ARTIFICIAL INTELLIGENCE &ITS APPLICATIONS

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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 confineitse lf to methods that are biologically observable. While no consensual definition of Artificial Intelligence (AI) exists, AI is broadly characterizedas the study of computations that allow for perception, reason and action. Today, the amount of data that is generated, byboth 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-*machinelearning, deeplearning, neuralnetworks, Natural Language Processing and Knowledge Base System.*

INTRODUCTION-

ArtificialIntelligence(AI)isthebranchofcomputersciencewhichdealswithintelligenceofmachineswhereanintelligen tagentisasystemthattakesactionswhichmaximizeitschancesofsuccess.Itisthestudyofideaswhichenablecomputersto dothethingsthat 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

Machine Learning-

It is one of the applications of AI where machines are not explicitly programmed to perform certain tasks; rather, they learn andimprove from experience automatically. Deep Learning is a subset of machine learning based on artificial neural networks forpredictive analysis. There are various machine learning algorithms, such as Unsupervised Learning, Supervised Learning, andReinforcement Learning. In Unsupervised Learning, the algorithm does not use classified information to act on it without anyguidance. In Supervised Learning, it deduces a function from the training data, which consists of a set of an input object and thedesiredoutput.Reinforcementlearningisusedbymachinestotakesuitableactionstoincreasetherewardtofindthebest possibilitywhich shouldbe takenintoaccount.

NaturalLanguageProcessing (NLP)-

It is the interactions between computers and human language where the computers are programmed to process natural

languages.MachineLearningisareliabletechnologyforNaturalLanguageProcessingtoobtainmeaningfromhumanlan

guages.InNLP,theaudio of a human talk is captured by the machine. Then the audio to text conversation occurs, and then the text is processed wherethe data is converted into audio. Then the machine uses the audio to respond to humans. Applications of Natural LanguageProcessingcan be found in IVR (Interactive Voice Response) applications used in call centers, language translation applicationslikeGoogleTranslateandword processorssuchasMicrosoftWordtochecktheaccuracyofgrammarin text.However,thenatureof human languages makes the Natural Language Processing difficult because of the rules which are involved in the passing ofinformation using natural language, and they are not easy for the computers to understand. So, NLP uses algorithms to recognizeand abstract the rules of the natural languages where the unstructured data from the human languages can be converted to a formatthatisunderstoodbythe computer.

Automation & Robotics-

The purpose of Automation is to get the monotonous and repetitive tasks done by machines which also improve productivity andinreceivingcost-effectiveandmoreefficientresults.Manyorganizationsusemachinelearning,neuralnetworks,andgraphsin automation.SuchautomationcanpreventfraudissueswhilefinancialtransactionsonlinebyusingCAPTCHAtechnology.Roboticprocessautomationisprogrammedtoperformhighvolumerepetitivetaskswhichcanadapttothechangeindifferentcircumstances.

MachineVision-

Machines 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-BasedSystems (KBS)-

A KBS can be defined as a computer system capable of giving advice in a particular domain, utilizing knowledge provided by ahuman expert. A distinguishing feature of KBS lies in the separation behind the knowledge, which can be represented in a numberof ways such as rules, frames, or cases, and the inference engine or algorithm which uses the knowledge base to arrive at aconclusion.

ApplicationsofAI-

Artificial Intelligence has various applications in today's society. It is becoming essential for today's time because it can solvecomplex problems with an efficient way in multiple industries, such as Healthcare, entertainment, finance, education, etc. AI ismakingourdailylife more comfortable andfaster.

Followingaresomesectorswhich havetheapplicationofArtificialIntelligence:

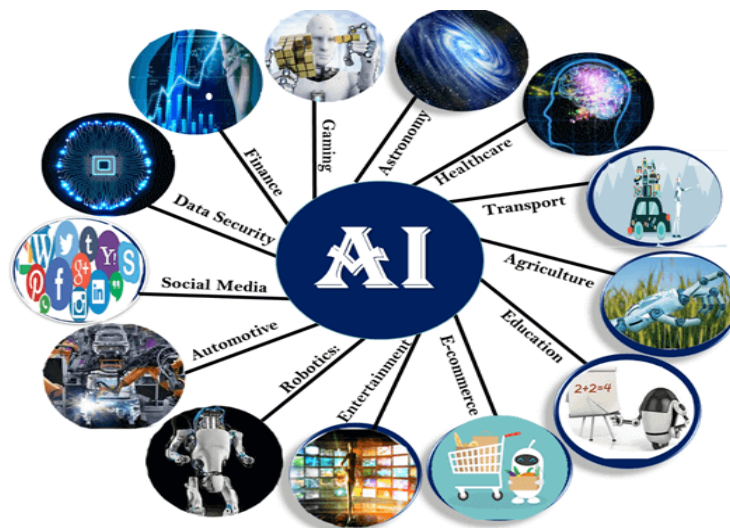**Figure 1. An applicationofArtificialIntelligence**

1. AIinAstronomy

o ArtificialIntelligencecanbeveryusefultosolvecomplexuniverseproblems.AItechnologycanbehelpfulforun derstanding theuniverse suchashow itworks,origin,etc.

2. AIinHealthcare

o Inthelast,fivetotenyears,AIbecomingmoreadvantageousforthehealthcareindustryandgoingtohaveasignifi cantimpactonthisindustry.

o HealthcareIndustriesareapplyingAItomakeabetterandfasterdiagnosisthanhumans.AIcanhelpdoctorswith diagnosesandcaninformwhenpatientsareworseningsothatmedicalhelpcanreachtothepatientbeforehospital ization.

