupation army in 1941-1944 was particularly cruel to the civilian population. This is evidenced by the memorial in Khatyn. This is the memory of thousands of Belarusian villages whose inhabitants were shot and burned by the German occupiers.

Data in the categories of culture and civilization References

The philosophy of history in the categories of culture and civilization was developed by representatives of ancient philosophy, the philosophy of the Enlightenment, the philosophy of Marxism, the philosophy of life, and structuralism. N. Berdyaev wrote about the relationship between culture and civilization. In fact, the categories of culture and civilization designate two periods of human history.

Culture is justified as a more attractive period of human history for people, since in this period of history there was no social inequality and the social conflicts it caused, in particular, wars. A similar position was held by representatives of Marxist philosophy, who idealized primitive societies in a model called "primitive communism" and considered the goal of human progress to be a return to this model, but on a higher technological basis.

O. Spengler (philosophy of life) in analyzing the value characteristics of culture and civilization gave preference to culture, since civilization was interpreted by him as the final stage of human history. One of the reasons for such a negative assessment was technology and technology. N. Berdyaev (personalism) substantiated a similar evaluative approach to culture and civilization. He also blamed technology for the destruction of culture. A similar assessment is contained in the books written by J. Ortega y Gasset (existentialism). It is argued that civilization gave birth to a crowd. These are people who have rejected traditional values and the social structure of society. They are determined to continue to destroy culture.

Representatives of psychoanalytic philosophy Z. Freud and K.G. Jung wrote about civilization as the basis for the formation of a crowd. E. Husserl (phenomenology) wrote about the crisis of culture. The fundamental flaw of the civilizational stage in human history was considered to be the nihilism it generated. This phenomenon was described by F. Nietzsche. He believed that the historical era of nihilism had already begun through humanity's reassessment of all values.

The boundary was the rejection of faith in God. According to F. Nietzsche, "God is dead and we have killed him." As a result, the era of traditional societies and the cultural values associated with them ended. The historical era of culture ended. This historical era was replaced by the historical era of civilization (industrial society). M. Heidegger wrote about the negative content of this historical era in the individual consciousness of people, although he himself was under the influence of nihilism, which manifested itself in his collaboration with the German Nazis during the Second World War. Some philosophical schools limited themselves

to criticizing the historical stage of civilization as an era of uncertainty and nihilism. These schools did not carry out a critical analysis of industrial society.

Representatives of Marxism accepted the fact of the existence of industrial society and, for the sake of returning to the initial primitive forms of organization of social life of mankind, allowed the use of technologies of civilization, as well as the use of the institution of the state to resist capitalism as the historically first modification of industrial society.

Most philosophical schools that stood on the positions of understanding the historical era of civilization as the progress of mankind avoided using the concept of capitalism. The position of technological determinism was taken as a basis. Based on this position, the stages of industrial, post-industrial and information societies were identified in the historical era of civilization.

According to the criteria of technological determinism, industrial society is based on industrial production, cities of factory and plant construction and a capacious market of low- and medium-skilled workers. Managers are engaged in the effective use of labor resources and the organization of production. Engineers and technical specialists ensure the development, implementation and operation of equipment and technologies. In percentage terms, workers dominate in the structure of industrial society, the class of which is replenished as a result of migration of the population from rural areas. Employment in agriculture tends to be minimal percentage values. This is possible due to new technologies of agricultural production and efficient organization of activity processes.

Industrial society at the post-industrial stage not only retains the industrial basis, but also transforms it to meet the tasks of functioning of the mass consumer society. Priority is given to the production of consumer goods, maintenance of these goods and provision of services. The outflow of population from rural areas to large cities has stopped at a minimum of 3-5% of the 100% value of the labor market. The flow of the working class into the middle class has also begun. Against the background of a decrease in employment in industrial production, employment of the population in the service sector has begun to grow.

Industrial society at the information stage actively uses digital technologies due to which information has become a valuable asset (Big Data). The use of information has become a key resource for digital platforms, digital ecosystems and digital metaverses. Large digital platforms create databases about users with their indirect participation through user requests. These information resources play an important role in digital marketing and digital logistics. The concept of technological structure is also used as a fundamental characteristic of industrial societies. The first technological structure was from 1770 to 1790. The components of the technological structure were spinning machines and their use in the textile industry. Mechanization of labor and the creation of flow production were carried out. The second technological structure from 1830 to 1850 was based on steam navigation, coal mining, and the use of railways.

The third technological order of the 1880-1920s was formed by inorganic chemistry, ferrous metallurgy, railways, shipbuilding, and explosives production.

The fourth technological order of the 1930-1990s was formed by the internal combustion engine, jet and turbojet engines, rockets, nuclear fuel, computers, lasers, and conveyor production. The fifth technological order of the 1990-2010s was formed by microelectronics, computer science, genetic engineering, new types of energy, materials, and satellite communications. Microelectronic components played an important role. The sixth technological order since 2010 has been determined by nanotechnology and NBICS convergence of technologies (NBIC).

Data in the structure of anthroponymy

The role of data in the structure of anthroponymy will be considered using the surname Loiko as an example. People with this surname live in Belarus, Poland, the USA, Ukraine, Russia, Finland, France, and Sweden. The surname "Loik" is common in France. The surname, first name, and patronymic often coincide. There are Alexandra Ivanovich Loiko in Russia (Krasnodar, Krasnoyarsk), Ukraine, and Belarus (Minsk). Scientists believe that the surname "Loiko" originates in the region of southern Belarus, where the city of Loyev is located. The city

is located on the banks of the Dnieper. It is territorially part of the Gomel region of Belarus. The root word for the surname "Loiko" is the word "loy". This is part of the fat base of a domestic animal, which was used for certain purposes.

