
SURVEY PAPER ON ARTIFICIAL INTELLIGENCE & ITS APPLICATIONS

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ABSTRACT

It is the science and engineering of making intelligent machines, especially intelligent computers. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable. While no consensual definition of Artificial Intelligence (AI) exists, AI is the study of computations that allow for perception, reason, and action. Today, the amount of data that is generated, by both humans and machines, far outpaces humans' ability to absorb, interpret, and make complex decisions based on that data. Artificial intelligence forms the basis for all computer learning and is the future of all complex decision making. This paper examines features of artificial Intelligence, introduction, definitions of AI, history, applications, growth, and achievements.

Keywords- Machine Learning, Deep Learning, Neural Networks, Natural Language Processing And Knowledge Base System

1. INTRODUCTION

Artificial Intelligence (AI) is the branch of computer science which deals with intelligence of machines where an intelligent agent is a system that takes actions which maximize its chances of success. It is the study of ideas which enable computers to do the things that make people seem intelligent. The central principles of AI include such as reasoning, knowledge, planning, learning, communication, perception, and the ability to move and manipulate objects. It is the science and engineering of making intelligent machines, especially intelligent computer programs.

2. ARTIFICIAL INTELLIGENCE METHODS

and then the text is processed where the data is converted into audio. Then the machine uses the audio to respond to humans. Applications of Natural Language Processing can be found in IVR (Interactive Voice Response) applications used in call centers, language translation applications like Google Translate, and word processors such as Microsoft Word to check the accuracy of grammar in text. However, the nature of human languages makes Natural Language Processing difficult because of the rules that are involved in the passing of information using natural language, and they are not easy for computers to understand. So, NLP uses algorithms to recognize and abstract the rules of the natural languages where the unstructured data from the human languages can be converted to a format that is understood by the computer.

Machine Learning-

It is one of the applications of AI where machines are not explicitly programmed to perform certain tasks; rather, they learn and improve from experience automatically. Deep Learning is a subset of machine learning based on artificial neural networks for predictive analysis. There are various machine learning algorithms, such as Unsupervised Learning, Supervised Learning, and Reinforcement Learning. In Unsupervised Learning, the algorithm does not use classified information to act on it without any guidance. In Supervised Learning, it deduces a function from the training data, which consists of a set of an input object and the desired output. Reinforcement learning is used by machines to take suitable actions to increase the reward to find the best possibility which should be taken in to account.

Natural Language Processing (NLP)

It is the interactions between computers and human language where the computers are programmed to process natural languages. Machine Learning is a reliable technology for Natural Language Processing to obtain meaning from human languages. In NLP, the audio of a human talk is captured by the machine. Then the audio-to-text conversation occurs,

Automation & Robotics-

The purpose of Automation is to get the monotonous and repetitive tasks done by machines which also improves productivity and receives cost-effective and more efficient results. Many organizations use machine learning, neural networks, and graphs in automation. Such automation can prevent fraud issues while financial transactions online by using CAPTCHA technology. Robotic process automation is programmed to perform high-volume repetitive tasks that can adapt to change in different circumstances.

Machine Vision-

Machines can capture visual information and then analyze it. Here cameras are used to capture the visual information, analog-to-digital conversion is used to convert the image to digital data, and digital signal processing is employed to process the data. Then the resulting data is fed to a computer. In machine vision, two vital aspects are sensitivity, which is the ability of the machine to perceive weak impulses, and resolution, the range to which the machine can distinguish objects. The usage of machine vision can be found in signature identification, pattern recognition, medical image analysis, etc.

Knowledge-Based Systems (KBS):

A KBS can be defined as a computer system capable of advising a particular domain, utilizing knowledge provided by a human expert. A distinguishing feature of KBS lies in the separation behind the knowledge, which can be represented in several ways such as rules, frames, or cases, and the inference engine or algorithm which uses the knowledge base to conclude.

