WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

EVOLUTION OF ARTIFICIAL INTELLIGENCE

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ABSTRACT :

Artificial intelligence refers to computers or computer-aided machines that can comprehend complex algorithms. AI is a powerful tool which brings a new revolution in the world. AI, or artificial intelligence, has developed steadily. Over time, it has impacted numerous industries, including machine learning, robotics, and neural networks. It is referred to as computer artificial intelligence, and it conveys wisdom. Wisdom is power, but artificiality refers to something that is not natural or created by humans. Acquire and utilize knowledge and abilities. Many different fields of artificial intelligence research, each with its own applications and definitions presented. This paper's objective is to provide a summary of the offerings in artificial intelligence (AI), as well as its various applications and environment.

Keywords: Artificial Intelligence, Neural Network, Deep Learning, Machine Learning, AI Winter, Humanoid

Introduction :

When we talk about computer programmers with human-like thinking and behavior, we are talking about artificial intelligence (AI). Artificial intelligence (AI) is either a boon or a bane for this world. Artificial intelligence was started in 1956. It entails creating computer programs and algorithms that are capable of carrying out operations like speech recognition, visual perception, decision-making, and language translation that normally require human intelligence [1]. Artificial Intelligence has the capacity to revolutionize numerous sectors, with uses ranging from self-driving cars to virtual personal assistants. The goal of AI is to mimic human intelligence for boosting the output and speed. Artificial intelligence gives innovation the meaning of the word 'intelligence'. As they measure the intelligence of a tiger. In experiments in the wild, bees lack solitary individuals unless they develop highly efficient collective systems. Artificial intelligence (AI) can be used to execute a sequence more accurately than humans. Artificial intelligence (AI) is more efficient than human intelligence because it is never boring or versatile. This paper clearly notes how our lives have changed due to the advancement of AI.

History :

- **1943:** Warren McCulloch and Walter Pitts completed the first research in what is now known as artificial intelligence. A neurological model is established.
- **1949:** Donald Hebb showed how to modify the code to vary the strength of interactions between neurons. Hebbian learning is the modern term for that regime
- **1950:** English mathematician Alan Turing, inventor of machine learning that year. "Computing Machinery and Intelligence" was published by Alan Turing, who also proposed experiments on it. The Turing test is used to determine if a machine is capable of exhibiting intelligent behavior comparable to a human.[7]

AI Winter :

First winters of AI occurred in the 1970s when the first AI research projects failed to meet the ambitious goals, And expectations were great for AI, but as it became clear that technology was still poised to fulfill those promises No one, so did funding for AI research dwindle.[3]

Second AI Winter (late 1980s to early 1990s): The second AI winter followed an exciting period in the 1980s when expert systems were seen as a take on AI playing a promising role but proved difficult to build and maintain these systems, often did not meet expectations . Funding and interest in AI declined further during this period.

Third AI Winter (early 2000s): The third AI winter was caused by the bursting of the dot-com bubble and the lack of significant progress in AI research. [6]

Areas of Artificial Intelligence :

1. **Machine Learning :** It is among the areas of AI where devices can imitate human abilities. Clarification and knowledge derived from experience are both elements of machine intelligence (ML). Today, machines have largely taken the place of human labor on the globe. But it's still unclear how these machines could be taught to comply with our requirements.

These devices can now function independently and produce their own judgments. There are three main categories of machine learning. These are the following:

- **Supervised-learning:** It indicates that some data has already been assigned the right response. An algorithm for supervised learning gains knowledge from training data with labels, which facilitates the prediction of unknown data.
- **Unsupervised Learning:** In this you need to allow the model to work on its own. It is computationally more complex.
- **Reinforcement-learning:** It is a feedback-based machine learning technique where an agent acts in a given environment and observes the outcomes of that behavior to learn how to behave in that environment.

1. **Artificial Neural Networks (ANN)**: Artificial Neural Networks are built using biological neurons structural and operational features. Implementation of neural networks in computational applications process the information in such a manner similar to the body of its own muscles which is not linear numerical data modeling techniques such as modern neural network Very popular characters. As nerves send information to our brain, there is a series of processes they are called nodes.

2. **Deep Learning:** Deep learning involves training artificial neural networks that typically need intelligence comparable to humans. Computers can learn on its own and perform human-like tasks.

3. **Robotics:** Artificial intelligence reduces the need for human labor by using artificial intelligence to perform specific tasks in a real environment. While a robot requires its own hardware, other intelligent environments rely primarily on software. The ability to move allows robots to interact with the real world. There are some most popular robots like Sophia. Robotics is a great field to explore now-a-days.
4. **Fuzzy Logic:** In the digital age, there is only yes/no or true/false. Real world possibility included things probably, definitely, greatly, & definitely. Precarious systems can have many applications in the automotive industry, such as in aircraft, independent gearboxes, four-wheel steering, humidifiers, air conditioners, dryers, heaters, and other climate-controlled devices so no resolution itself.

