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## **ARTIFICIAL INTELLIGENCE: HUMAN INTELLIGENCE VERSES MACHINE INTELLIGENCE**

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### **ABSTRACT**

*Artificial Intelligence(AI), the science of making smarter and intelligent human-like machines, has sparked an inevitable debate of Artificial Intelligence Vs Human Intelligence. AI has also penetrated many organizational processes resulting in a growing fear that smart machine will soon replace humans in decision making. Machine Learning(ML) and Deep Learning(DL) algorithms are built to make machines learn on themselves and make decisions just like we humans do. This paper revolves around the various fields of AI, the differences between Human and Machine intelligence and also pointed out some major trends of Artificial intelligence.*

**Keywords:** *Artificial Intelligence, Machine Learning, Deep Learning, Neural Network, computer Vision, Turing Test*

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### **INTRODUCTION**

The purpose of Artificial Intelligence is to aid human capabilities and help us make advanced decisions with far reaching consequences. From a philosophical perspective, Artificial Intelligence has the potential to help humans live more meaningful lives devoid of hard labour, and help manage the complex web of interconnected individuals, companies, states and nations to function in a manner that is beneficial to all of humanity.

Artificial Intelligence has grown to be very popular in today's world. It is the simulation of natural intelligence in machines that are programmed to learn and mimic the actions of humans. These machines are able to learn with experience and perform human-like tasks.

Currently, the purpose of Artificial Intelligence is shared by all the different tools and techniques that we have invented over the past thousand years to simplify human effort, and to help us make better decisions. Artificial Intelligence has also been touted as our Final Invention, a creation that would invent ground breaking tools and services that would exponentially change how we lead our lives, by hopefully removing strife, inequality and human suffering. Artificial Intelligence is being used mostly by companies to improve their process efficiencies, automate resource-heavy tasks, and to make business predictions based on hard data rather than gut feelings. As all technology that has come before this, there search and development costs need to be subsidized by corporations and government agencies before it becomes accessible to everyday laymen. (Vaishani 2021)

Artificial Intelligence (AI), the science of making smarter and intelligent human-like machines, has sparked an inevitable debate of Artificial Intelligence Vs Human Intelligence (Gupta2021). Indeed, Machine Learning (ML) and Deep Learning (DL) algorithms are built to make machines learn on themselves and make decisions just like we humans do.

In contrast to robotic automation, AI reliably automates repetitive, high-volume and highly computerized tasks, drawing insights and inference from big data. Deep learning makes businesses more intimate with their customers. It is no wonder that organizations are increasingly using AI in their decision-making process. At least they can place greater trust on the outcomes of machine learning algorithms. This has enormous implications for the future of work!

## **LITERATURE REVIEW**

Artificial intelligence refers to a computer system that can undertake tasks usually performed by human intelligence. An intelligent entity created by humans Capable of performing tasks intelligently without being explicitly instructed Capable of thinking and acting rationally and humanely (Vaishani 2021).

Artificial Intelligence is the study of agents that receive percepts from the environment and perform actions (Russell and Norvig 2021).

Building an AI system is a careful process of reverse-engineering human traits and capabilities in a machine, and using its computational prowess to surpass what we are capable of.

To understand How Artificial Intelligence actually works, one needs to deep dive into the various sub-domains of Artificial Intelligence and understand how those domains could be applied to the various fields of the industry.

### **Machine Learning (ML):**

ML teaches a machine how to make inferences and decisions based on past experience. It identifies patterns, analyses past data to infer the meaning of these data points to reach a possible conclusion without having to involve human experience. Machine learning is a feature of artificial intelligence that provides the computer with the capability to automatically gather data and learn from the experience of the problems or cases they have encountered rather than specially programmed to perform the given task or works

This automation to reach conclusions by evaluating data, saves a human time for businesses and helps them make a better decision. Machine learning emphasizes on the growth of the algorithms which can scrutinize the data and make predictions of it. Machine learning is mostly used in the fields of healthcare system, it is the technology used for diagnosis of the disease, medical scan interpretation, etc.

### **DeepLearning (DL):**

Deep Learning is a ML technique. It teaches a machine to process inputs through layers in order to classify, infer and predict the outcome. Deep learning is software that can imitate the activity of layers of neurons in the neocortex, the part of the brain where rational thinking takes place. This hones a computer system with unique skills to identify objects and interpret speech in real time (Zenith 2018)

It is the process of learning by processing and analyzing the input data by several methods until the machine discovers the single desirable output. It is also known as the self-learning of the machines.