Neural Networks:

NNs are biologically inspired systems consisting of a massively connected network of computational “neurons,” organized in layers. By adjusting the weights of the network, NNs can be “trained” to approximate virtually any nonlinear function to a required degree of accuracy. NNs typically are provided with a set of input and output exemplars. A learning algorithm (such as backpropagation) would then be used to adjust the weights in the network so that the network would give the desired output, in a type of learning commonly called supervised learning.

Applications of AI

Artificial Intelligence has various applications today. It is becoming essential for today's time because it can solve complex problems efficiently in multiple industries, such as Healthcare, entertainment, finance, education, etc. AI is making our daily life more comfortable and faster.

Following are some sectors which have the application of Artificial Intelligence:



1. AI in Astronomy

- Artificial Intelligence can be very useful to solve complex universe problems. AI technology helps understand the universe such as how it works, its origin, etc.

2. AI in Healthcare

- In the last, five to ten years, AI has become more advantageous for the healthcare industry and going to have a significant impact on this industry.
- Healthcare Industries are applying AI to make a better and faster diagnosis than humans. AI can help doctors with diagnoses and can inform when patients are worsening so that medical help can reach the patient before hospitalization.

3. AI in Gaming

- AI can be used for gaming purposes. The AI machines can play strategic games like chess, where the machine needs to think of many possible places.

4. AI in Finance

- AI and finance industries are the best matches for each other. The finance industry is implementing automation, chatbot, adaptive intelligence, algorithm trading, and machine learning into financial processes.

5. AI in Data Security

- The security of data is crucial for every company and cyber-attacks are growing very rapidly in the digital world. AI can be used to make your data more safe and secure. Some examples such as the AEG bot, and AI2 Platform, are used to determine software bugs and cyber-attacks in a better way.

6. AI in Social Media

- Social Media sites such as Facebook, Twitter, and Snapchat contain billions of user profiles, which need to be stored and managed in a very efficient way.
- AI can organize and manage massive amounts of data. AI can analyze lots of data to identify the latest trends, hashtags, and requirements of different users.

7. AI in Travel & Transport

- AI is becoming highly demanding for travel industries. AI can do various travel-related work such as making travel arrangements to suggesting hotels, flights, and the best routes to the customers.
- Travel industries are using AI-powered chatbots which can make human-like interaction with customers for better and fast response.

8. AI in Automotive Industry

- Some Automotive industries are using AI to provide virtual assistant to their user for better performance. Such as Tesla has introduced Tesla Bot, an intelligent virtual assistant.
- Various Industries are currently working to develop self-driven cars that can make your journey safer and secure.

9. AI in Robotics:

- Artificial Intelligence has a remarkable role in Robotics. Usually, general robots are programmed such that they can perform some repetitive tasks, but with the help of AI, we can create intelligent robots that can perform tasks with their own experiences without pre-programmed.
- Humanoid Robots are the best examples of AI in robotics, recently intelligent Humanoid robots named Erica and Sophia have been developed that can talk and behave like humans.

10. AI in Entertainment:

- Artificial intelligence (AI) has made a significant impact on the entertainment industry, revolutionizing various aspects of content creation, distribution, and consumption. Here are some of the key benefits of AI in the entertainment industry.

11. AI in Agriculture

- Agriculture is an area that requires various resources, labor, money, and time for the best result. Nowadays agriculture is becoming digital, and AI is emerging in this field. Agriculture is applying AI in agriculture robotics, solid and crop monitoring, and predictive analysis. AI in agriculture can be very helpful for farmers.

12. AI in E-commerce

- AI is providing a competitive edge to the e-commerce industry, and it is becoming more demanding in the e-commerce business.
- AI is helping shoppers discover associated products with recommended sizes, colors, or even brands.

13. AI in education:

- AI can automate grading so that the tutor can have more time to teach. AI chatbot can communicate with students as a teaching assistant.
- AI in the future can work as a personal virtual tutor for students, which will be accessible easily at any time and any place.