People associated with the technology of obtaining loy began to be called by the name "Loy". Judging by the large geography of the spread of the surname "Loiko" among citizens of Belarus, Ukraine, Russia, other countries and even the Gypsies, this surname came into use long before the formation of ethnic communities in Eastern Europe. One of the factors in the spread of the surname was international migration. Representatives of the surname "Loiko" became residents of Siberia and the United States. Within Belarus, a certain toponymy of the surname "Loiko" was formed. This surname is common in the Grodno region.

This city has the status of a regional center. About 400 thousand people live in it. Not far from the city is a fairly large settlement "Loiki". The surname "Loiko" is common in Slonim. The city is located in the Grodno region. The population of the city is 30 thousand people. The city is famous thanks to the Oginsky family. Their residence and the famous theater they created were located in the city, the troupe of which became the basis for the Warsaw theater. The surname "Loiko" is also common in the vicinity of Slonim.

Another center of distribution of the surname "Loiko" is around the city of Baranovichi with a population of about 200 thousand people. The city is a large railway and industrial center. In its vicinity, within a radius of thirty kilometers, there are settlements where the surname "Loiko" predominates. The surname "Loiko" is also common in the Minsk region.

People with the surname "Loiko" were not distinguished by great ambitions. But among them there are representatives of the nobility, craftsmen who worked at the Radziwill manufactory in Slutsk. This city is located in the south of the Minsk region. Its population is 50 thousand people. Not far from the city there is an industrial mining region.

With the surname "Loiko" there is a famous pilot of the First World War. He was an officer in the Russian imperial army. During the Soviet period of history,

people with the surname "Loiko" became Belarusian writers and poets, military men and scientists.

One of the centers of dominance of the surname Loiko is the village of Konyukhi in the Lyakhovichi district of the Brest region of Belarus. You can get there by train by suburban train "Baranovichi - Slutsk" or "Baranovichi - Timkovichi". You need to get off at the stop "Podlesye". From the railway to the village of Konyukhi it is a thirty to forty minute walk. Since the village of Konyukhi is located on the asphalt road from Lyakhovichi towards Kletsk, you can go by bus to the stop "Konyukhi". You can also go by bus route "Lyakhovichi - Nacha", but then you will have to walk two kilometers from Nacha to Konyukhi. They went through Nacha from Konyukhi to Sinyavka. In the 16th-18th centuries, Konyukhi had the status of a royal estate where they bred horses.

Of the many people with the surname Loiko, Loiko Khristofor Vikentyevich (1901-1985) stands out. He came from a local family in the village of Konyukhi, which was called the Kovalevs because they were blacksmiths. In 1944-1947, Loiko Khristofor Vikentyevich was a private in the Soviet Army. After the capture of Berlin in 1945, he served in the military commandant's office of this city.

He was tall, broad-shouldered, with a good head of hair. He did not smoke or drink alcohol. He lost his father early. He had two brothers - Ivan, born in 1904, and Vikenty, born in 1907. Their fate was difficult. Almost nothing is known about one. According to assumptions, after the Great Patriotic War he migrated to Europe. Another brother, Ivan, was a member of the Communist Party of Western Belarus. Since 1920, Western Belarus was part of Poland.

Ivan was in a conspiratorial position, because he was afraid of being detained by the Polish authorities. And after being detained, Belarusians were sent either to the Bereza-Kartuzskaya concentration camp or to the famous Lukish prison in Vilnius. The Polish army occupied Vilnius. Lithuanian troops were unable to resist it. Poland's territorial claims against Lithuania regarding the Vilnius region were explained by the fact that the bulk of the population in the city and its envi-

rons were Polish-speaking Catholics of Belarusian origin. Ethnic Belarusians also considered Vilnius to be their cultural center. But the Poles had a regular army.

Ethnic Belarusians also considered Vilnius to be their cultural center. But the Poles had a regular army. The capital of Lithuania in the 1930s was Kaunas.

Loiko Ivan Vikentyevich lived with his family in Lyubcha and Novogrudok. Lyubcha is located on the banks of the Neman in the Grodno region of Belarus.

Novogrudok as a city has a rich history. The city became the first capital of the Grand Duchy of Lithuania. Mindaugas was crowned here in the 13th century. The city's castle fortification has survived to this day.

The works of Adam Mickiewicz are associated with Novogrudok and its environs. Not far from the city is Lake Svityaz, which he glorified in the poem *Svityazyanka*. In the poem *Pan Tadeusz* he described the nature of the local region, and in the poem *Uncles* - traditions.

The surnames Loiko and Kichilo were united through marriage. Before marriage, Loiko Nadezhda Iosifovna, born in 1912, had the surname "Kichilo".

The surname "Kichilo" has Bulgarian roots. It is translated as joyful, cheerful. Kichilo Iosif Ivanovich lived in 1850-1922. He had a brother Fabian. Kichilo Iosif's father was called Kichilo Ivan. He was born in 1825. Kichilo Anna Konstantinovna lived in 1851-1920. They were from the Puznovsky family. Loyko Nadezhda Iosifovna was short, thin, and fair-haired with an energetic character. People with the surname Kichilo also lived in Snov.

This is a well-known agricultural town in the Nesvizh district of the Minsk region. It specializes in meat and dairy production and grain farming. Loiko Khrystofor Vikentyevich (died 28.03.1985) and Loiko Nadezhda Iosifovna (died 31.12.2000) are buried in the cemetery in Konyuhi. Only the Orthodox part of the village population is buried in the cemetery. Catholics bury their deceased relatives in the cemetery in Lyakhovichy. There is no church or Catholic church in Konyuhi. There was only a four-year school, a store, a club, a cemetery, and a unique stone building of a reserve store, built in 1911.

A full-time school is located in Nacha, two kilometers away. An asphalt road with bus service runs from Konyuhi to Nacha. It runs parallel to a beautiful spruce forest. The area is hilly with significant elevation changes. This is the Kopyl Upland. The upland creates beautiful panoramic views over long distances.

