



EMBRACE OF ARTIFICIAL INTELLIGENCE WITH MACHINE LEARNING OUTPUTS EXTRAVAGANZA OUTCOME

Jaydeep Roy, Dibyendu Dutta, Sourav Hatui*, Soumya Chakraborty and Dr. Dhruvo Jyoti Sen

School of Pharmacy, Techno India University, Salt Lake City, Sector-V, EM: 4/1, Kolkata-700091, West Bengal, India.



*Corresponding Author: Sourav Hatui

School of Pharmacy, Techno India University, Salt Lake City, Sector-V, EM: 4/1, Kolkata-700091, West Bengal, India.

Email ID: dhrubos69@gmail.com.

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ABSTRACT

Artificial Intelligence (AI) is an umbrella term for computer software that mimics human cognition in order to perform complex tasks and learn from them. Machine learning (ML) is a subfield of AI that uses algorithms trained on data to produce adaptable models that can perform a variety of complex tasks.

KEYWORDS: AI, ML.

INTRODUCTION

Artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems. Specific applications of AI include expert systems, natural language processing, and speech recognition and machine vision.

Artificial intelligence (AI) makes it possible for machines to learn from experience, adjust to new inputs and perform human-like tasks. Most AI examples that you hear about today – from chess-playing computers to self-driving cars – rely heavily on deep learning and natural language processing.



Figure-1: Cognition wave controlled by software.

Some of these types of AI aren't even scientifically possible right now. According to the current system of classification, there are four primary AI types: reactive, limited memory, theory of mind, and self-aware. Artificial intelligence leverages computers and machines to mimic the problem-solving and decision-making capabilities of the human mind. **Alan Turing** was the first person to carry out substantial research in the field that he called Machine Intelligence. The field of AI research was founded at a workshop held on the campus of Dartmouth College, USA during the summer of 1956.

Those who attended would become the leaders of AI research for decades. The history of artificial intelligence (AI) began in antiquity, with myths, stories and rumors of artificial beings endowed with intelligence or consciousness by master craftsmen. The seeds of modern AI were planted by philosophers who attempted to describe the process of human thinking as the mechanical manipulation of symbols. This work culminated in the invention of the programmable digital computer in the 1940s, a machine based on the abstract essence of mathematical reasoning.

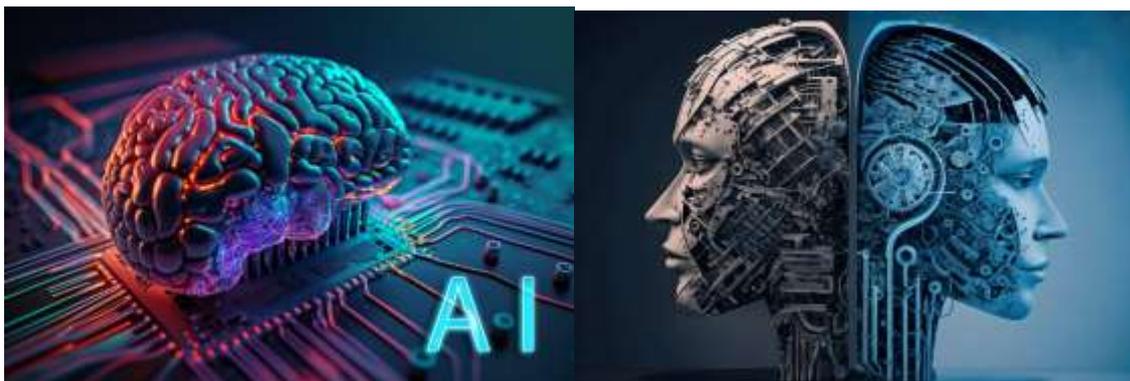


Figure-2: Artificial Intelligence and Machine learning as cognition dual nature.

