Artificial Intelligence

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Abstract: **The goal of the multidisciplinary field of artificial intelligence (A.I.) is to automate jobs that presently need human intelligence. Automation of tasks requiring human intelligence is the aim of the diverse field of artificial intelligence (A.I.). Though little is known about artificial intelligence (AI), this technology is revolutionizing all aspects of existence. This essay aims to inform readers on artificial intelligence (AI) and encourage them to use it as a tool to rethink data collection, processing, and evaluation in a range of fields. In this piece, we covered artificial intelligence (AI) in brief, along with its uses and possible everyday applications.**

Keywords- **machine learning, deep learning, computer vision, Cognitive Computing and Knowledge Base System**

I. INTRODUCTION

The ability of an artificial creature to use its own intelligence to solve complex issues is known as artificial intelligence, or AI. Artificial Intelligence is the combination of physiology and computer science. Simply described, intelligence is the computational aspect of a person's ability to achieve objectives in the real world. The ability to reason, visualize, memorize, and grasp, see patterns, make judgments, adjust to change, and gain knowledge from experience is known as intelligence. The goal of artificial intelligence is to make computers act more like humans at a fraction of the time it takes a human to accomplish so. It is therefore referred to as artificial intelligence. Pushing the frontiers of practical computer science toward systems that are flexible, adaptive, and able to create their own solutions and analyses by applying general knowledge to circumstances is another goal of artificial intelligence.

II. OVERVIEW OF AI

Artificial intelligence is the intelligence derived from machines or software. Knowing + Examining + Responding

= Intelligence. Computer science's artificial intelligence is a field that is quickly gaining popularity since it has made life better for humans in many ways. Over the past 20 years, artificial intelligence has significantly improved the performance of production and service systems. Expert systems are a rapidly developing field of technology that started with studies on artificial intelligence. In many fields in the future, intelligent machines will either supplement or replace human capabilities.

III. WORKING OF AI

A. Machine Learning | Learning from experience

It's a common misconception that AI is out of place on an island with robots and self-driving automobiles. However, this approach ignores one of the most significant real-world uses of artificial intelligence, which is the analysis of the enormous amounts of data generated daily. By carefully applying AI to specific tasks, insight gathering and job automation may be completed at a speed and scale never before possible. Artificial intelligence (AI) systems conduct complex searches over the vast amounts of data that humans produce. They interpret text and images to find patterns in complex data and then take appropriate action based on their results. Thanks to advanced technologies, computer systems are now able to understand human language, learn from mistakes, and anticipate future events. Here are some examples of AI subfields.

An application of artificial intelligence called machine learning, or ML, enables computers to autonomously learn from their experiences and

develop without the need for explicit programming. Developing algorithms with the ability to analyze data and produce predictions is the aim of machine learning. In addition to forecasting your preferred Netflix films, machine learning is being used in the healthcare, pharmaceutical, and life sciences industries to enhance disease identification, medical image interpretation, and drug development.

B. Deep Learning | Self-educating machines

Deep learning is a subset of machine learning that makes use of artificial neural networks that learn by studying data. The design of artificial neural networks is modeled after the organic neural networks seen in the brain. For example, in order to discern a face image from a mosaic of tiles, multiple layers of artificial neural networks work together to generate a single output from a multitude of inputs. In order for the machines to progress, they need constant processing and reinforcement for the tasks they complete. They learn by receiving both positive and negative reinforcement.

C. Cognitive Computing | Making inferences from context

Another crucial element of AI is cognitive computing. Its goal is to replicate and enhance human-machine interaction. By comprehending human language and the significance of visuals, cognitive computing aims to replicate human mental processes in computer models. Artificial intelligence and cognitive computing work together to give machines human-like traits and information-processing capabilities. Speech recognition is another type of deep learning that allows phone voice assistants to comprehend queries such as "Hey Siri, how does artificial Intelligence work?"