### **Neural Networks:**

A neural network is a computer system that has artificial neurons. It can be built to solve tasks like classification and prediction (Kumar, 2021). Neural Networks work on the similar principles as of Human Neural cells. They are a series of algorithms that captures the relationship between various underlying variables and processes the data as a human brain does.

The neural networks are the brain of artificial intelligence. They are the computer systems which are the replica of the neural connections in the human brain. The artificial corresponding neurons of the brain are known as the perceptron.

### **Natural Language Processing:**

NLP is a science of reading, understanding, interpreting a language by a machine. Once a machine understands what the user intends to communicate, it responds accordingly.

With this feature of artificial intelligence, computers can interpret, identify, locate, and process human language and speech. The concept behind introducing this component is to make the interaction between the machines and the human language seamless and the computers will become capable of delivering logical responses towards human speech or query.

The natural language processing focus on both the verbal and written section of human languages means both active and passive modes of using algorithms. The Natural Language Generation (NLG) will process and decode the sentences and words that humans used to speak (verbal communication) while the Natural Language Understanding (NLU) will emphasize the written vocabulary to translate the language in the text or pixels which can be understood by machines.

### **Computer Vision:**

Computer vision algorithms try to understand an image by breaking down an image and studying different parts of the objects. This helps the machine classify and learn from a set of images, to make a better output decision based on previous observations.

The computer vision is a very vital part of artificial intelligence as it facilitates the computer to automatically recognize, analyze, and interpret the visual data from the real world images and visuals by capturing and intercepting them. It incorporates the skills of deep learning and pattern recognition to extract the content of images from any data given, including images or video files within PDF document, Word document, PPT document, XL file, graphs, and pictures, etc.

### **Cognitive Computing:**

Cognitive Computing algorithms try to mimic a human brain by analyzing text/speech/images/objects in a manner that a human does and tries to give the desired output.

The purpose of this component of artificial intelligence is to initiate and accelerates the interaction for complex task completion and problem-solving between humans and machines.

While working on various kinds of tasks with humans, the machines learn and understand human behavior, sentiments in various distinctive conditions and recreate the thinking process of humans in a computer model. For Example, Google Assistant is a very big example of cognitive computing.

### **ALAN TURING**

Alan Mathison Turing was an English mathematician, Computer Scientist, Cryptanalyst. Turing was a pioneer of theoretical computer science and artificial intelligence, Turing was highly influential in the development of theoretical computer science, providing a formalization of the concepts of algorithm and computation with the Turing machine, which can be considered a model of a general-purpose computer. Turing is widely considered to be the father of theoretical computer science and artificial intelligence.

Less than a decade after breaking the Nazien cryption machine Enigma and helping the Allied Forces win World War II, mathematician Alan Turing changed history a second time with a simple question:"Can machines think?"(Builtin 2021).

Turing's paper "Computing Machinery and Intelligence" (1950), and its subsequent Turing Test, established the fundamental go a land vision of artificial intelligence (Builtin 2021).

Turing was the man who was much ahead of his time, started toiling on the thought whether machines can think. In 1950, a time when the computers had just come into being, and the term Artificial intelligence was not even coined and we had Alan already thinking if a machine could think like a human. (Britannica 2021)

A thought needs to be backed by evidence and Turing knew this very well. Hence, Alan Turing published a paper in 1950 in which he suggested an idea or a test called 'The Imitation Game', today known as the Turing Test. The idea behind this test was to check if machines have intelligence or not.

After modifications, Turing proposed the Imitation Game where there would be two contestants, one human (of either gender) and one computer. And there would be a judge or an interrogator whose job would be to decide which of the two contestants is human and which one of them is a machine. He would do this by asking a series of questions to the contestants. Hence in this game if the accuracy of the Judge was less than 50% then it meant that he is likely to pick either of them. This would suggest that a computer is a quite good simulation of human and therefore intelligent.

AI has gained so much recognition that every industry in their own way are somehow using AI, I.T sectors, Automobiles, Education, Banking and the rest. A simplest illustration of AI being used would be apps like Siri, Alexa, Cortana. All these apps are assisted by AI and have become an integral part of our everyday lives

The Turing Test proposed by Alan Turing has been one of his best works and it has been a significant contribution to the field of Artificial Intelligence.