There are few forests in these parts. They were cut down in the Middle Ages, since the territories belonged to the Radziwills. These are rich lands for grain crops and flax. Wheat, barley, oats, rye and corn grow well there. Konyuhi is the center of sheep breeding.

The nearest Orthodox church is in the village of Bolshoe Podlesye. In Konyuhi, there was a large garden behind the club. It remained from the estate of a rich man. It had many apple and pear trees. There was a beautiful alley of acacia, especially beautiful, was obvious when the trees were in bloom. Gradually, the garden lost trees, because no one looked after it.

Catholics live in Zharebkovich, Zubelevichi, Potapovich and Lyakhovich. The main place of their spiritual life is Lyakhovich. Part of the village in Zubelevichi is called "Varshavskoe predmestie".

The surnames Loiko and Kerus were united through marriage. The marriage was concluded between Loiko Ivan Khristoforovich and Kerus Malvina Kirillovna. She was born in the village of Dvorishche, Khoyniki district, Gomel region. And this marriage was preceded by the unification of two more surnames. The marriage was concluded at one time by the parents of Malvina Kirillovna - Kirill Andreevich and Sophia Romanovna. As a result, the Loiko surname became genealogically connected with the surnames Kerus and Shleg. The surname "Kerus" has its origins in the 15th century. The bearers of this surname were representatives of the highest Moscow clergy in the 15th-16th centuries, who had a royal privilege.

The surname is mentioned in the census list of the time of Ivan the Terrible. The surname comes from Southern Belarus, where great importance was always attached to the status of Orthodox priests. Kyiv was nearby. Suffering oppression from the Catholic Church, Orthodox priests moved to Muscovite Rus'.

The surname "Schlegh" has an intercultural origin from the German language. The word "schilling" was transformed into the word "schelling", then - "sheleg", and after the abbreviation it became "schleg". According to the anthropological external light features, Schlegh Sophia Romanovna had many similarities with the German type of appearance.

How could the Germans, and it is they who are being discussed, end up in the south of Belarus? Most likely, it was a compact placement of mercenaries from the Teutonic Order who served in the army of the Grand Duchy of Lithuania after they were defeated at Grunwald in 1410 and were faced with the choice of swearing allegiance to the victors or being executed. The surname "Schlegh" is typical for a limited area associated with the villages of Velikiy Bor and Khrapkov in the Khoyniki district. Apparently, not all soldiers and officers slept at night. The second source of the surname "Schlegh" may be a coin called "schilling". It was in circulation in many European countries. The coin appeared on the territory of Belarus due to the intensive economic and political ties of the Grand Duchy of Lithuania with European countries.

From 1418, a military contingent of five thousand people from the Grand Duchy of Lithuania was stationed in the Czech Republic during the Hussite Wars. It supported the Hussites. At one time, the Hussites even proclaimed Vitovt their king. Vitovt, at the head of a five-thousand-strong military detachment, sent his deputy Sigismund Korybutovich, the son of the appanage prince of Chernigov-Seversk, Dmitry Korybut of the Gedyminovich family.

Chernigov is located on the eastern side of the Dnieper River. It is not that far from Khoyniki. From 1422, Sigismund Korybutovich was in the Czech Republic. He was a talented military leader. He helped the Hussites defend the independence of the Czech Republic and resist the Holy Roman Empire, associated with the Vatican. Sigismund was popular among the Czechs. He was the deputy of the King of the Czech Republic and the de facto ruler of the Czech Republic. But he was forced to leave the country because of discord among the Hussites. In 1434, he re-

turned to the Grand Duchy of Lithuania, which was in a state of civil war. He was captured and executed by the winning side.

The city of Khoyniki is located in the south of Belarus, 107 kilometers from Gomel and 400 kilometers from Minsk. On the north-eastern forest outskirts of the city is a railway station. Trains with a change go to Minsk, Gomel. The bus station is located at the exit of the city in the western direction. From the bus station you can see Dvorishchi. The villages of Rudnoye, Ezapov, Sudkovo are located around. The Pripyat River flows nearby.

The Pripyat River is a tributary of the Dnieper River. It is a full-flowing and navigable river. Local residents traveled along it on hydrofoils to Kyiv, which is 150 kilometers away. The pier was in Tulgovichi.

The region described was at the epicenter of the Chernobyl accident. The Vetkovsky district was among the victims. The town of Vetka is unique in that Orthodox Old Believers from Russia settled here in the 17th century with the permission of local authorities. There is a museum of Old Believer culture in Vetka.

The surname "Gromyko" comes from the Old Believers. Andrei Gromyko, a native of these places, was the most authoritative Minister of Foreign Affairs of the USSR. The Sozh River flows through the Vetkovsky district. The surname Loyko is common in the Grodno region. Here in the village of Dudki, the family of Loyko Ivan Khristoforovich lived. He was the director of the school.

The village of Dudki is located on the highway. The distance to the district center of the city of Shchuchin is 56 kilometers. The distance to the city of Varena (Lithuania) is 40 kilometers. The Grodno-Dubichi, Shchuchin-Petyulevtsy and Shchuchin-Kaunas bus routes ran. The border with Lithuania is two kilometers away. In Soviet times, the border between Belarus and Lithuania was not demarcated and allowed free movement.

The village of Dudki is located in close proximity to the border of Lithuania and its unique forest country - Dzūkija. In Soviet times, the Chapkėliai Nature Reserve was created here. These places are the birthplace of the famous Lithuanian artist Čiurlionis. The main city of these places is Drużgeniki (Druskininkai). At

one time, the city was on the territory of Belarus (BSSR). But it was transferred by the USSR authorities to the Lithuanian side.

The sanatorium remained in the possession of Belarus. On the Belarusian side, there was no reserve, so the forest zone was subjected to melioration and industrial development. Pine forests were planted. The Kotra River flows through this forest border zone. Along the river from Motyl'skaya Kotra to Paramok there is a forest road. Around there are unique forests with rare species of trees and plants. In the lake "Kraskovo" there is a golden crucian carp. Since the lake is forested, there are a lot of mosquitoes.

