ABSTRACT It is the science and engineering of making intelligent machines, especially intelligent computer programs. 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 broadly characterized

as 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

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

ARTIFICIAL INTELLIGENCE METHODS:

Machine LearningIt 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, 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 centres, 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 the Natural Language Processing difficult because of the rules which are involved in the passing of

information using natural language, and they are not easy for the 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.

Automation & RoboticsThe purpose of Automation is to get the monotonous and repetitive tasks done by machines which also improve productivity and

in receiving 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 which can adapt to the change in different circumstances.

Machine VisionMachines can capture visual information and then analyze it. Here cameras are used to capture the visual information, the analogue

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 impulses that are weak and resolution, the range to which the machine can distinguish the objects. The usage of machine

vision can be found in signature identification, pattern recognition, and medical image analysis, etc.

Knowledge-Based Systems(KBS):

A KBS can be defined as a computer system capable of giving advice in 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 a number

of ways such as rules, frames, or cases, and the inference engine or algorithm which uses the knowledge base to arrive at a

conclusion.

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 back propagation)

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 in today's society. It is becoming essential for today's time because it can solve

complex problems with an efficient way in multiple industries, such as Healthcare, entertainment, finance, education, etc. AI is

making our daily life more comfortable and fast.

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

1. AI in Astronomy

o Artificial Intelligence can be very useful to solve complex universe problems. AI technology can be helpful for

understanding the universe such as how it works, origin, etc.

2. AI in Healthcare

o In the last, five to ten years, AI becoming more advantageous for the healthcare industry and going to have a significant

impact on this industry.

o 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 to the patient before hospitalization.

3. AI in Gaming

o AI can be used for gaming purpose. The AI machines can play strategic games like chess, where the machine needs to

think of a large number of possible places.

4. AI in Finance

o 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

o 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 AEG bot, AI2 Platform,are used to determine

software bug and cyber-attacks in a better way.

6. AI in Social Media

o 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, hashtag, and requirement of different users.

7. AI in Travel & Transport

o AI is becoming highly demanding for travel industries. AI is capable of doing various travel related works such as from

making travel arrangement to suggesting the hotels, flights, and 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

o Some Automotive industries are using AI to provide virtual assistant to their user for better performance. Such as Tesla

has introduced TeslaBot, an intelligent virtual assistant.

o Various Industries are currently working for developing self-driven cars which can make your journey more safe and

secure.

9. AI in Robotics:

o Artificial Intelligence has a remarkable role in Robotics. Usually, general robots are programmed such that they can

perform some repetitive task, but with the help of AI, we can create intelligent robots which can perform tasks with their

own experiences without pre-programmed.

o Humanoid Robots are best examples for AI in robotics, recently the intelligent Humanoid robot named as Erica and Sophia

has been developed which can talk and behave like humans.

10. AI in Entertainment

11. AI in Agriculture

o Agriculture is an area which requires various resources, labor, money, and time for best result. Now a day's agriculture is

becoming digital, and AI is emerging in this field. Agriculture is applying AI as agriculture robotics, solid and crop

monitoring, predictive analysis. AI in agriculture can be very helpful for farmers.

12. AI in E-commerce

o 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 to discover associated products with recommended size, color, or even brand.

13. AI in education:

o AI can automate grading so that the tutor can have more time to teach. AI chatbot can communicate with students as a

teaching assistant.

o AI in the future can be work as a personal virtual tutor for students, which will be accessible easily at any time and any

place.

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 application in 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 in 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

workforcesfor 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, sound processing are some of the major areas on which research in Music and Artificial Intelligence are

focusing on. Eg:chucks, Orchextra, smartmusic etc.

7. Antivirus: Artificial intelligence (AI) techniques have played increasingly important role in antivirus detection. At present,

some principal artificial intelligence techniques applied in antivirus detection It improves the performance of antivirus

detection systems, and promotes the production of new artificial intelligence algorithm and the application in antivirus

detection to integrate antivirus detection with artificial intelligence.

Future of AI

Looking at the features and its wide application we may definitely stick to artificial intelligence. Seeing at 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.A rtificial 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 particular 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 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 hyperscale

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 aggregations points.

• Cloud Volumes can be used to rapidly prototype new projects and provide the ability to move AI data to and from

the cloud.

Conclusion

Till now we have discussed in brief about Artificial Intelligence. We have discussed some of its principles, its applications, its

achievements etc.The ultimate goal of institutions and scientists working on AI is to solve majority of the problems or to achieve

the tasks which we humans directly can’t 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 creamy layer of engineers to develop this field.