ARTIFICIAL INTELLIGENCE – A BRIEF DESCRIPTION, IS AI BOOM OR BANE-A CRITICAL STUDY.

Dr. LakshLata Prajapati

Assistant professor (Faculty Member) Law Department M.J.P.R.U. Bareilly U.P.

ABSTRACT

"One of our big goals in search is to make search that really understands exactly what you want, understands everything in the world. As computer scientists, we call that artificial intelligence".

In Simple terms, we can define AI as a machine that can simulate human thought process and can take actions based on those thoughts and even draw conclusion. It should also be able to correct itself if it makes a mistake. This also means that AI – based computer would be able to make decision in a given situation like human beings and in some cases even better. In other word Artificial intelligence is the science of making machines that can think like human beings. It can do things which are assume "smart". AI technology can process large amounts of data in ways, unlike humans. The target for AI is to be capable to do things such as recognise patterns make decisions and judge like humans. The main purpose of this research is to understand AI, its pros and cons impact, types etc. This paper will be helpful to others who desire to know about this.

KEYWORDS

Artificial intelligence, Computer, Adaptability, Reasoning, Perception, Brain, Machine, Microsoft Cortana, Domain, NLP, robotic, Humanity, caretaker, eradicate, eliminate, devices, oxford, Diligent.

INTRODUCTION

Ever since machines were invented, human have been trying to make machines smarter like themselves. So we can say artificial intelligence is associating machines with human thinking with human thinking process like decision making, problem solving and learning

through the available database. AI is the study of how to make computers think like humans in the field of AI which they are better like decision making and logical thinking.

To understand AI, we need to understand the unique thinking capabilities of human beings

Brief History of AI

The journey to understand if machines could truly think began much before john Macarthy's first academic conference . In Vannevar Bush's seminar work "As we May Think" he proposed a system which amplifies people's own knowledge and understanding Five years later AlanTuring wrote a paper on the notion of machines being able to simulate human beings and the ability to do intelligent things, such as play chess. AI was limited to problem solving in 1950s, and later in 1960s, US Defence did most of the work. The first intelligent personal assistant was introduced by one voice as IVAN in the year 1999.

Tasks Performed by AI

Although AI is in its initial stage or we can say it is still evolving but the AI Machines are expected to perform the following tasks : chart

Terminologies Associated with Artificial Intelligence

Learning – Learning is the process of acquiring new knowledge behaviour skills, values and preferences. Machine learning is making the machine learn from its data bank rather than through explicit programming. Here, the performance automatically improves through experience.

Chatboats – These are AI programmes that are designed to have a conversation with a human being. These are deployed by many organisations to resolve customer queries.

Intelligence – means the ability to apply knowledge and skills. In the world Humans are the most intelligent species who can understand analyse and make decisions. An intelligent machines will perform the given task by understanding the environment and adjust its behaviour according to its senses. For example – Industrial robot .

Big data - As the name suggests, these are huge clusters of data. Example of such data can be global stock market data climate data of the entire world for weather for casting etc.

Data mining – This refer to the act of extracting useful information from a pile of data.

Internet of Things – Now a days, we have a plethora of devices that can connect to the Internet and access information. These interconnect devices are known IOT. Echo, Amazon, wearable fitness bands being among many such examples.

Programming Language – there are many Programming Languages used to programme AI – based systems. One must learn these to be able to create AI – based system.

Data Mining – This refers to the act of extracting useful information from a pile of data.

Difference between Human Intelligence and AI

Brain	Human brain is analogous	AI – based machines are digital
Tasks	Human beings perform various tasks using past experience using trial and error methods and the learning continues throughout their life.	
Nature	Human intelligence adjust with new environment using different cognitive skills.	AI Aims to build machines that can mimic human behaviour
Functioning	Human use brains memory ability to think and computational power.	AI based machines depend on the huge data bank and specific instructions are fed into the system.
Speed	Human beings take more time to process huge data manually	AI based machines processing speed is much faster than that of human beings
Change in the environment	Human insight takes less time to adapt to the changed environment	AI machines take much more time to adjust to the changed environment

Types of Artificial Intelligence –

Based on its capacity to mimic human characteristics and their real-world applications, AI is categorised into the following three categories :

- Artificial Narrow Intelligence
- Artificial General Intelligence
- Artificial super Intelligence

Artificial Narrow Intelligence – ANI has a narrow range of abilities. It is most dedicated to performing only one task. It operates under limited capabilities. It is goal oriented and focussed to do a single task. Consider sir virtual assistant **on an Iphone –** it uses speech and language recognition techniques to set as alarm or send an SMS to a contact on your phone . Narrow AI uses Natural Language Processing to perform . Example of weak AI –

- IBM's Watson
- Recommendations of e-commerce sites.
- Vision recognition of self-driving Cars.
- Image/facial recognition software
- Apple Siri, Amazon, Microsoft Cortana and other virtual assistants operate on limited activities.