This device and the ideas behind it inspired a handful of scientists to begin seriously discussing the possibility of building an electronic brain. **John McCarthy** is considered as the **Father of Artificial Intelligence**. John McCarthy was an American computer scientist. The term "artificial intelligence" was coined by him. He is one of the founder of artificial intelligence, together with Alan Turing, Marvin Minsky, Allen Newell, and Herbert A. The term "AI" could be attributed to John McCarthy of MIT (Massachusetts Institute of Technology), which Marvin Minsky (Carnegie-Mellon University) defines as "the construction of computer programs that engage in tasks that are currently more satisfactorily performed by human beings because they require high-level. **John**

McCarthy (September 4, 1927 – October 24, 2011) was an American computer scientist and cognitive scientist. He was one of the founders of the discipline of artificial intelligence. He co-authored the document that coined the term "artificial intelligence" (AI), developed the programming language family Lisp, significantly influenced the design of the language ALGOL, popularized time-sharing, and invented garbage collection. McCarthy spent most of his career at Stanford University. He received many accolades and honors, such as the 1971 Turing Award for his contributions to the topic of AI,^[3] the United States National Medal of Science, and the Kyoto Prize.



Figure-3: John McCarthy, Ada Lovelace and Arthur Samuel [Inventors of AI & ML].

Birth of AI: 1950-1956. The term "mother of AI" is often used figuratively to refer to **Ada Lovelace** [Augusta Ada King, Countess of Lovelace (10 December 1815 – 27 November 1852) was an English mathematician and writer, chiefly known for her work on Charles Babbage's proposed mechanical general-purpose computer, the Analytical Engine. She was the first to recognize that the machine had applications beyond pure calculation.], an English mathematician and writer who lived in the 19th century. While she is not the literal mother of AI, she is considered the first computer programmer and made significant contributions to the concept of artificial intelligence. History and relationships to other fields.

Birth of ML: 1959. The term machine learning was coined in 1959 by **Arthur Samuel**, an IBM employee and pioneer in the field of computer gaming and artificial intelligence. The synonym self-teaching computers was also used in this time period. **Arthur Lee Samuel** (December 5, 1901 – July 29, 1990) was an American pioneer in the field of computer gaming and artificial intelligence. He popularized the term "machine learning" in 1959. The Samuel Checkers-playing Program was among the world's first successful self-learning programs, and as such a very early demonstration of the fundamental concept of artificial intelligence (AI).



Figure-4: AI in Biometrics and Robotics.

AI is revolutionizing pharmacy practice by improving medication management, streamlining workflow, and enhancing patient safety and outcomes. Artificial intelligence (AI) is revolutionizing the field of health care and the practice of pharmacy is no exception. AI can also be used to predict a patient's prognosis by analyzing various data sources, including medical images, electronic health records, and genomic data. This can help doctors develop personalized treatment plans for their patients. In addition, AI can assist in drug development for cancer treatment. AI can assist pharmacists in managing their medication inventory, predict medication demand, and identify potential drug

interactions and adverse reactions. This can help pharmacists make more informed decisions about prescribed medications and how to manage medication regimens. While AI can never replace pharmacists, it can certainly enhance their ability to deliver care efficiently. Administrative tasks are an integral part of a pharmacist's responsibilities, and AI can automate these processes to free up more time for patient-centered care. AI-driven platforms streamline communication between pharmacists and clinicians by delivering real-time updates on patient medications, potential drug interactions, and dosage recommendations derived from integrated patient data.



Figure-5: AI in robotics pharmacy.

Examples of tasks that a robot could automate are packing drugs in pouches or boxes, loading products on trays or stacking boxes on pallets. Clearly, there are several options for implementing automation through robots within the pharmaceutical industry. Artificial Intelligence (AI) and big data technologies are transforming the pharmaceutical industry by enabling companies to restructure their business models,

rationalize biopharma manufacturing, improve financial decisions, reduce human error, increase performance, and boost speed to market.