The population of the territory is dense. The villages are located at a short distance in the field of view. These are Ryski, Romanovo, Raki, Streltsy, Yushkovtsy, Petyulevtsy, Benki, Zydary, Kashaty, Zamosh'e, Motyli and Zabolot'e.

In the forest part of the local territory there are the villages of Motyl'skaya Kotra and Paramok. In the forest zone there was also the village of Gorodishche, which was burned by the Germans in 1943, and all the inhabitants were shot.

The role of data in the study of industrial societies

The historical era of industrial societies began with the Renaissance and Reformation in the 14th century. The supporters of the Renaissance sought to completely abandon the religious worldview and move to the principles of secular law and way of life. Thus, Erasmus of Rotterdam in his book "Praise of Folly" in satirical form described the problems that worried the scholastics. Nicholas of Cusa (von Krebs) stood at the origins of the philosophy of humanism.

The philosophy of the Renaissance manifested itself in Italian cities associated with the logistics of the Great Silk Road. The poet and philosopher Dante Alighieri wrote the poem "The Divine Comedy". Giovanni Boccaccio wrote the social satire "The Decameron". Marco Polo described the Great Silk Road.

At the beginning of the sixteenth century, the Cinquecento era, such outstanding artists, engineers, scientists, philosophers as Leonardo da Vinci, Michelangelo Buonarroti, Raphael Santi, Benvenuto Cellini lived. The Reformers wanted

to use a modified religious Christian worldview. They believed that an industrial society needed a spiritual foundation. As a result, the urban inhabitants of Europe transformed Catholic Christianity.

The essence of the transformation was the refusal to obey the instructions of the Vatican. This is how the Christian branch of Protestantism arose. In Germany, Martin Luther became the spiritual leader of this branch. In French-speaking Europe, Jean Calvin became the spiritual leader. Protestantism spread to the northern countries of Europe, including Belarus. But in Belarus and France, Protestantism gave way to the Counter-Reformation, which restored the influence of the Vatican on the Catholic population of some European countries.

Protestants developed their own work ethic. Its role in the development of a market industrial society was studied by M. Weber. He showed on statistical data that the Protestant ethic was very effective.

It helped Protestants to settle in the New World (North America) and establish an industrial type of economic life there. Industrial society in the economic sphere is based on highly productive industry. This industry requires raw materials, and for the transportation of raw materials and goods, maritime logistics in the form of shipping are needed. In turn, shipping relies on optical technologies and the science associated with these technologies.

Nicolaus Copernicus stood at the origins of modern philosophy of science. In his book "On the Revolutions of the Celestial Spheres" he used mathematical methods to calculate the heliocentric model of the solar system.

Galileo Galilei formulated a methodology for empirical research of the solar system and designed a telescope for these purposes. Giordano Bruno became the first victim of religious persecution for his scientific views. In 1600, he was burned at the stake by the Jesuits.

Michel Montaigne in his book "Essays" examined the physical and humanitarian problems of science. He denied the sinfulness of human nature, looking for the source of morality in man. Within the tradition of social utopia created by Plato, Thomas More wrote the novel "Utopia". Tommaso Campanella wrote a book

called "City of the Sun". Miguel de Cervantes in his philosophical novel *Don Quixote* described the transition of European culture to an industrial society.

The social philosophy of the Renaissance was associated with the applied task of substantiating and practically using the concept of natural law. The source of natural law is the people. The greatest practical results in implementing the concept of natural law were achieved by lawyers in Belarus. F. Skaryna, S. Budny, A. Volan, N. Gusovsky and L. Sapieha managed to implement the new concept in constitutional law. This was the first example of using natural law at the state level.

The geographical discoveries of the Renaissance marked the beginning of the formation of new centers of philosophical reflection in Latin and North America and in Australia.

The formation of Latin American philosophical thought began in the Iberian colonial period, when the Spaniards destroyed the civilizations of the Aztecs, Incas and Mayans and, with the support of the Catholic Christian church, began to form a new cultural space. The Portuguese were engaged in a similar colonial task within the borders of modern Brazil. They also relied on the Catholic Christian church.

The Catholic Christian church relied on theology, in which scholasticism played an important role. The value status of theology in the public consciousness of the inhabitants of Latin America turned out to be very stable.

It is preserved in the industrial society of Latin America. The latest modification of religious philosophy was the theology of liberation and the "Ethical Philosophy" of Enrique Dussel.

During the historical period of the struggle of the formed Ibero-American race against Spanish and Portuguese rule, a request was made to philosophy to develop a philosophy of Latin American identity.

José Vasconcelos was engaged in developing a philosophy of the "Ibero-American race". Alejandro Korn focused on the topic of "Philosophy of Freedom". Vaz Ferreira was searching for a "new philosophy". The search for originality did not interfere with the use of the achievements of Spanish philosophy, in particular,

the concept of "perspectivism" of José Ortega y Gasset. Thinkers of Mexico demonstrated especially active reflection.

The historical and philosophical teachings of Jose Gaos and Samuel Ramos demonstrated this. The book by L. Cea entitled "The Philosophy of American History. The Destinies of Latin America" became a landmark.

The political philosophy of Bolivar (1783 – 1830) became the transition from Iberian colonialism to the creation of a Latin American essence. This philosophy asserts that the source of evil is the colonial origin of Latin America. Political independence gives little if it is not based on internal independence.

A. Bello proceeded from the need to reckon with the Spanish colonial past, which created the values of a common history and culture. Without their assimilation, it is impossible to find one's own cultural essence. D. F. Sarmiento denied the need for continuity. Martí y Pérez substantiated its own foundations as the subject of Latin American philosophy.