Artificial General Intelligence - AGI has intelligence as per with human beings. Ist performance is just like humans. It is called Deep AI or strong AI . The Machine can mimic human behaviour with the ability to learn and solve problems. AGI can learn, think and decide in a similar manner as humans would do in a situation.

Artificial Super Intelligence – Artificial Super Intelligence has intelligence more than human beings . It can do tasks beyond human capabilities . It is a hypothetical idea of an AI where machines become self-aware and surpass human intelligence and abilities. A super AI will be capable of thinking, perform, analyse, perform plan, decide, learn and communicate on its own. The potential of such powerful machines is very appealing but, it may have its own multiple consequences.

DATA – Data are the facts and figures which are processed to find meaningful results. Data plays a pivotal role in the field of AI. Data is the lifeblood of AI because an AI system needs to learn from the data that is provided to it. If we provide incorrect data to the system, we will never correct results.

These data can be numeric, (loan amount, temperature etc.) cate gorial (gender, colour, etc.), or even free text (like doctor's notes, opinion surveys, prescriptions etc.)

Natural Language Processing (NPL)

NLP, usually shortened as NLP is a domain of AI which works with the interactions, between humans and computer systems using natural language. Most of the voice recognition apps like Siri, cortana, Alexa etc, use NLP to process the audio input.

Different types of NLP include –

- Speech recognition involves converting spoken words into data
- Optical character Recognition for converting written and printed text into data.

Natural Language Generation is a software process which converts structured data into natural language.

- **Machine translation –** Where the source language without human interference.
- **Semantic search –** is understanding the intension behind any search. It also optimises the search predictions.
- Sentiment Analysis is a process used to determine whether a piece of text is positive, negative or neutral.
- **Computer vision –** Computer vision is a field of AI which deals with how computers can develop a high level of understanding from digital images or videos just like humans do. The basic idea of using CV is to give any machine the ability to "see" and interpret the world around it. Larry reberts is commonly considered as the father of computer vision.

The tasks performed by CV

A CV can performed the following tasks:

Object classification: It can analyse and identify a particular object among many in an image or a video. For example, CV system can identify an apple amongst a bunch of flowers in an image.

Object Tracking - The system processes any given video and finds the object that matches the searching criteria and then tracks its movements.

Object Identification – The system analyses visual content and identifies a particular object of an video or image. For example – The system tries to find a green apple among the apples in the image.

Possibilities of AI – AI, as we see today, is not as it was expected to be, when it was first conceived by John McCarthy in Dartmouth college during his first speech. A research

predicts that AI could create 38.2million net new jobs across the world economy offering much more skilled occupants as part of this transition.

As we know that every organisation desired skilled employees . To be an employee in the AI field, you must have some specific skills.

Technical Skills - technical skills are the abilities or knowledge used for practical tasks in the field of science, engineering, technology etc. Following are some of the technical skills required in the field of AI.

- Machine Learning Algorithms
- Artificial Neural Networks
- Mathematics and Algorithms
- Programming Languages.
- Signal Processing Techniques

<u>**Soft skills –**</u>

- Collaboration skills.
- Critical Thinking skills
- Leadership skills
- Data Literacy skills

Career opportunities in AI

When we talk about the best jobs in the future, a few industries have clearly shows that enterprise applications for AI have grown 27% in few years, where the demand is much more than the supply of qualified job Candidates –

<u>**Letus understand some of the most in –**</u> demand jobs in the field of AI

The growth in this field has been 244% between 2015 and 2019 . It is expected to grow further in the coming years. Machine learning engineers are skilled programmers who develop machines and system that can learn and apply knowledge without precise direction from a human.

<u>**Necessary Skills -**</u> A Machine Learning engineering requires to be exceptionally good at:

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- dynamic programming, deep learning, neural network architectures, natural language, processing audio and video processing, reinforce learning algorithms

Robotics engineer – The next growing career in AI is that of robotics engineering with 128% growth. These engineers, research, design, develop or test robotic applications.

Necessary skills- A robotic engineering requires to be good at

- creative ideas
- Programming mind set
- Science, Mathematics or applied mathematics, psychology, electronics and cognition.

Data scientist – A data scientist is responsible for collecting, analysing and interpreting huge amount of data. A data scientist's role is a combination of several traditional technical roles like mathematician computer professional and statistician.

Necessary skills – Data scientists are expected to be skilled in programming languages like Python, R, SQL, etc. And some more skills like :

- Critical thinking
- Risk analysis
- Statistical Analysis and maths
- Data visualisation and Reporting
- Machine Learning techniques.

