ROLE OF ARTIFICIAL INTELLIGENCE IN PHARMA INDUSTRY

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Abstract –
Now a days artificial intelligence is emerging in almost ever fields. It can be used in various fields like Research & Development, drug development, diagnosis, disease prevention, epidemic prediction, manufacturing and marketing. AI concentrates on how computers analyze the data. AI has achieved human level capabilities and continue to improve rapidly. For pharmaceutical industry AI can improve decision making and transform for better medicines. On successful implementation of AI in the delay in drug development, failure of clinical trials can be reduced.
Keywords – Artificial Intelligence, Tools and Networks, Medical Diagnosis, Drug Discovery

Introduction -

Artificial Intelligence is a branch of science and technology that creates that creates intelligent machines and programs to perform various tasks that requires human intelligence. It is a system which can mimic the various functions which humans can do. AI works by using the big data in order to achieve excellent performance for the given tasks. A few years ago AI was just a concept which was seen in science fictions which included the effects of technology but now it has become a part of our day to day life. AI has brought significant impact on various industries like health care, manufacturing, research and development, drug development, diagnosis, disease prevention, marketing, remote monitoring and epidemic prediction. History of AI was created by the philosophers and fiction writers. To understand the importance of being a human philosophers brought the concept of intelligent machines. To find the intelligence of a machine "Turing test" – If a human cant distinguish between a machine and another human when he interacts with them then the machine is intelligent. Artificial Intelligence plays a major role in growth and development of India by acting as a catalyst which can accelerate the development. India provides vast opportunities with large workforce, democracy and economy. The applications of AI enhances not only the public sectors but also the private sectors. Within the recent years many start up companies are emerged in India among which 170 companies are based on AI.

AI tools and Networks –

AI involves several method domains such as reasoning, knowledge representation, solution search and a fundamental paradigm of machine learning (ML). ML works by using the various patterns within a particular set of data. Deep Learning (DL) is a subfield of ML which engages Artificial Neural Networks (ANN). The consist of a set of interconnected sophisticated computing elements involving perceptron analogues to human biological neurons which mimics the transmission of electrical impulses in the human brain. ANN constitute of set of nodes each receiving a separate input ultimately converting them in output. It involves various types which includes Multi-layer perceptron network, (MLP), recurrent neural networks (RNN) and convolutional neural networks (CNN) which utilizes either supervised or unsupervised training procedures. MLP network has many applications which includes the pattern recognition, optimization aids, process identification and controls.

AI in Life cycle of Pharmaceutical Products –

Involvement of AI in development of a pharmaceutical product which assist in decision making, determine the right therapy for a patient, including personalized medicines and managing the clinical data generated and use it for future drug development. E-VAI is a analytical and decision making AI platform developed by Eularis which uses ML alogrithms along with an ease to use user interface to create analytical roadmaps based on competitors, key stakeholders and currently held the market share to predict key drivers in sales of pharmaceuticals thus help market executives to allocate resources for the maximum gain.

AI in Drug Discovery –

Due to the lack of advanced technologies it limits the drug development process making it a time consuming and expensive task which can be addressed by the AI. AI can recognize lead compounds and it provides a quicker validation of the drug target and optimization of the drug structure design. Different applications of AI in drug discovery are in drug design, polypharmacology, chemical synthesis, drug repurposing and drug screening. In drug design AI is used to predict the 3D structure of the target protein, predicting the drug protein interactions and determining the drug activity. AI helps in designing biospecific drug molecules and multitarget drug molecules in polypharmacology. AI in chemical synthesis is used in prediction of the reaction yield and retrosynthesis pathways and in designing synthetic route. AI in drug repurposing it helps in identification of the therapeutic target and prediction of the new therapeutic use where as in drug screening for toxicity, bioactivity, physicochemical property and identification and classification of target cells.

AI in Medical Diagnosis –

The use of Artificial Intelligence is rapidly growing in the medical field especially in diagnostics and management of treatment. Accurate diagnosis is a fundamental aspect of the global health care systems. In the recent years AI and machine learning have emerged as powerful tools for assisting diagnosis. Doctors can make use of the advanced machine learning systems to collect, process, and analyze vast volumes of patients healthcare data. Healthcare providers around the world are using this ML technology to store the sensitive patient data securely in the cloud or a centralized storage system. This is known as Electronic Medical Records (EMR). Doctors can refer to the records when there is a need to understand the specific genetic traits on the health of the patient. ML systems can use the data stored in EMR's to make real time predictions for the diagnosis purposes and suggest proper treatment to patients. As ML technologies possess the ability to process and analyze the large amount of data quickly and can help quicken the diagnosis process which can save many lives.

AI in Disease Prevention –

Pharma companies can make use of AI to develop the cure for diseases like Alzheimer's, Parkinson's and STD's. Disease prevention with the help of AI can be used to identify the ecological epidemiological patterns that lead up to epidemics to predict the outbreaks before they happen. Mathematical models and machines can be used to analyze the huge amounts of data to get clues about the next likely source of the infections. Tracking the spread of the diseases by using the AI enabled systems which will help doctors to detect the spread of the diseases as new patients enter the hospital and for the rapid diagnosis aided by machine learning. To identify the most promising compounds for drug testing scientists use AI for the analysis. Medical researchers assisted by the AI analyze the virus genomes for quickly developing the vaccines in part by detecting mutations as they emerge. In the case of Covid – 19 the analysis might initially prove challenging as AI requires large quantity of data. Researchers now use AI in identification of the ecological and epidemiological patterns that leads up to epidemics.

AI in Manufacturing –

Pharma companies can implement AI in the manufacturing process for higher productivity, improved efficiency, and the faster production of the life saving drugs. AI can be used to manage and improve manufacturing process like quality control, predictive maintenance, waste reduction, design optimization and process atomization. AI can replace the time consuming conventional manufacturing techniques thereby helping pharma companies for launching drugs in market much faster and at cheaper rates.

AI in Marketing –

By using AI pharma companies can explore and develop unique marketing strategies that promise high revenues and brand awareness. AI can help to map the customer journey which allows companies to see which marketing technique led visitors to their site and ultimately pushed the converted visitors to

purchase for them. In this way the pharma companies can focus on making more strategies that lead to increase revenues.

Conclusion –

In the past few years considering amount of increasing interest towards use of AI technology. It has been identified for analyzing some important fields in pharmacy like drug discovery, medical diagnosis, disease prevention, manufacturing and in marketing. AI technological approaches believe like human beings imagining knowledge, cracking problems and decision making. The uses of automated workflow and database for analysis which employing AI are found to be useful.

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