3. SOME OTHER APPLICATIONS:

1. **Fraud detection.** The financial services industry uses artificial intelligence in two ways. Initial scoring of applications for credit uses AI to understand creditworthiness. More advanced AI engines are employed to monitor and detect fraudulent payment card transactions in real-time.
2. **Virtual customer assistance (VCA).** Call centers use VCA to predict and respond to customer inquiries outside of human interaction. Voice recognition, coupled with simulated human dialog, is the first point of interaction in a customer service inquiry. Higher-level inquiries are redirected to a human.
3. **Medicine:** A medical clinic can use AI systems to organize bed schedules, make a staff rotation, and provide medical information. AI has also applications in the fields of cardiology (CRG), neurology (MRI), embryology (sonography), complex operations of internal organs, etc.
4. **Heavy Industries:** Huge machines involve risk in their manual maintenance and working. So, it becomes necessary part to have an efficient and safe operation agent in their operation.
5. **Telecommunications:** Many telecommunications companies make use of heuristic search in the management of their workforces for example BT Group has deployed heuristic search in a scheduling application that provides the work schedules of 20000 engineers.
6. **Music:** Scientists are trying to make the computer emulate the activities of the skillful musician. Composition, performance, music theory, and sound processing are some of the major areas on which research in Music and Artificial Intelligence is focusing. E.g.: chucks, Orchestra, smart music etc.
7. **Antivirus:** Artificial intelligence (AI) techniques have played an increasingly important role in antivirus detection. At present, some principal artificial intelligence techniques are applied in antivirus detection It improves the performance of antivirus detection systems and promotes the production of new artificial intelligence algorithms and applications in antivirus detection to integrate antivirus detection with artificial intelligence.

Future of AI

Looking at the features and its wide application we may stick to artificial intelligence. Seeing the development of AI, is it that the future world is becoming artificial? Biological intelligence is fixed, because it is an old, mature paradigm, but the new paradigm of non-biological computation and intelligence is growing exponentially. The memory capacity of the human brain is probably of the order of ten thousand million binary digits. But most of this is probably used in remembering visual impressions, and other comparatively wasteful ways.

Hence, we can say that as natural intelligence is limited and volatile too world may now depend upon computers for smooth working. Artificial intelligence (AI) is truly a revolutionary feat of computer science, set to become a core component of all modern software over the coming years and decades.

This presents a threat but also an opportunity. AI will be deployed to augment both defensive and offensive cyber operations. Additionally, new means of cyber-attack will be invented to take advantage of the weaknesses of AI technology.

Finally, the importance of data will be amplified by AI's appetite for large amounts of training data, redefining how we must think about data protection. Prudent governance at the global level will be essential to ensure that this era-defining technology will bring about broadly shared safety and prosperity.

NetApp and artificial intelligence

As the data authority for the hybrid cloud, NetApp understands the value of the access, management, and control of data. The NetApp data fabric provides a unified data management environment that spans across edge devices, data centers, and multiple hyper-scale clouds.

The data fabric gives organizations of all sizes the ability to accelerate critical applications, gain data visibility, streamline data protection, and increase operational agility.

NetApp AI solutions are based on the following key building blocks:

- **ONTAP software** enables AI and deep learning both on-premises and in the hybrid cloud.
- **AFF all-flash systems** accelerate AI and deep learning workloads and remove performance bottlenecks.
- **ONTAP Select software** enables efficient data collection at the edge, using IoT devices and aggregation points.
- **Cloud Volumes** can be used to rapidly prototype new projects and provide the ability to move AI data to and from the cloud.

4. CONCLUSION

Till now we have discussed in brief about Artificial Intelligence. We have discussed some of its principles, its applications, its achievements, etc. The goal of institutions and scientists working on AI is to solve most of the problems or to achieve the tasks that we humans directly cannot accomplish. It is for sure that development in this field of computer science will change the complete scenario of the world Now it is the responsibility of a creamy layer of engineers to develop this field.

5. REFERENCES

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