D. Computer Vision | Understanding images

IV. TYPES OF AI
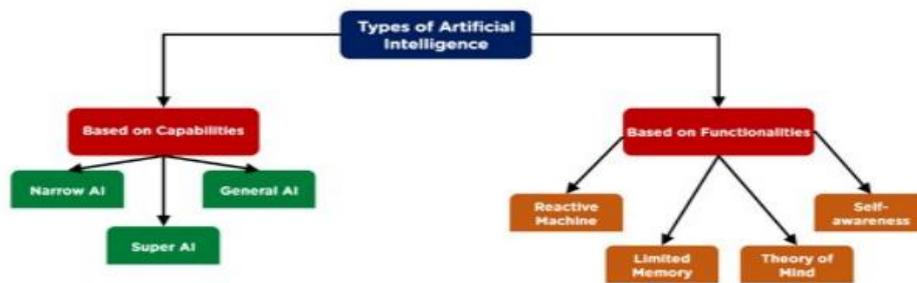
A. AI type-1: Based on Capabilities

Computer vision is the application of deep learning and pattern recognition techniques to the interpretation of picture content, including graphs, tables, and photos contained in PDF documents, together with other text and video. Computers can recognize, process, and interpret visual data thanks to a field of artificial intelligence called computer vision. Applications of this technology are already starting to change industries like healthcare and research and development. In order to diagnose patients more quickly, x-ray images of patients are analyzed using computer vision and machine learning.

1. Narrow AI: One type of AI that can intelligently do a certain task is called narrow AI. Narrow artificial intelligence (AI) is the most common and widely available type of AI at the moment. Narrow

AI cannot function outside of its domain or bounds since it is only trained for a specific task. It is therefore also referred to as "weak AI." Narrow AI may fail in unforeseen ways when it hits its limits. Although it can only do a limited range of tasks, Apple Siri is a great example of narrow artificial intelligence. Narrow AI includes things like speech recognition, picture identification, self-driving cars, chess playing, and recommendation engines for online stores.*General AI:* General AI is a sort of intelligence that is capable of doing any intellectual work as well as a human. The goal of general AI is to create a system that can learn and reason like a person on its own. Currently, no system exists that can be classified as general AI and execute any work as well as a person. Researchers from all across the world are now concentrating their efforts on creating robots that can do general AI tasks. Because generic AI systems are still being researched, developing such systems will take a lot of work and time.

2. Super AI: Super AI is a degree of system intelligence at which machines may outsmart humans and execute any task better than humans with cognitive qualities. It's a result of AI in general. Some fundamental properties of powerful AI are the capacity to understand, reason, solve puzzles, make judgements, plan, learn, and communicate independently. Super AI is still a futuristic Artificial Intelligence idea. The creation of such systems in the actual world is still a world changing effort.

B. AI type-2 Based on Functionality

Reactive Machines: Reactive robots are the simplest form of artificial intelligence. These AI systems don't use their past experiences or memories to guide their decision-making in the future. These robots just take into account the situation at hand and react as best they can. One example of a reactive machine is IBM's Deep Blue system. Google's AlphaGo is a further example of a reactive computer.

1. Limited Memory: The next two types of AI are currently simply concepts or works in progress, however the first two categories of AI have been and still are widely used. Theory of mind AI is the next stage of AI systems that researchers are currently developing. When interacting with other beings, a theory of mind level AI will be able to

recognize their wants, feelings, beliefs, and thought processes. While the field of artificial emotional intelligence is now booming and a priority for well-known AI researchers, more progress in other AI domains will be necessary to get artificial intelligence to the level of Theory of Mind AI. Due to the fact that AI systems will need to perceive people as unique individuals whose brains may be altered by

2. Self-Awareness: This is the last step of AI development, which exists only in theory at the moment. Self- aware AI is an AI that has matured to the point where it is so similar to the human brain that it has gained self-awareness. The ultimate goal of all AI research is and will always be to create this form of AI, which is decades, if not centuries, away from becoming a reality. This form of AI will not only be able to recognize and generate emotions in individuals with whom it interacts, but will also have its own emotions, wants, beliefs, and maybe goals. And this is the kind of AI that sceptics of the technology are concerned about. Although the growth of self-awareness has the potential to accelerate our progress as a civilization, it also has the potential to lead to disaster. This is because, once self-aware, AI may have ideals like self-preservation, which could either directly or indirectly mark the end of mankind, since such an entity could easily outmaneuver any human brain and create sophisticated schemes to take over humanity. The categorization of technology into Artificial Narrow Intelligence (ANI), Artificial General Intelligence (AGI), and Artificial Superintelligence (ASI) is an alternative method of classification that is more commonly used in tech jargon (ASI).

V. APPLICATIONS OF AI

There are many ways in which the average technology consumer interacts with artificial intelligence technologies in their daily lives, but most people don't realize what technologies actually use AI. Here are a few examples of artificial intelligence technologies that many people encounter in their lives.

A. Chatbots

HOW AN A.I. CHATBOT WORKS
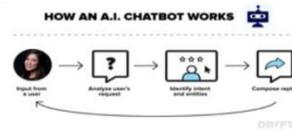
then that" programming." programming.