### **The four approaches of A.I**

According to Norvig and Russell (2020) there are four different approaches that have historically defined the field of AI, they are thinking humanly, thinking rationally, acting humanly, acting rationally

The first two ideas concern thought processes and reasoning, while the others deal with behavior. Norvig and Russell focus particularly on rational agents that act to achieve the best outcome, noting "all the skills needed for the Turing Test also allow an agent to act rationally." Acting humanly

The first proposal for success in building a program and acts humanly was the Turing Test. To be considered intelligent a program must be able to act

sufficiently like a human to fool an interrogator. A human interrogates the program and another human via a terminal simultaneously. If after a reasonable period, the interrogator cannot tell which is which, the program passes.

**Thinking Humanly:** This requires "getting inside" of the human mind to see how it works and then comparing our computer programs to this. This is what cognitive science attempts to do. Another way to do this is to observe a human problem solving and argue that one's programs go about problem solving in a similar way.

Example: GPS (General Problem Solver) was an early computer program that attempted to model human thinking. The developers were not so much interested in whether or not GPS solved problems correctly. They were more interested in showing that it solved problems like people, going through the same steps and taking around the same amount of time to perform those steps.

**Thinking Rationally:** Aristotle was one of the first to attempt to codify "thinking". His syllogisms provided patterns of argument structure that always gave correct conclusions, given correct premises, an example of thinking rationally is, all computers use energy, using that energy makes them generate heat. Therefore, all computers generate heat.

**Acting Rationally:** Acting rationally means acting to achieve one's goals, given one's beliefs. An agent is just something that perceives and acts.

In the logical approach to AI, the emphasis is on correct inferences. This is often part of being a rational agent because one way to act rationally is to reason logically and then act on one's conclusions. But this is not all of rationality because agents often find themselves in situations where there is no provably correct thing to do, yet they must do something.

## **ARTIFICIAL INTELLIGENCE VS HUMAN INTELLIGENCE (AI VS HI)**

The vision of making machines that can think and act like humans has evolved from movie-fiction to real-world facts. We have long attempted to inherit Intelligence in Machines to ease our work. There are bots, humanoids, robots, and digital humans that either outplay humans or coordinate with us in many ways. These AI-driven applications have higher speed of execution, have higher operational ability and accuracy, while also highly significant in tedious and monotonous jobs compared to humans.

On the contrary, Human Intelligence relates to adaptive learning and experience. It does not always depend on pre-fed data like the ones required for AI. Human memory, its computing power, and the human body as an entity may seem insignificant compared to the machine's hardware and software infrastructure. But, the depth and layers present in our brains are far more complex and sophisticated, that machines still cannot beat at least not in the near future!

How does AI work?

AI requires a foundation of specialized hardware and software for writing and training machine learning algorithms. No one programming language is synonymous with AI, but a few, including Python, R and Java, are popular. In general, AI systems work by ingesting large amounts of labeled training data, analyzing the data for correlations and patterns, and using these patterns to make predictions about future states (Techtarget 2021).

In this way, a chatbot that is fed examples of text chats can learn to produce life like exchanges with people, or an image recognition tool can learn to identify and describe objects in images by reviewing millions of examples.

AI programming focuses on three cognitive skills: learning, reasoning and self-correction. (Tech target 2021)

**Learning processes:** This aspect of AI programming focuses on acquiring data and creating rules for how to turn the data into actionable information. The rules, which are called algorithms, provide computing devices with step-by-step instructions for how to complete a specific task.

**Reasoning processes:** This aspect of AI programming focuses on choosing the right algorithm to reach a desired outcome.

**Self-correction processes:** This aspect of AI programming is designed to continually fine-tune algorithms and ensure they provide the most accurate results possible.

AI is an interdisciplinary science with multiple approaches, but advancements in machine learning and deep learning are creating a paradigm shift in virtually every sector of the tech industry.

## **HUMANS VS MACHINES**

The difference between Human and Machine Intelligence.