Aerospace engineer – with the advancement of AI, the field of space exploration is expanding rapidly. Aerospace engineers are required to perform the task of designing and controlling space vehicles and robots. Nasa use AI to help them schedule and plan space shuttle maintenance –

Necessary skills –

- Applied mathematics
- Astrophysics
- Machine Learning
- Electronics

Computer vision engineering - Digital landscape is charging fastest than anything. Computer vision engineering jobs have shows 116% growth between 2015 and 2019. Some are as of work include face recognition, camera calibration, computer vision and Surveillance. The workplace may be related to medicine, defence, manufacturing etc.

Necessary skills - A computer vision engineering is expected to have mastery over:
- Face detection and recognition
- Optical character recognition
- Object detection and tracking moving object over time

Many companies such as Google, Amazon Microsoft hire AI professionals at different levels. All these organisations are well known and deploy AI or some of its domain in one from or the other.

Some case study of AI start-ups in India –

Start ups can be defined as newly established business founded by some very creative people termed as entrepreneurs. Our country is among top listed nations that have achieved millions of funding for tech based start-ups. Some of the very famous ones are listed here.

Niramai Health Analytix is working on an innovation AI-based method of detecting breast cancer in its early stage.

Haptik- ai is an artificial intelligence company powering chatbots which are conversational assistants to improve customer experience.

Discover.ai is a Pune based start-up which is using ML and NLP to help the enterprises to reduce cost, improve productivity and boost revenue.

Avaamo – is a deep-learning software company that specializes in conversational interfaces to solve specific and high impact problems in the enterprise.

Niki.ai – was founded by II T Kharagpur's 4 graduates in may,2015. Niki is a chatbot product which works as an AI Personal assistant. It Understands the language of Indian Users and works for them like the famous household worker "ramukaka" shows in movies.

Discover – ai is a Pune-based start-up which is using ML and NLP to help the enterprises to reduce cost, boost revenues and improve productivity.

Doxper – Today the company is helping doctors and hospitals digitise to improve their operational, clinical and patient engagement outcomes. Doxper is seamlessly digitising healthcare data.

Expertrons – This Mumbai-based start-up is the world's first AI video but assisted platform. It helps college graduates to crack interviews by attending 24*7 interview-based queries. There are many more start-ups like Rubique, SigTuple, Artivatic.ai, Agricx, etc.

ETHICS AND AI-

It is noticeable that everywhere demand of AI professional are increasing. Industries are adapting to the new changes. With so much AI all around us, some questions are raised like-will AI replace teachers? Will AI driven machines fight wars? And so on.

AI ethics can be defined as a set of values, principles and techniques which can be applied in the development and deployment of Artificial intelligence technologies to guide the moral conduct of a machine towards right and wrong.

The AI code of ethics also called the AI value platform is a statement that defines the role of artificial Intelligence.

Significance of AI ethics-

The need of AI ethics is to defines ownership. It also involves the moral behaviour of humans as they design, create, use and treat artificially intelligent systems. We need International and national regulatory frameworks to ensure that AI benefits humanity as a whole. We need to develop human-centered AI for the greater interest of people.

United Nations economic social cultural organisation proposes the development of a comprehensive global standard setting instrument to provide AI with a strong ethical basis that will not only protect but also promote human dignity and human rights. If adopted it will be an ethical guiding compass and a global normative bedrock allowing to build a strong respect for the rule of law in the digital world. There are several ethical issues with AI which are follows-

Humanity The AI chatbots are now improving in their way of talking/conversation more and more and are becoming better at modelling human relationships and behaviours. This may create confusion whether we are talking to a real human or machines in customer services or sales. On a positive note, it could evolve into an opportunity to push society towards a positive attitude on the other hand it could be harmful, if not used prudentially.

Accountability learning and intelligence are complement to each other Intelligence comes with learning . AI systems have a training phase in which they learn from a huge data pool to understand images and patterns and act accordingly once this training phase is over, it goes to the testing phase to understand its performance in this phase the real world in not include . It is possible that they may be wrongly used by malicious people for their

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own gain. So, there can be ethical issues when AI systems are used in surveillance and security.

Unforeseen circumstances -

Since AI machines are not fully capable of appliying intelligence like humans, it is very much possible for them to make mistakes in unforeseen circumstances. For example – if an AI system is asked to eradicate corona virus, it will research and come to a conclusion that the virus is a parasite that won't survive without a host. So, it might reach a conclusion that to eradicate the virus it must eliminate the host. This is an incorrect conclusion.

Threat to Human Dignity-

In 1967, Joseph weizenbaum who is known another father of modern Artificial Intelligence argued that AI technology should not be used to replace humans in position that require respect and care.