The project of finding one's own cultural essence was formulated in the philosophy of Rodó, A. Caso, J. Vasconcelos, González Prada y Ulloa and S. Sumet. Its implementation was continued in the works of the representatives of the "philosophy of Latin American essence" Gaos y González Paul, F. Romero, S. Ramos Magaña and L. Cea. But the philosophical reflection on an independent Latin American essence was dissonant with the dominance of US neocolonialism in Latin America, represented by puppet political regimes.

Cuba was the first to rebel, generating the phenomenon of Fidel Castro. Latin American organizations increasingly turned to the philosophy of Marxism. At the same time, they did not reject their own revolutionary basis, which they discovered in the philosophy of history of the Bolivarians. This philosophy states that Latin America has always depended on a specific center of power, which created various disasters for it. Any form of dependence brings exploitation.

Exploitation leads to the plunder of Latin America and because of this Latin America suffers. To stop suffering Latin America must achieve sovereignty. Latin

America is strong, but does not realize its overall strength. A strong personality can unite people around him and give them the determination to fight

Philosophical reflection in North America is based on the theology of the Protestant and Catholic communities of immigrants from the British Isles of Europe. The main language of these immigrants is English. In the 18th century, the religious philosophy of Puritanism was supplemented by the political philosophy of the founding fathers John Adams, Thomas Jefferson, Benjamin Franklin and James Madison. In practical application, this philosophy was realized in the US Declaration of Independence and the US Constitution.

The philosophical culture of North America continued to be influenced by the philosophy of the British Isles. It only became the basis of its own identity when pragmatism took a dominant position through the efforts of Charles Peirce. A prominent representative of pragmatism was George Santayana.

On the Australian continent, philosophical reflection began to be cultivated in the 19th century. It was studied by settlers from the British Isles Arthur Prior, David Armstrong, J. Smart, Frank Jackson, Passmore, John, Peter Singer, Genevieve Lloyd and Futa Helu. The main language of this philosophy is English.

The first department of mental and moral philosophy was created at the University of Melbourne in 1886. It was headed by Henry Lowry. He received his education at the University of Edinburgh in Scotland in the British Isles. After Henry Lowry, the department was headed by Boyce Gibson.

Data in empiricism, rationalism and sensationalism

After the industrial society determined the priorities of scientific and technological development, it made a request to philosophy to develop an effective methodology of scientific research.

Philosophers proposed methodologies for scientific research of empiricism, rationalism and sensationalism. Empiricism (F. Bacon) believes that science should be a laboratory experimental science. Its main methods should be induction and experiment. Induction is used to process data. Experiment is used to obtain data in

specially created conditions of a scientific laboratory. Empiricism subsequently became the basis for various varieties of positivism and analytical philosophy.

Rationalism (R. Descartes) believes that science should be based on a well-developed theoretical apparatus of mathematics and on the deductive method of constructing scientific knowledge. R. Descartes outlined this methodology in the books "Discourse on the Method" and "Principles of Philosophy". The analytical geometry developed by R. Descartes in the modification of engineering graphics was used at the Higher Polytechnic School of Paris to train engineers.

Descartes' supporter, a native of Belarus, Kazimir Semianovich, developed applied theories of ballistics, pyrotechnics and rocket science based on gunpowder mechanics. He outlined these applied theories in his book "The Great Art of Artillery", published in the Netherlands in Latin and soon published in other European languages. A prominent representative of rationalism is G. Leibniz. He substantiated the methodology of rationalism in the books "A New Experience Concerning Human Reason" and "Monadology". Leibniz believed that science should be based on the principles of mathematical logic, and not on sensory cognition. The principles of logic are not derived from experience. He formulated the law of sufficient reason. According to this law, any scientific statement must have logical proof.

Leibniz became the founder of the practice of modeling in modern science. Models are built as hypotheses that can subsequently be tested empirically. An example of such a model was Leibniz's doctrine of monads. Since it was a purely logical construction, Leibniz did not adhere to a material idealistic interpretation. In fact, he formulated the concept of possible worlds. This concept is currently used in virtual reality technologies.

Sensationalism (J. Locke) believes that scientific research should proceed from the thesis that feelings and sensations are the basis of knowledge. J. Locke formulated this thesis in his book "An Essay Concerning Human Understanding". The philosopher opposed innate ideas. In his opinion, ideas arise from sensory experience. In the 20th century, sensationalism received a design implementation in the form of sensory technologies. Sensory devices provide round-the-clock surveil-

lance and contact with the user within the framework of human-machine interaction. The first industrial revolution, along with research science, used the achievements of technological sciences and design developments.

Based on design developments, automatic weaving machines, lathes with automatic supports capable of moving a cutter fixed to them, and machines that independently performed or facilitated basic production operations were created.

Technical developments were introduced in the textile industry as a result of the invention of the spinning machine and the mechanical weaving loom.

The metalworking lathe was created by the end of the 18th century, when A.K. Nartov created a support, and Henry Maudsley equipped it with a cam chuck with precise guides for moving the cutter to the part. Eli Whitney invented a milling machine in 1818.

The mass production of machine tools was ensured by the creation of Christopher Spencer's "automaton". This machine was used as a programmable machine for the production of screws, nuts, gears and parts for the mechanical engineering industries. The machine was programmed by placing profiled cams along the perimeter of the turret drum. The cams controlled the movement of levers that fed parts and tools. Cam mechanisms were a common control method in machine tools and machines until the 1950s.

In the twenties of the 18th century Bouchon and Falcon designed looms for the production of patterned silk fabric, which were partially controlled by punched cards or punched tape. These looms were improved by Jacques de Vaucanson and Joseph Jacquard in the 1770s. In 1805, Jacquard developed an automatic loom.

The work of M. Faraday led to the creation of an electric motor and to the development of large electric generators, which made it possible to create an electrical network. Based on the results obtained in physics, the formation and development of an electric drive and elements of electrical automation began.