1. The human develops machines with intelligence just like humans and they also give results to the complex problem to the very near extent just like humans.
2. The humans distinguish the data by visual and audio patterns, past situations, and circumstances events whereas the artificially intelligent machines recognize the problem and handle the issue based on predefined rules and backlog data.
3. Humans memorize the data of the past and recall it as they learned it and kept in the brain but the machines will find the data of the past by searching algorithms.
4. Robots need a large capital, maintenance, power, etc, while humans do not.
5. If robots ultimately do all the work, and man just sits and monitor them, then it might cause health hazards. For example, If an AI-based diagnosis fails to detect the actual illness of the patient, who would be held responsible for it, the programmer or the artificial intelligence itself?
6. Robots are very expensive, they require huge capital investment, and the software equipments too are very expensive.

### **TRENDS IN ARTIFICIAL INTELLIGENCE**

Artificial Intelligence (AI) is the next big thing in digital disruption. Trends in artificial intelligence could unleash the next wave of the digital age: The goal of AI is to create intelligent machines that can interact and communicate with humans, creating innovative solutions.

Investment in artificial intelligence is currently being dominated by tech giants, such as Google, Amazon, Apple, Alibaba and Baidu, among others

According to Forbes, application of deep learning has helped data scientists to attain breakthroughs in natural processing language, speech and image recognition. For instance, Apple Technology Company is breaking the ice of AI, transforming the way we sign on to our phones. The company's latest product, iPhone X, uses a biometric technology known as FACEID, which combines mathematical model with machine learning to allow users unlock their phones or make purchases with a firm glance. The biometric technology uses a True Depth camera to scan user's face and match the resulting data with a saved mathematical model for authentication.

Artificial Intelligence is also tipping the scales in self-driving cars, that has a robust computer system and a graphics processor, which analyzes and identify close objects using deep learning. The vision of self-driving car makers is to drastically reduce the high rate of road accidents caused by human errors, particularly wrong image recognition and lack of attention. With the application of AI, a self-driving vehicle can significantly prevent road accidents, making our roads safer.

The 7 biggest Artificial Intelligence Trends in 2022 pointed out by Forbes Media will see artificial intelligence continue along the path to becoming the most transformative technology humanity has ever developed (Bernard Marr 2022). These are

1. The augmented workforce

There have always been fears that machines or robots will replace human workers and may even make some roles redundant. However, as companies navigate the process of creating data and AI literate cultures within their teams, we will increasingly find ourselves working with or alongside machines that use smart and cognitive functionality to boost our own abilities and skills. In some functions, such as marketing, we're already used to using tools that help us determine which leads are worth pursuing and what value we can expect from potential customers.

2. Bigger and better language modeling

Language modeling is a process that allows machines to understand and communicate with us in language we understand or even take natural human languages and turn them in to computer code that can run programs and applications. GPT3 released by Open AI, is the most advanced (and largest) language model ever created, consisting of around 175 billion "parameters" variables and data points that machines can use to process language. Open AI is known to be working on a successor GPT4, that will be even more powerful.

3. AI in cyber security

This year the World Economic Forum identified cyber crime as potentially posing a more significant risk to society than terrorism. As machines take over more of our lives, hacking and cyber crime inevitably become more of a problem, as every connected device you add to a network is inevitably a potential point of failure that an attacker could

use against you. By analyzing network traffic and learning to recognize patterns that suggest immoral intentions, smart algorithms are increasingly playing a role in keeping us safe from 21<sup>st</sup> century crime.

#### 4. AI and the Metaverse

The metaverse is the name given for a unified persistent digital environment, where users can work and play together. It is a virtual world, like the internet, but with the emphasis on enabling immersive experiences, often created by the users themselves. The concept has become a hot topic since Mark Zuckerberg spoke about creating it by combining virtual reality technology with the social foundations of his Facebook platform.

AI will undoubtedly be a lynchpin of the metaverse. It will help to create online environments where humans will feel at home at having their creative impulses nurtured. We will also most likely become used to sharing our metaverse environments with AI beings that will help us with tasks we're there to do, or just be our partner for a game of tennis or chess when we want to relax and unwind.

#### 5. Low-code and no-code AI

A big barrier to the adoption of AI-driven efficiency in many companies is the scarcity of skilled AI engineers who can create the necessary tools and algorithms. No-code and low-code solutions aim to overcome this by offering simple interfaces that can be used, in theory, to construct increasingly complex AI systems. Much like the way web design and no-code UI tools now let users create web pages and other interactive systems simply by dragging and dropping graphical elements together, no-code AI systems will let us create smart programs by plugging together different, pre-made modules and feeding them with our own domain-specific data. Technologies such as natural language processing and language modeling (see above) mean that soon it may be possible to use nothing more than our voice or written instructions. All of this will play a key role in the ongoing "democratization" of AI and data technology.