The following position should not be occupied by AI- driven machines.

- A soldier   A judge
- A police officer   A the rapist
- Customer Service representative   caretaker for the elderly

AI ethics Progress –

Many organisation such as public, and, government, private and social are working on AI ethics and policies.

Some of the major progress made are as follows:

- Amazon, facebook (Meta) Apple, Microsoft and IBM have come to partnership to frame the best practices on AI technologies.
- Institute of electrical and electronic engineers is working on ethics of Autonomous and intelligent systems, creating and revising guidelines with the help of public feedback.
- European commission has a high-level expert group on AI.
- In the US, the obama Administration had prepared a road map for AI policies. In 2020, THE Trump Administration carried forward the work and emphasised the need to boost the public trust in the AI applications, reduce thye barriers in the usage and keep the technology competitive in the global market.
  There are three research institutes currently at oxford university that mainly focus on AI ethics.

Is AI a Boon or a Bane?

At present AI is every where. Almost all the devices operate has some kind of AI system in it . For example the facial recognition system in the latest generations of the android and

smart phones the adware working in the background that analyses your actions and provides content according to your preference.

1. **<u>Quick Actions –</u>** Human takes decision with emotions along with intelligence, so it can cause delay, whereas AI Machines are programmed and skilled to take action in given situation, so they are much faster. Human action are not sometimes error-free and quick but AI actions are free from delay. Playing chess games is the best example.

*   **Diligent –** AI machines can work 24 hours but man 4 to 7 hours. Human need break and break to fresh AI Machines need not break. There is no chance making mistakes for being overworked or getting bored of mundane tasks. Amazons chat bots are example of diligent AI systems are available effectively all the time.

*   Good replacement of humans at high-risk places:-
    Going on a Mars Mission, exploring the ocean's deepest levels, helping out humans during man-made or natural disasters, etc AI machines can reduce the risks to human lives. AI systems can be put to work in such conditions to minimize risks on human lives.

*   **<u>Reduction of Human error –</u>**
    To error is human is a well known proverb. Humans tend to make mistakes. AI-based systems get better and better as we use them and tend to make less mistakes or no mistakes. Like AI being used in weather forecasting has incredibly reduce the human errors and these days it can provide highly accurate results and for castes.

*   **<u>Ai- powered new Inventions-</u>**
    New inventions are becoming more powerful by adding AI in them using it, the majority of complex problems can be solved easily. Healthcare industry is the best example of these AI-powered machines. Now a days, treating diseases like breast cancer is possible at a very early stage because of the uses of AI.

*   **<u>*Every day AI –*</u>**
    Having Siri, cortage and Alexa by our side, we have AI involved in every aspect of our daily life. It makes certain tasks so easy. Managing our e-mails have become effortless.
    Disadvantages of AI –
    Every coin has two sides, AI too has some disadvantages.

*   **<u>Unemployment –</u>**
    As industries are looking for hard skilled and soft skilled workers are to be replaced by robots to do the job more efficiently and accurately, there would be unemployment problem generating huge pay gaps and uneven living standards.

- **Expensive –**

AI Machines are very complex in nature , have huge manufacturing cost. AI technology is very new, hence, it is extremely expensive to procure and there are hidden costs. For example, being a new technology, it requires constant upgrades of both hardware and software.

- **Health issue –**

With smart house, having the ability to control everything over a cell phone, ability to complete tasks with the click of a button, makes humans more lazy. This may promote obesity and various other health problems related to laziness.

Ethics and Morality –

Ethics and morality are important human features that cannot be incorporated into an AI has raised a number of concerns and it is speculated that one day. AI will grow uncontrollably and eventually wipe out humanity. This phenomenon is referred to as the AI singularity.

Black Box Problem –

The system uses huge data bank to learn and produce results. There is no way to understand how the system is working, what exactly the algorithm is doing and what method it is using during the process. Since there is no insight it is called a Black Box Problem. This happens because the data that the AI system is working on goes through a lot of neural nodes which mulates it making it extremely difficult to determine the working and the source of the problem.

CONCLUSION –

AI can be good or bad depending on how we use it. A knife can cut the vegetable as well as neck a man. The use of AI is therefore entirely dependent upon how we educate it and how we use it . It and how we use it. It is definitely a boon for the future generation. Legislations required for Generative AI in the education sector : technology had to be accommodated in the legislation to avoid its misuse. We are fortunate to have the information Technology is the new normal. The chief Justice of India D.Y. Chandrachud, In the case of <u>All India Association of Jurists v/s uttrakhand High court, said that</u> it was disturbing that some high court chief justice are doing away with the technology set up for virtual hearings. He sent a strong message to the High court CIs to not disband the hybrid hearing option as technology was not only for a pandemic time.

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