The development of technical devices required an understanding of the transformation of technological processes. Johann Beckmann was engaged in understanding these processes. He received his education in 1759 - 1762 at the Uni-

versity of Göttingen. From 1766 he was an extraordinary professor of philosophy, and from 1777 he was an ordinary professor of economics at the University of Göttingen. J. Beckmann considered technology as an independent science of production processes. He systematized the features of workshops and factories.

In 1777, he published the book "Introduction to Technology or the Knowledge of Workshops, Factories and Manufactories...". In the book, he defined technology as the science of processing natural objects. Technology provides a systematic ordering and scientific basis for the actions and knowledge necessary for the further development of production. In the "Outline of General Technology" he compared different types of work through the end-means relationship.

I. Beckmann's student was Johann Heinrich Moritz Poppe. From 1818 he was a professor at the University of Tübingen. In 1821, he published the book "Guide to General Technology". According to his definition, the subject of technology, as a science of crafts, is the description of production, tools, machines and instruments used in the processing of rough materials in craft establishments, factories and plants. Technology describes the structure of factories and machines, explains their mode of operation, calculates different tools and their use in various industries, shows what material the product is made of. Special technology considers each technical craft separately. General technology considers different industries according to their similar purpose.

Franz Reuleaux was educated at the Polytechnic Institute in Karlsruhe. He had extensive practical experience as a technical specialist. In 1861, he wrote the book "Constructor". A. Riedler was interested in the rational organization of engineering education. In 1856, engineers in Germany created the Union of German Engineers. It played an important role in updating the philosophy of technology.

Educational issues were one of the key topics of the Enlightenment. In addition to technological topics, an important role was given to economic and political philosophy. In the field of economic philosophy, an important role was played by the books of Adam Smith, in which he considered not only purely economic topics, but also ethical issues. Political philosophy in the British Isles was focused on the

current topic of the fight against corruption. The theme for this struggle was set by Thomas Hobbes's teaching on the state.

Big Data and Environmental Philosophy

The subject matter of environmental philosophy is based on the thesis that industrial society is located in the space of the Earth's biosphere and through technological processes exerts increasing anthropogenic pressure on the biosphere. As a result, the question arose about the capabilities of the biosphere to maintain a dynamic equilibrium on the planet in terms of climatic parameters, as well as in terms of the chemical composition of the atmosphere, in which oxygen and ozone play a key role for people. People breathe oxygen. The ozone layer, together with the Earth's magnetic field, acts as a protective screen from solar radiation.

The concept of "ecosophy", introduced by Felix Guattari, as well as deep ecology, which was developed by Arne Naess, are the basis for understanding environmental philosophy. The mutual activity of forms that create a harmonious world determines its expedient and optimal structure and the fact that nothing is done in it in vain. In the 20th century, this was expressed in J. Gibson's ecological theory of perception. One of the most important conclusions from the development of the extended ecological approach is that the ecological approach is a holistic and integrated holistic thinking.

When considering the Earth's biosphere, the concept of an ecosystem is used. When an ecosystem is affected by organisms that are not typical for it, detrimental consequences may occur. New organisms distort the natural order of things disrupt the natural balance and harming the environment.

Ecosystems can be of different sizes, exist in different spaces, both large and small. Ecological systems occupy forests, deserts, steppes. Planet Earth is a common ecosystem for all creatures living in it.

No ecosystem has clearly defined boundaries. Usually, each system is separated by a certain barrier in the form of a desert, archipelago or river. Since there are no clear boundaries, ecological systems smoothly flow into each other. That is

why several small ecosystems can be combined in lakes at the same time. In this case, each ecosystem will have unique characteristics that distinguish it from others. Such mixtures of ecosystems are called ecotones.

Natural ecosystems were created by nature in the form of forests, lakes, seas and oceans. Artificial natural ecosystems are created by man to satisfy utilitarian and aesthetic needs (vegetable garden, garden, park, flower garden).

A special topic in the philosophy of nature is the analysis of the concepts of the biosphere and noosphere. This perspective on nature within the Earth was set by T. de Chardin and V. Vernadsky. The biosphere is considered as a physical ecosystem within the Earth that arose through self-organization and evolution over 4.5 billion years. This is a geographical sphere that includes living organisms, the atmosphere, the hydrosphere and the lithosphere, as well as the products of the vital activity of living organisms. Humanity is a part of this environment.

The evolution of the biosphere within the Earth is accompanied by constant threats to its existence. Until the 20th century, this threat was mainly created by volcanic activity on the planet and the fall of meteorites and comets.

Since the 20th century, risks to the biosphere have been created by one of its components, represented by humanity. V. Vernadsky believed that the cause of this situation is the technological sphere created by humanity in the space of the biosphere, which has become an independent geological force in the form of industrial activity of people.

As a result, the problem of parallel, non-harmful coexistence of the biosphere and the noosphere within the Earth has arisen. This problem is included in the subject of ecology. The applied branch of this scientific direction is engineering ecology. It is based on the use of research in biology, chemistry and physics in creating projects for the full life cycle of open pit mines and shafts. This cycle contains an assumption about taking into account the costs of the subsequent return of mine workings to the natural environment of the Earth.

One of the options for a closed production cycle is a circular economy and recycling technologies. An important role is given to biotechnology in solving the

problems of minimizing the consequences of environmental industrial disasters. This is the localization of oil and fuel and lubricant leaks, as well as the embankment of radiation leak zones.

Biotechnology and chemical absorbents play an important role in water supply technologies and water drainage from sewer systems of urban environments and industrial zones.

At the present stage, environmental philosophy has become part of international political philosophy. The beginning of this synthesis was laid in the 90s of the twentieth century in Rio de Janeiro at the UN Conference on the Environment. At this conference, the green agenda was formulated in the form of a concept of the life of current generations without harming subsequent generations of people and without harming the biological and resource diversity of the Earth.