#### 6. Creative AI

We know that AI can be used to create art, music, poetry, plays, and even video games. In 2022, as new models such as GPT-4 and Google's Brain

redefine the boundaries of what's possible, we can expect more elaborate and seemingly "natural" creative output from our increasingly imaginative and capable electronic friends. Rather than these creations generally being demonstrations or experiments to show off the potential of AI, as is the case now, in 2022, we will increasingly see them applied to routine creative tasks, such as writing headlines for articles and newsletters, designing logos and info graphics. Creativity is often seen as a very human skill, and the fact we are now seeing these capabilities emerging in machines means "artificial" intelligence is undeniably coming closer in terms of scope and function to the somewhat nebulous concept we have of what constitutes "real" intelligence.

#### 7. Autonomous vehicles

AI is the "brains" that will guide the autonomous cars, boats, and aircraft that are set to revolutionize travel and society over the coming decade. 2022 should be a year to remember when we look back in the future and contemplate with horror the fact that we thought it was normal that 1.3 million people died of traffic accidents every year, 90% of which were caused by human error!

As well as increasingly effective autonomous cars— Tesla says its cars will demonstrate full self-driving capability by 2022, although it's unlikely they will be ready for general use. Its competitors include Waymo (created by Google), Apple, GM, and Ford, and any of them can be expected to announce major leaps forward in the next year. The year will hopefully also see the first autonomous ship crossing the Atlantic, as the Mayflower Autonomous Ship (MAS), powered by IBM and designed in partnership with non-profit ProMare, will once again attempt the journey (having been forced to turn back during its initial attempt this year).

Thus, as conversational AI takes hold, there are some statistics that support this new development in 2021 and into future years:

AI will support 95% of customer interactions by 2025. The usage of voice assistants will increase three fold from 2.5 billion in 2018 to 8 billion in 2023. Approximately 80% of businesses will use some version of a chatbot system by the end of 2021 (Mitchell 2021).

## **CAN ROBOTS REPLACE HUMANS?**

There have been a lot of debates about whether machines will replace humans in the future or not, Undoubtedly, the increasing dominance of robotics in the field of I.T poses great threat to the job opportunities in workplaces as A.I is sure to increase the levels of unemployment in the countries. Also, the reliance on robots for the smallest tasks will make the human brain weak.

In the future, new jobs and roles will be created to support a technology driven workplace, such as robot/AI trainer, virtual reality manager, and advanced data scientist (Humanresouceonline.net, 2020)

Citrix Systems carried out a survey (work 2035) which is a year long examination of global work patterns, to understand how technology will play vital role in enabling people to perform at their best in future.

Citrix teamed up with Oxford Analytica and Coleman Parkes to survey over 500 C-suite leaders and 1,000 employees within large corporations and mid-market businesses globally on current and future workforce strategies and work models and according to Citrix findings, robots will not replace humans but they will make humans smarter and more efficient. More than three-quarters of those polled (77%) believe that in fifteen years, artificial intelligence (AI) will significantly speed up the decision-making process and make workers more productive. (Humanresourcesonline.net, 2020)

New jobs and roles will be created to support a technology-driven workplace and the changing relationship between humans and machines.

Secondly, Work will be more flexible, a technology that allows for seamless access to the tools and information people need to collaborate and get work done wherever they happen to be will fuel flexible models that the future of work will demand.

Thirdly productivity will get a major boost. Technology, closely integrated with humans, will drive step changes in productivity. Digital assistants driven by AI will draw on personal and workplace data to help employees prioritize their tasks and time and ensure mental and physical wellness.

Humans always follow their instinct, vision, experience, circumstances situations, surrounding information, visual and raw data available, and also the things they have been taught by some teachers or elders to analyze, solve any problem and come out with some effective and meaningful results of any issues while on the other hand, artificially intelligent machines at every level deploy

the various algorithms, predefined steps, backlog data, and machine learning to arrive at some useful results.

Conclusively, It is humans that develops new ideas and have the potential to turn imagination into reality, Jobs other activities in health, scientific, technical services or research, hospitality etc, cannot be completely taken over by robots, robots can interpret and learn things, but can never beat the ultimate human mind. (Hindustantimes, 2019)

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