Disadvantages: Training complications. AI technology needs to be extensively trained with curated data sets in order to perform as expected. Change can be difficult. In any industry, change can prove challenging.



Figure-6: AI in banking & examination.

Artificially intelligent computer systems are used extensively in medical sciences. Common applications include diagnosing patients, end-to-end drug discovery

and development, improving communication between physician and patient, transcribing medical documents, such as prescriptions, and remotely treating patients. AI

chatbots can be integrated with wearable devices such as smart watches to provide insights to both patients and caregivers in improving their behaviour, sleep and general wellness. The extensive application of AI-based technology in the defense sector covers many functions and possibilities such as training, surveillance, logistics,

cybersecurity, UAV, advanced military weaponry like LAWS, autonomous combat vehicles & robots. Artificial intelligence (AI)-enabled smart watches continuously monitor the heart rate, which potentially helps to diagnose unwarranted rhythm and irregularity problems such as tachycardia, bradycardia, and fibrillation.

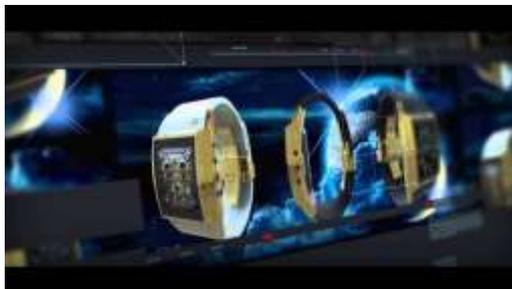


Figure-7: AI Smart watches.

AI can be used to verify the identity of students and to detect if they are using unauthorized materials. AI can also be used to detect patterns of cheating, such as groups of students giving the same answers to questions. Overall, AI has the potential to make online exams more efficient, secure, and fair. AI can be used in proctoring

software to track eye movements, facial expressions, and keyboard strokes to detect anomalies during online exams. Moreover, AI-based text analysis tools can identify subtle changes in a student's writing style, indicating potential AI-assisted cheating.



Figure-8: AI in drug store and microbiology lab.

Machine learning (ML) is a field of study in artificial intelligence concerned with the development and study of statistical algorithms that can learn from data and generalize to unseen data, and thus perform tasks without

explicit instructions. Recently, generative artificial neural networks have been able to surpass many previous approaches in performance.



Figure-9: AI in ANN and Gaming.

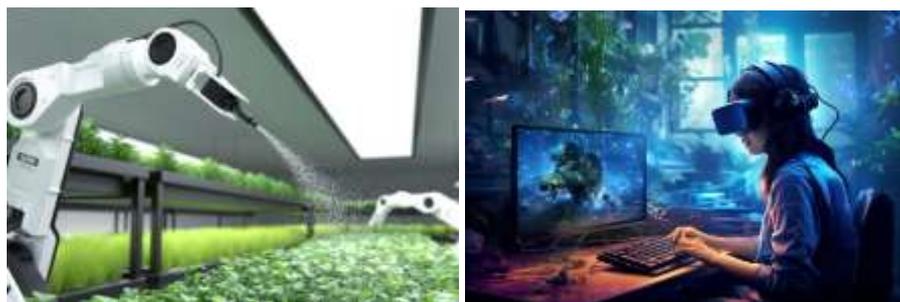


Figure-10: AI in Agriculture & Oceanography.

Machine learning approaches have been applied to many fields including large language models, computer vision, speech recognition, email filtering, agriculture, and medicine, where it is too costly to develop algorithms to

perform the needed tasks. ML is known in its application across business problems under the name predictive analytics.



Figure-11: AI with ML in Banking & Transaction.

Although not all machine learning is statistically based, computational statistics is an important source of the field's methods. There are four basic types of machine learning: supervised learning, unsupervised learning, semi supervised learning and reinforcement learning. The type of algorithm data scientists choose depends on

the nature of the data. Machine learning is used in internet search engines, email filters to sort out spam, websites to make personalized recommendations, banking software to detect unusual transactions, and lots of apps on our phones such as voice recognition.