Diagram to show relationship between AI, ML and DL:

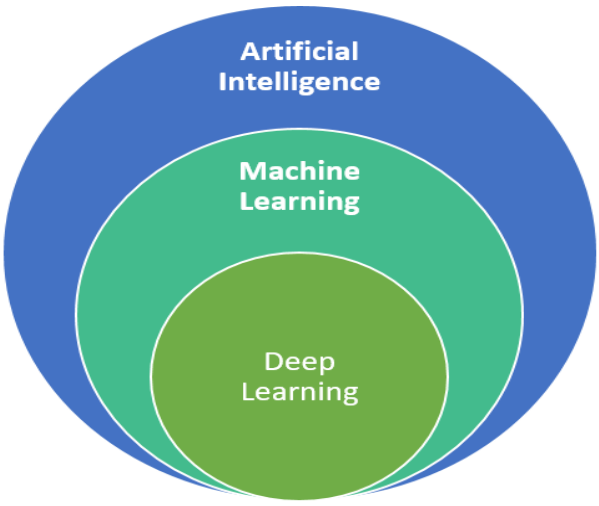

Figure 1: artificial intelligence, machine leaning and deep learning Source: Nadia BERCHANE (M2 IESCI, 2018)

Advantages of Artificial Intelligence

1. **Automation:** Artificial intelligence (AI) can carry out labor-intensive, repetitive tasks, boosting output and lowering human error. This is especially helpful for data entry, logistics, and manufacturing tasks.
2. **Decision Making:** AI is faster in decision making and giving efficient solutions by their decisions.
3. **Scalability:** AI is used in big data analysis and processing because it can be readily scaled to handle complex tasks and large amounts of data.
4. **Consistency:** AI systems never deviate from pre-established guidelines or policies to prevent interference with human judgment.
5. **24/7 operation**: AI systems are able to operate continuously without getting tired, which guarantees ongoing monitoring and decision-making on crucial applications like infrastructure and cyber security.
6. **Healthcare:** AI can assist in medical diagnosis.
7. **Humanoids:** Humanoids can be used in wars to save humans.

Applications of Artificial Intelligence :

1. **Natural Language Processing (NLP):** Artificial Intelligence is utilized in chatbots, virtual assistants, sentiment analysis, and language translation, among other applications.
2. **Computer vision:** AI is utilized in autonomous cars, medical image analysis, face and object recognition
3. **Healthcare:** AI is used in drug development, medical diagnosis, customized treatment planning, and health evaluation.
4. **Finance:** Algorithmic trading, credit scoring, fraud detection, and risk analysis all use AI.
5. **E-commerce**: AI is used in e-commerce to provide dynamic pricing, product discovery, and personalized recommendations.
6. **Gaming**: Artificial intelligence is used in gaming for single player or content generators.

Literature Survey:

- This section provides context for the AI-based articles that appear in TF&SC (formerly known as Technology Forecasting). Digging deeper into the articles, we find that AI has impacted various facets of society, business organizations, and human life. In general, AI has disrupted both individuals and organizations. At the level of the organization, AI has changed conventional manufacturing into viable scientific manufacturing.
- It evaluates the AI degree of intelligence. The device provides 2 person test support. By giving the other two text-based questions to motivate them, one serves as a judge and lets the other two finish on their own.

Methodology:

- The investigation and research provides all the information and records. Information is collected from different articles. Before diving into the present, it's important to have a full understanding of AI's winter past. Non-scientific literature on the topic already covers a number of topics without explicitly indicating relevance. On the other hand, this study examines the historical literature to examine the main causes of AI winter. This will be followed by a specifically focused discussion of current expert opinions.

- Discipline-specific knowledge inflows are used to gauge the influence of a certain discipline on published AI research. Based on the citations the publications create, an estimate of the total knowledge outflow is made. Therefore, the disciplinary influence of the published research on artificial intelligence is represented by the knowledge flows to different disciplines.[7]

Case Study-

Cisco: With its network intuitive, Cisco is redefining networking. Cisco uses ML to examine vast volumes of network traffic and identify anomalies and ideal network setups. In the end, Cisco will make possible a network that is intent base, self-driving, and healing. Traffic will be automatically redirected, and the network will recover from both external and internally shock such as device malfunctions & attacks - on its own.[4]

Challenges in Evolution of AI

1. **Security Issues:** Misuse of personal information and personal photos using AI tools destroying the privacy of individuals.
2. **Lack in Logic:** AI can't answer when it comes to common sense and logical reasoning.
3. **Over Dependence:** Over-reliance on AI can make humans lazy and reduce their creativity.
4. **Maintenance:** AI systems need to be updated with information and maintained continuously. AI systems may only have a little effect and lose predictability over time if they are not calibrated appropriately.
5. **Cost:** AI system creation and implementation can be costly for both larger and smaller companies. In addition to technology, costs also

cover the knowledge required to create and manage AI systems**.**

6. **Environmental Concern:** AI model training and operation, particularly for deep learning models, can be computationally demanding and have a significant carbon impact, raising environmental concerns.[5]
7. **Collaboration issues between humans and AI:** It may be difficult to integrate AI into current business processes and make sure that people and AI coexist together. Organizational culture and practices may also need to adapt.
8. **Bias:** AI systems are susceptible to biases in the training data, which can produce inaccurate or biased results. Reducing and addressing biases in AI systems, particularly in fields like criminal justice, credit, and hiring, is a continuous challenge.

Conclusion:

In conclusion, amazing developments have been made in artificial intelligence (AI). That also applied to self-driving cars and robots decades earlier. Utilizing the device Simplified concepts and methods acquired have had a profound impact on the world. The development of AI today is the start of a long trend.

These days, AI is developed enough to solve the CAPTCHA puzzle. SOPHIA, a humanoid robot from Hanson Robotics, is capable of full conversation, empathy, and the ability to recognize and react to emotions.

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