International conferences on the environment became a practice. In practical terms, they developed and adopted international protocols with their subsequent ratification at the level of national legislation. This is how the Kyoto and Montreal Protocols came into force. Through the quota mechanism, they regulate industrial emissions into the atmosphere and protect the Earth's ozone layer through restrictions on the use of chemicals harmful to the ozone layer in technical systems. Environmental standards for car engines have also been developed.

In thermal power engineering, the share of brown and hard coals began to decrease. The emphasis began to be placed on the development of energy-saving technologies and on reducing the material intensity and energy capacity of industrial products. Similar requirements affected the agricultural sector.

The green agenda has become part of the domestic political life of many countries of the European Union and North America. Some political parties, representing the emancipated population of megacities, are implementing the green agenda in every possible way, despite the rise in prices for energy resources and the rise in the cost of living for citizens. Other political parties, such as the Republican Party in the United States, do not adhere to the green agenda and give priority

not to ecology, but to traditional values and believe that the biosphere should be left in the mode of its own self-regulation.

At the level of civil private initiative, the organizational activity of A. Peccei on the creation of the Club of Rome, in whose activities he attracted owners of large capital, became effective. The Club finances research reports to the Club of Rome on environmental topics. One report is published every four years. AI technologies contain environmental issues. These issues are caused by the fact that these technologies involve the consumption of large amounts of electrical energy and water. They generate electronic waste. This implies the need for a raw material base of rare earth elements, the extraction of which is not always environmentally friendly. Data processing centers stand out in terms of environmental issues.

They consume large amounts of electrical energy. Significant amounts of water are used to cool servers. This has given grounds to assert that data processing centers can have a significant carbon footprint.

Data ecology in the categories of linear and nonlinear dynamics

The linear dynamics of the existence of nature and society are understood as directed processes of the evolution of nature (universal evolutionism) and the development of society. Continuity and certainty dominate in these processes. Due to this, these processes can be predicted and scientifically reconstructed.

The term "dialectics" is used to denote the linear dynamics of the existence of nature and society. The term has different semantics. In the original version of the Greek language, it denoted the art of conversation, dialogue and debate. In this context, dialectics was used to characterize the characteristics of human thinking in the processes of social communication. The first use of the term dialectics in this context in oral form is attributed to Socrates, and in written form to Plato.

Ancient philosophers also paid attention to the subject of dialectics associated with the dynamics of physical existence. Representatives of the Miletus philosophical school believed that the basis for this dynamics is created by opposites.

Heraclitus believed that the dynamics of physical existence is created by a dynamic foundation in the form of fire.

Subsequently, until the second half of the 19th century, the subject of dialectics was limited to aspects of the formation of the art of thinking in humans through scholastic discussions and debates (the Middle Ages of European Christianity). It was believed that grammar is the art of correct speech, rhetoric is the art of persuasion, and dialectics is the art of debate, separating truth from lies.

Therefore, dialectics was combined with the formal logic of Aristotle and the analysis of categorical structures and processes of human thinking carried out by this philosopher. The analysis of categorical structures of human thinking in German classical philosophy was carried out by I. Kant and Hegel.

A systematic approach to the description of the features of human thinking (subjective dialectics) and to the description of the semantic dynamics of the absolute idea as the other being of nature was applied by Hegel in his book "The Science of Logic". This was the intellectual platform of objective idealism.

Hegel described in detail the categorical apparatus of dialectics and the three laws of development of immaterial being, represented by the absolute idea, associated with it. One law describes the source of linear dynamics. Such a source is contradictions, the internal dynamics of which are formed by the interaction of opposites based on their identity and difference.

The second law of dialectics describes the mechanism of linear dynamics through the mutual connection between quantitative and qualitative changes in the system. In this mutual connection there is a measure of the dynamic equilibrium of the system, but this measure is not absolute, since the dynamics of quantitative and qualitative indicators of the system transforms it, prompting it to adapt through a leap to new parameters of its qualitative and quantitative characteristics.

The third law of dialectics describes the features of the processes of succession in systems through cumulativeness and transformation of the architecture of the system's components.

K. Marx and F. Engels believed that the action of the principle of dialectical development should not be limited only to the sphere of thinking and the dialectical logic of immaterial dynamics. They applied categorical structures and laws of dialectical logic to the description of the linear dynamics of processes in physical nature (dialectical materialism), to the description of the linear dynamics of social processes (historical materialism) and to the description of the linear dynamics of processes in the economic system of the base (economic determinism).

They outlined their philosophical views in the books "Philosophy of Nature", "Anti-Dühring", "Theses on Feuerbach", "Capital". On the platform of Marxist philosophy, Russian philosophers and representatives of Western European Marxism, in particular, T. Adorno, were engaged in the development of dialectics. Taking into account the conceptual work done by philosophers, the structure of the theory of the linear dynamics of the existence of natural and social systems was constituted, including a description of the features of human logical thinking.

The structure of this theory includes principles, a categorical apparatus and laws. The initial principles of the theory under consideration are the principles of objectivity, mutual connection and interaction, direction of linear dynamics (development), determinacy of linear dynamics (determinism), and systemicity.

The principle of objectivity prescribes a person to see natural and social reality as it really is. Based on this principle, the professional activity of an engineer is built. It consists in the fact that criteria proportionate to the real state of affairs should be applied to technological reality.

The principle of universal connection and interaction indicates the mutual connection of objects of varying complexity, quality, and level. It means the integrity of natural and social being, its internal unity, interconnectedness, interdependence of all its components, objects, phenomena, and processes. Connections can be external and internal, direct and indirect, genetic and functional; spatial and temporal, random and regular.

Gravitational, electromagnetic, weak, and strong nuclear interactions play an important role in natural systems. They form the architecture of natural systems.

