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Smart Solutions: Ai's Impact on Pharma

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Abstract

Artificial intelligence (AI) is the capability of a computer program or machine to mimic intelligent human behavior, do instantaneous calculations, and assess new data in light of previously assessed data.. Artificial intelligence (AI) applications in healthcare have significantly transformed the medical industry. These include electronic medical records (EMR) and imaging, as well as data storage and access for health organizations, physician intelligence augmentation, and precision and preventive medicine. Pharmaceuticals have major role in drug development such as the Technology is taking the role of traditional drug design techniques and it also contributes to drug discovery but deals with major ethical issues. Recent patents, pharmaceutical businesses are utilizing advances in artificial intelligence (AI).

Keywords: - Software, EMR, intelligence.

Introduction

The pharmaceutical industry has traditionally been characterized by a slow and methodical approach to drug discovery and development. But things are changing at a never-before-seen rate as artificial intelligence (AI) finds its way into more and more pharmaceutical research and development projects. [1,2] The fast improvement of technology and the rapid development of the pharma industry and drug design techniques have evolved the life of each of us. One fundamental aspect of computer science, artificial intelligence (AI), has greatly benefited many fields of science and technology, from fundamental engineering to medical research. As a result, the fields of medicinal chemistry and health care have begun to use AI.
Computer-aided drug design has supplanted traditional drug design techniques in recent years. Artificial Intelligence is being used widely to enhance drug design methods and time requirements. [3] Additionally, AI makes it easy to identify the target proteins, increasing the likelihood that the intended medication will be successful. [4]

Artificial intelligence's function in medication development

With over 1060 molecules, the wide chemical space facilitates the synthesis of several therapeutic substances. However, the lack of cutting-edge technologies makes the process of creating new medications more challenging and expensive; artificial intelligence (AI) can assist in addressing this issue. AI can expedite the validation of therapeutic targets, differentiate between hit and lead compounds, and improve the design of drug structures. [3, 6]

OTHER THAN ITS SIGNIFICANCE

The amount, expansion, diversity, and ambiguity of data are the main causes of the few significant data points that provide a challenge to AI. Millions of molecules may be present in data sets that pharmaceutical companies have available for drug research; conventional machine learning algorithms might not be able to handle this amount of data. [2] Many distinct chemicals or basic physicochemical features like log P or log D can be reliably predicted by a computer model known as the quantitative structure-activity relationship, or QSAR. Because these models lack a solid biological foundation, they are not very good at predicting the effectiveness and side effects of medications, for example. In addition, short training sets, inaccurate experimental data in training sets, and a dearth of experimental validations are addressed by QSAR-based models. [1, 6]
In order to address these issues and assess the safety and effectiveness of pharmaceutical compounds using massive data modeling and analysis, recently developed AI techniques like deep learning (DL) and pertinent modeling studies may be employed. In order to track the benefits of deep learning (DL) in the pharmaceutical industry's drug discovery process, Merck

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sponsored a QSAR ML competition in 2012. DL models outperformed classical ML techniques in terms of predictability across 15 drug candidate ADMET (absorption, distribution, metabolism, excretion, and toxicity) data sets.

Predictive Analytics in Clinical Trials

One revolutionary use of artificial intelligence (AI) that could significantly increase the effectiveness and success of clinical research is predictive analytics in trials. Its AI-powered capabilities have the potential to completely transform the medication development process [5,8]. AI can speed up the discovery of novel treatments and cut costs by strengthening data quality, optimizing trial design, recruiting more patients, and predicting outcomes. To guarantee that AI is utilized properly in clinical research, it is crucial to address ethical and regulatory issues.