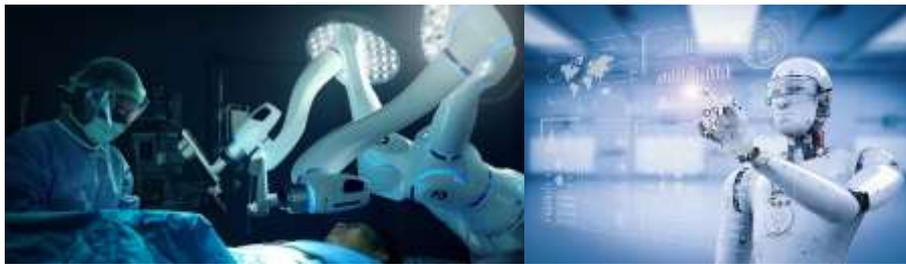


Figure-12: AI in Robotic Surgery.

Machine learning involves showing a large volume of data to a machine so that it can learn and make predictions, find patterns, or classify data. The three machine learning types are supervised, unsupervised, and reinforcement learning. The term machine learning was

coined in 1959 by Arthur Samuel, an IBM employee and pioneer in the field of computer gaming and artificial intelligence. The father of machine learning is Geoffrey Everest Hinton.



Figure-13: AI in DNA Fingerprinting & Engineering.

Geoffrey Everest Hinton CC FRS FRSC (born 6 December 1947) is a British-Canadian computer scientist and cognitive psychologist, most noted for his work on artificial neural networks. From 2013 to 2023, he divided his time working for Google (Google Brain) and the

University of Toronto, before publicly announcing his departure from Google in May 2023, citing concerns about the risks of artificial intelligence (AI) technology. In 2017, he co-founded and became the chief scientific advisor of the Vector Institute in Toronto.



Figure-14: Geoffrey Everest Hinton.

The simplest way to understand how AI and ML relate to each other is: AI is the broader concept of enabling a machine or system to sense, reason, act, or adapt like a human. ML is an application of AI that allows machines to extract knowledge from data and learn from it autonomously. Correlation, in the context of AI, refers to the statistical relationship between two or more variables. It helps us understand how changes in one variable relate to changes in another. This relationship allows AI systems to make accurate predictions and decisions based on available data.

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The inspiration has been reflected to make Artificial Intelligence and Machine Learning article from the AI picture of Sourav Hatui currently studying in baccalaureate course in pharmacy of 6th semester [Third Year]. Mind blowing creativity has given inspiration to all the authors to reach the milestone of success because success walks on the footsteps of hardships to reach at target [Sneh N. Patel, Kamlesh R. Prajapati, Nadim M. R. Chhipa, Dhrubo Jyoti Sen, Dron P. Modi; *Success walks on the footsteps of hardships to reach at target*: International Journal of Pharmaceutical Research and Bio-Science, 2014; 3(2), 315–351.

CONCLUSION

A subset of artificial intelligence (AI), machine learning (ML) is the area of computational science that focuses on analyzing and interpreting patterns and structures in data to enable learning, reasoning, and decision making outside of human interaction. Advancements in AI for applications like natural language processing (NLP) and computer vision (CV) are helping industries like financial services, healthcare, and automotive accelerate innovation, improve customer experience, and reduce costs. A correlation is the statistical summary of the

relationship between two sets of variables. It is a core part of data exploratory analysis, and is a critical aspect of numerous advanced machine learning techniques. Machine learning is an application of AI. It's the process of using mathematical models of data to help a computer learn without direct instruction. This enables a computer system to continue learning and improving on its own, based on experience. ML is an artificial intelligence methodology. All ML solutions are AI solutions. AI is best for completing a complex human task with efficiency. ML is best for identifying patterns in large sets of data to solve specific problems.

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