

IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE IN MODERN LOGISTICS

Arutyunyan A.H., student

Baltsevich A.S., student

Scientific supervisor – Slesaryonok E.V., senior lecturer

English language department №1

Belarusian National University of Technology

Minsk, Republic of Belarus

The logistics sector is the backbone of international trade in our increasingly interconnected global economy, enabling the seamless flow of commodities across intricate supply networks. With previously unheard-of levels of operational intelligence, cost savings, and efficiency, the integration of artificial intelligence (AI) technology is radically changing logistics operations. According to researches, the use of AI in 2025 in logistics might result in 1.3-2 trillion in annual economic value due to waste reduction and enhanced operations. Demand forecasting, route optimization, warehouse management, autonomous transportation, and machine learning algorithms are just a few of the logistics-related fields that are being revolutionized by AI-powered solutions. Robotics and automation improve warehouse operations, and AI-driven predictive analytics helps businesses anticipate supply chain disruptions and reduce risks [1].

“AI makes it possible to automate processes, analyze large amounts of data, and predict demand. Key areas of its application include: route optimization, which includes real-time analysis and dynamic planning of routes; algorithms of machine learning algorithms analyze traffic congestion, weather and other factors to suggest optimal delivery routes. This reduces fuel costs and travel time; predictive analytics” [1].

- Automation warehouses. “Robots, equipped with AI can sort, load and unload goods, speeding up processes and reducing reliance on human error (working of automated guided vehicles (AGVs) and collaborative robots (cobots) alongside human employees” [2].

Some companies already do use AI in solution of some logistic problems [2]. Amazon is actively uses robots and predictive analytics to optimize warehouses and logistics processes. DHL is implementing AI for

routing and demand prediction. Tesla and Waymo are testing autonomous trucks that could replace drivers in the future for long-distance transportation. Despite inherent challenges, the urgent need for AI integration in logistics is undeniable. Significant financial investments in AI development and implementation are already underway, highlighting the industry's commitment. However, substantial budget allocation isn't solely about software and hardware; it also encompasses the considerable costs associated with data migration, system integration, and ongoing maintenance. Furthermore, successful AI deployment requires a skilled workforce. Training programs must cover not only the technical aspects of AI systems but also the ethical considerations. This necessitates collaboration between logistics companies, educational institutions, and AI developers to create targeted curriculum and reskilling initiatives that address the evolving needs of this sector. The logistics sector is already undergoing a transformation because to AI, which is changing how products are handled throughout supply chains, stored, and transported. Businesses may increase overall productivity, minimize inefficiencies, and rationalize working processes by means of actively using automation, machine learning, and big data analytics. "AI-powered solutions improve the speed and precision of logistics processes by enabling real-time shipment tracking, predictive vehicle maintenance, and automated decision-making. The increasing usage of autonomous vehicles for delivery and transportation is one of the most significant developments brought about by AI. Drones and self-driving trucks are being tested and used to manage long-haul freight and last-mile deliveries" [1]. That can easily and more effectively diminish the necessity to rely on human drivers while increasing efficiency and safety. In order to ensure on-time delivery with the fewest possible delays, these cars use artificial intelligence (AI) to negotiate routes, adapt to shifting traffic circumstances.

References

1. ИИ в логистике: 9 удивительных глав о том, как ИИ меняет отрасли – URL: <https://julienflorkin.com/ru/> (date of access 20.03.2025).
2. Болдычева А.Г., Аналитика больших данных для динамического планирования и управления запасами (А.Г. Болдычева, журнал "Аудитор", N 11, ноябрь 2024 г.) – URL: <http://ivo.garant.ru/#/document/482317624> (date of access 20.03.2025).