THE INFLUENCE OF BIG DATA IN THE BIOTECH INDUSTRY

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The biotechnology industry is ruled by data. The explosion of data in the last few years has been critical to the progress of technology and science in biotechnology. In its simplest form, biotech is the science of technology based on biology. It harnesses scientific cellular and biomolecular processes to develop technologies and products with the sole purpose of improving lives and the health of our planet. Over the last decades, humankind has leveraged biotechnology in agriculture, food production, and medicine but it is now inclusive of diverse scientific fields such as genomics, recombinant gene techniques, immunology, drug development, and more.

In recent years, Big Data analytics in the biotech industry has made the biggest impact in the following areas:

1. Genomics: Modern genomics relies heavily on Big Data analytics due to the vastness of available information in the field. Big Data has radically changed the industry by making the genomic technology commercially attainable, cost-wise and time-wise.

2. Drug discovery: The tedious and costly process of drug discovery within the biotech industry is simplified with the help of Big Data analytics which helps pharmaceutical companies analyze collections of millions and millions of compounds to build predictive models for drugs with a higher chance of success.

3. Agriculture: Environmental conditions change from season to season and from day to day. It is important for farmers to have accurate information to cope responsibly and intelligently with the changing environment. Big Data analytics contributes by analyzing GPS-fed information to implement precision farming. Additionally, analytics is also a significant contributing factor to genetic research to develop GMOs. These engineered crops can be altered more efficiently using data to improve yields and adapt in a fast-paced environment.

4. Health care: In the past, even though hospitals had access to a wide array of patients' data including diagnosis history, medical charts, nurse's records, genetic information and personal habits, there was no system that could effectively manage it all. However, big data analytics can now be deployed in the healthcare industry to analyze unstructured data.

An example of a big data use case in Korean healthcare comes from Samsung Medical Center (SMC). The center provides big data-driven personalized and precision medicine based on a patient's genetic makeup, medical history and lifestyle patterns.

This service uses big data technology to analyze a patient's entire medical record to formulate a personalized and optimized treatment plan as well as diagnose any other potential illnesses. The focus of this system is more towards managing and protecting patients' health, rather than just providing treatment.

In 2013, the SMC partnered with Daumsoft to develop a suicide forecast system. Predictors of suicide from social media data, such as consumer price index,

unemployment rate, weather, and well-publicized suicides, were used to monitor national suicide rates. The SMC's successful application of big data has inspired other hospitals such as Seoul National University Hospital and Ajou University Hospital to follow suit.

Big Data is generating results in different industries because innovative companies are using it to unlock value, trends, and insights. The biotech industry is quickly adapting to Big Data solutions because they have both public and private information sources that offer research, safety, and quality improvement opportunities. Part two will cover how Big Data is specifically impacting drug safety and research.

References

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