When creating technical systems and technological processes, designers take the interaction of various components in these systems as a basis and design these interactions to ensure the functional qualities of technical systems.

The principle of the direction of linear dynamics (development) asserts the impossibility of absolute rest in nature and society. Development is presented as the self-development of matter. Development is considered both a movement toward new states of the system (evolution) that meet new conditions, and a return for some period to already existing forms of dynamics (regression).

The principle of the causality of linear dynamics (determinism) substantiates the role of cause in the structure of effect. It actualizes the important role of causal connections, when one causal connection generates another causal connection. Processes are conditioned by the fact that they have either an external or an internal cause. The cause, in turn, generates an effect, and the connections as a whole are called cause-and-effect relationships.

In the implementation of these connections, an important role is played by possibility and reality, necessity and chance. Taking into account the role of these factors, determinism has modifications of rigid and non-rigid determination. The mathematical apparatus of non-rigid determination is based on probability theory. It assumes taking into account errors and randomness in the dynamics of processes.

The principle of systematic means that matter does not exist chaotically, but in an orderly manner based on the mechanism of connections that form a system in which they are located in a dynamic order.

In addition to principles, any theory includes a conceptual (categorical) apparatus of concepts that are used to interpret and describe processes characteristic of natural and social systems. Thus, the law of contradiction (unity and struggle of opposites), which describes the sources of linear dynamics of natural and social systems, has a conceptual basis in the form of the categories of identity, difference, opposition, contradiction, conflict and dialogue.

The basis of contradiction is formed by the relationship between identity and difference. The dominance of identity means that opposites strive for mutual com-

plementarity based on effective interaction. In living nature, such a method of self-organization led to the formation of the biosphere, in the space of which all living organisms, through the range of tolerance, found for themselves advantageous "technological niches" of joint evolution and due to this, the biosphere became a stable system with a high rate of efficient use of resources.

If differences become dominant, then the role of systemic advantages of cooperation and division of functions is devalued. Practices of conflict, confrontation and violence come to the forefront in social systems. Conflicts manifest themselves in society in the form of quarrels, fights, trade wars, protectionism, sanctions, terrorism and wars. For society, it is important to be able to resolve conflicts peacefully through legal institutions and diplomacy.

The constructive role of the law of contradiction was discovered by A. Altshuller in the process of developing the theory of inventive problem solving (TIPS). The law of measure (mutual transition of quantitative and qualitative changes) describes the mechanism of linear dynamics in conditions of dynamic equilibrium of the system. In order for this equilibrium not to be disturbed, various regulatory quantitative and qualitative reference measures of norming and standardization of professional activity of people are used in social systems.

Quantitative reference measures are developed by metrology for various technical systems and technological processes. Quantitative regulatory measures for maintaining the dynamic equilibrium of the world economy are developed on the basis of quotas for the entire range of commercial products in order to maintain a balance between supply and demand in the market.

Thus, excess of demand over supply leads to a deficit in the market and to an increase in prices, which undermines the capacity of the consumer market and undermines the competitiveness of industrial companies due to the growth of costs for electric energy. Excess of supply over demand leads to a fall in prices for commercial products and makes their production unprofitable for companies, since they cannot recoup the costs of their production.

In the applied plan of ensuring microeconomic and macroeconomic competitiveness, the category of quality plays an important role. This is a whole system of technological solutions and standards that are developed in production management to solve the problems of competitiveness and the effectiveness of the professional activities of specialists. In international practice, a quality management system is widely used, which includes a number of quantitative definitions, for example, ISO 9000 and ISO 9001.

The law of succession (negation of negation) uses the concepts of determinism, succession, cumulateness, negation, double negation as a categorical apparatus. Determinism indicates the determinacy of linear dynamics in natural and social systems. The resources of the past form the basis for creating the content of the present. The continuity of scientific and engineering schools, as well as culture, plays an important role in the content of social dynamics.

No less important is the cumulative nature of natural and social systems. In living nature, its expression is the genetic code and instinct. In social systems, cumulateness is most relevant for the activities of economic and state institutions. First of all, this applies to the indicators of liquidity of the banking system and the indicators of gold and foreign exchange reserves of national banks. The concept of "negation" indicates that in linear dynamics there are evolutionary leaps that pursue the goal of systemic modernization of institutions of traditional society with their subsequent transformation into institutions of industrial society.

The evolution of many states followed a similar path. The concept of double negation indicates that social evolution is practically incompatible with radical forms of modernization of society and the individual. Therefore, the radical first denial is almost always followed by the stage of the second denial, which preserves the evolutionary basis of society and personality.

In engineering activities, this means that technical specialists prefer not so much a complete rejection of some generations of technical systems and related technological practices, but rather give priority to the modernization of already operated technical complexes and technological processes. This allows, without stop-

ping the main production, to achieve an increase in the efficiency of technological processes by automating them and combining them with robotic complexes.

The nonlinear concept of the dynamics of the existence of nature and society began to be developed in ancient times (Indian philosophy, Chinese philosophy) based on ontology, which explained the origin of the existing order of existence from chaos. The ideological rejection of the nonlinear interpretation of the existence of nature and society was explained by people's unwillingness to deal with uncertainty. Anxiety and concern for people were created by the nonlinear concept of the civilizational space of humanity on Earth, developed under the influence of the crisis of European culture and archaeological data by O. Spengler, A. Toynbee and K. Jaspers. From this concept it followed that local civilizations are born and die in the space of the Earth, which leave behind scientific evidence in the form of cities and lost technological achievements.

But philosophy was forced to return to the subject of nonlinear dynamics after discoveries were made in chemistry (I. Prigogine) and physics (G. Haken) that made it inevitable to develop a concept of nonlinear dynamics of the existence of nature and society using categorical means of philosophy and modern science. The concept of nonlinear dynamics of the existence of nature and society is based on the principles of self-organization, order from chaos, dissipation, turbulence, uncertainty and probability.

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