Although they are expensive and time-consuming, clinical trials are an essential stage in the development of new drugs. AI-driven predictive analytics help streamline this process by identifying patient populations, optimizing trial design, and predicting patient outcomes. This leads to more efficient trials and, ultimately, quicker drug approvals. [4,8]

Drug Safety and Pharmacovigilance: Drug safety and pharmacovigilance are critical aspects of the pharmaceutical industry and healthcare systems. They primarily focus on monitoring and ensuring the safety of drugs and medical products once they are on the market. **Drug safety**, also known as pharmacological safety, refers to the evaluation and monitoring of the safety profile of drugs during their development and after they are approved for use. It involves identifying, assessing, understanding, and minimizing the risks associated with drug use [2]. Within the specialty field of medication safety, pharmacovigilance concentrates on identifying, evaluating, comprehending, and averting side effects and other drug-related issues. It entails the methodical gathering, observation, and reporting of adverse drug reactions (ADRs) and related events connected to medications and medical supplies. Pharmacovigilance is essential to guaranteeing patient safety of pharmaceuticals available on the market. It assists in identifying possible safety issues that could result in limits, labeling revisions, or even medication recalls, as well as in the ongoing enhancement of drug safety. [9,3]

In summary, drug safety and pharmacovigilance are integral to the pharmaceutical industry and the healthcare system, working to ensure the safety and effectiveness of drugs and medical products throughout their lifecycle.

Challenges and Ethical Concerns:

While AI has immense potential in pharma, there are challenges and ethical concerns to address. Data privacy, regulatory hurdles, and the need for transparency in AI decision-making are among the key issues that must be tackled. The fusion of various technologies has resulted in the blurring of boundaries between conventional medical product categories including pharmaceuticals, medical devices, and human tissues, giving rise to new generations of medical technology goods. [10]

Conclusion:

AI plays a severe role in monitoring the safety of drugs once they enter the market. By analysing adverse event reports and real-world data, AI systems can identify potential safety concerns and help regulatory agencies make informed decisions regarding drug labelling and restrictions.

AI is revolutionizing the pharmaceutical industry by significantly reducing the time, cost, and risk associated with drug discovery and development. From accelerating drug discovery to enabling personalized medicine, AI-driven smart solutions possess the capacity to change the way we go about healthcare. However, addressing challenges and ethical concerns is crucial to realizing the full potential of AI in pharma. As the field continues to evolve, it's essential for pharmaceutical companies, researchers, and regulators to harness the power of AI responsibly and collaboratively to bring about positive changes in patient care and drug development.

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References

1. Farhud DD, Zokaei S. Ethical Issues of Artificial Intelligence in Medicine and Healthcare. Iran J Public Health. 2021 Nov;50(11):i-v. doi: 10.18502/ijph.v50i11.7600. PMID: 35223619; PMCID: PMC8826344.
2. Paul D, Sanap G, Shenoy S, Kalyane D, Kalia K, Tekade RK. Artificial intelligence in drug discovery and development. Drug Discov Today. 2021 Jan;26(1):80-93. doi: 10.1016/j.drudis.2020.10.010. Epub 2020 Oct 21. PMID: 33099022; PMCID: PMC7577280.
3. Ramesh A. Artificial intelligence in medicine. Ann. R. Coll. Surg. Engl. 2004; 86:334–338. [PMC FREE ARTICLE] [PUBMED] [GOOGLE SCHOLAR]
4. 2. Miles J., Walker A. The potential application of artificial intelligence in transport. IEE Proc.-Intell. Transport Syst. 2006; 153:183–198. [GOOGLE SCHOLAR]
5. Yang Y., Siau K. MWAIS; 2018. A Qualitative Research on Marketing and Sales in the Artificial Intelligence Age. [GOOGLE SCHOLAR]
6. Wirtz B.W. Artificial intelligence and the public sector—applications and challenges. Int. J. Public Adm. 2019; 42:596–615. [GOOGLE SCHOLAR]
7. Smith R.G., Farquhar A. The road ahead for knowledge management: an AI perspective. AI Mag. 2000;21 17–17. [GOOGLE SCHOLAR]
8. Lamberti M.J. A study on the application and use of artificial intelligence to support drug development. Clin. Ther. 2019; 41:1414–1426. [PUBMED] [GOOGLE SCHOLAR]
9. Beneke F., Mackenrodt M.-O. Artificial intelligence and collusion. IIC Int. Rev. Intellectual Property Competition Law. 2019; 50:109–134. [GOOGLE SCHOLAR]
10. Ethical issues in Artificial Intelligence in Health care (itu.int)