3. AIinGaming

o AIcanbeusedforgamingpurpose.TheAImachinescanplaystrategicgameslikechess,wherethemachineneeds tothink ofa largenumberof possible places.

4. AIinFinance

o AIandfinanceindustriesarethebestmatchesforeachother.Thefinanceindustryisimplementingautomation,c hatbot,adaptiveintelligence, algorithm trading,andmachinelearningintofinancial processes.

5. AIinData Security

o The security of data is crucial for every company and cyber-attacks are growing very rapidly in the digital world. AI canbe used to make your data more safe and secure. Some examples such as AEG bot, AI2 Platform, are used to determinesoftwarebugandcyber-attacksina betterway.

6. AIinSocialMedia

o Social Media sites such as Facebook, Twitter, and Snapchat contain billions of user profiles, which need to be stored andmanaged in a very efficient way. AI can organize and manage massive amounts of data. AI can analyze lots of data toidentify the latesttrends,hashtag, andrequirementof differentusers.

7. AIinTravel&Transport

o   AI is becoming highly demanding for travel industries. AI is capable of doing various travel related works such as frommaking travel arrangement to suggesting the hotels, flights, and best routes to the customers. Travel industries are usingAI-poweredchatbotswhich canmakehuman-like interactionwithcustomersforbetter andfastresponse.

8. AIinAutomotiveIndustry

o   SomeAutomotiveindustriesareusingAItoprovidevirtualassistanttotheiruserforbetterperformance.Suchas TeslahasintroducedTalbot, anintelligentvirtual assistant.

o   VariousIndustriesarecurrentlyworkingfordevelopingself-drivencarswhichcanmakeyourjourneymoresafeandsecure.

9. AIinRobotics:

o   Artificial Intelligence has a remarkable role in Robotics. Usually, general robots are programmed such that they canperform some repetitive task, but with the help of AI, we can create intelligent robots which can perform tasks with theirown experienceswithoutpre-programmed.

o   HumanoidRobotsarebestexamplesforAIinrobotics,recentlytheintelligentHumanoidrobotnamedasEricaa ndSophiahasbeendevelopedwhichcantalkandbehave likehumans.

SOMEOTHERAPPLICATIONS:

1. **Fraud detection.** The financial services industry uses artificial intelligence in two ways. Initial scoring of applications forcredit uses AI to understand creditworthiness. More advanced AI engines are employed to monitor and detect fraudulentpaymentcardtransactionsinrealtime.

2. **Virtual customer assistance (VCA).** Call centers use VCA to predict and respond to customer inquiries outside of humaninteraction. Voice recognition, coupled with simulated human dialog, is the first point of interaction in a customer serviceinquiry.Higher-level inquiriesare redirectedtoa human.

3. **Medicine:** A medical clinic can use AI systems to organize bed schedules, make a staff rotation, and provide medicalinformation. AI has also application in fields of cardiology (CRG), neurology (MRI), embryology (sonography), complexoperationsof internalorgansetc.

4. **HeavyIndustries:**Hugemachinesinvolverisk intheirmanualmaintenanceandworking.Soinbecomesnecessary parttohaveanefficientandsafe operationagentintheiroperation.

5. **Telecommunications:** Many telecommunications companies make use of heuristic search in the management of theirworkforces forexampleBTGrouphasdeployedheuristicsearchinaschedulingapplicationthatprovidestheworkschedules of20000engineers.

6. **Music:**Scientistsaretryingtomakethecomputeremulatetheactivitiesoftheskillfulmusician.Composition,pe rformance,music theory, sound processing are some of the major areas on which research in Music and

Artificial Intelligence arefocusing on. Eg: chucks, Orchextra,smart music 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 antivirusdetection systems, and promotes the production of new artificial intelligence algorithm and the application in antivirusdetection tointegrate antivirusdetectionwithartificialintelligence.

FutureofAI-

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 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 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.

NetAppandartificialintelligence-

As the data authority for hybrid cloud, NetApp understands the value of the access, management, and control of data. The NetAppdata fabric provides a unified data management environment that spans across edge devices, data centers, and multiple hyperscaleclouds. The data fabric gives organizations of all sizes the ability to accelerate critical applications, gain data visibility, streamlinedataprotection, andincrease operational agility.

NetAppAI solutionsarebased onthefollowing keybuilding blocks:

- **ONTAP software**enablesAIanddeeplearningbothonpremisesandinthehybridcloud.

- **AFFall-flashsystems**accelerateAIanddeeplearningworkloadsandremoveperformancebottlenecks.

- **ONTAPSelect software**enablesefficientdatacollectionattheedge,using IoTdevicesand aggregationspoints.

- **CloudVolumes**can beusedtorapidlyprototypenewprojectsandprovidetheabilitytomoveAIdata toandfromthe cloud.

Conclusion-

Till now we have discussed in brief about Artificial Intelligence. We have discussed some of its principles, its applications, itsachievements etc. The ultimate goal of institutions and scientists working on AI is to solve majority of the problems or to achievethe tasks which we humans directly can't accomplish. It is for

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sure that development in this field of computer science will changethecompletescenariooftheworldNowitistheresponsibilityofcreamy layer ofengineerstodevelop thisfield.

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