B. Smart Assistants

AI is exemplified by Siri, Alexa, and all the other virtual assistants. They are able to comprehend what people are saying to them, follow instructions, and react appropriately. These are similar to chatbots on steroids because they can recognize speech and are linked to bigger databases of data, including search engines.

C. Disease Mapping and Prediction

To anticipate and potentially prevent diseases, epidemiologists have always attempted to understand how they

Artificial Intelligence powers chatbots, such those you may have encountered on social Artificial Intelligence powers chatbots, such those you may have encountered on social networking platforms or websites. Since chat bots are just programmed to transmit messages in accordance with guidelines for how they should engage with users, they are among the more basic instances of artificial intelligence. Something along the lines of "if this, spread. The use of artificial intelligence is simplifying this. With this illustration, it's simple to see how artificial intelligence merely makes data processing and prediction modeling more rapid than it would be for humans working alone.
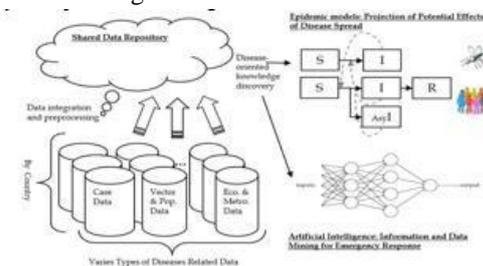
D. Healthcare

AI in Healthcare

E. Spam Filters

Everyone who uses email knows about spam filters. Email inboxes are equipped with filters that send spam emails to a separate folder so they don't clutter users' inbox with useless messages. Spam filters also exist for phone calls, to filter out scammers and other spam phone calls. AI powers these spam filters by using previous knowledge of what spam emails or phone calls look like from a data perspective, and filtering out the ones that match.

EMAIL SPAM

F. Recommendation Engines

The recommendation engines on Netflix and Spotify are some of the most well-known. They use data about which

Healthcare is one of the most significant sectors in the broader big data environment due to its vital role in a prosperous, healthy society. AI in healthcare data has the potential to truly be the difference between life and death. Artificial intelligence has applications for ordinary healthcare

workers such as doctors, nurses, and other staff members. By enhancing quality of life and preventative care, as well as by generating more precise diagnoses and treatment plans, artificial intelligence (AI) in healthcare may enhance patient outcomes. Artificial intelligence (AI) can assist predict and monitor the spread of dangerous diseases by evaluating data from the government, healthcare system, and other sources. Therefore, in the field of global public health, AI has the potential to be an essential tool in the fight against diseases and pandemics.shows you've previously watched or songs you've previously listened to in order to recommend other shows you should watch or songs you should listen to. These are only a couple examples. Recommendation engines also exist in social media platforms to recommend people you should connect to or to show you content you might like.

(a). Collaborative Filtering   (b). Content Filtering
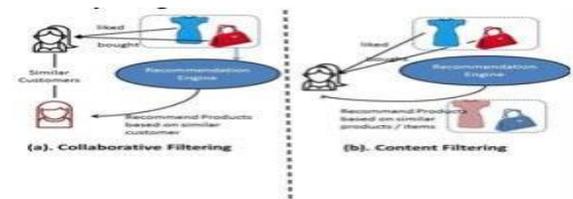
G. Search Engines

Search engines have such huge databases that the only way they are able to sort through all of their potential results to show you the best results for your search is with AI. Search engine algorithms are some of the best examples of robust algorithms out there. For example, Google is said to use something like 200 data points to determine where each result ranks on each results page. With billions of pages in their database, that is a lot of data running through their algorithm with every query.

H. Self-driving cars

Although fully self-driving cars aren't widely available yet, they are well in the works with multiple companies, and some self-driving features are already available in cars today. Companies like Google and Uber are vying to be the first to develop a consumer-ready self-driving car, but you can already buy cars with sensors that alert you to close

objects, break automatically, and can parallel park themselves. Just like how AI can detect cancer better than the human eye, self-driving cars can probably drive better than a lot of humans too.

VI. ADVANTAGES OF AI

A. Reduction in Human Error
Because people make mistakes from time to time, the term "human error" was coined. Computers, on the other hand, do not make these errors if they are correctly programmed. Artificial intelligence makes choices based on previously obtained data and a set of algorithms. As a result, mistakes are decreased, and the prospect of achieving better precision and accuracy is increased.

- For Example: AI has removed the bulk of human mistake in weather forecasting.

B. *Takes risks instead of Humans*

One of the most significant advantages of artificial intelligence is this. By constructing an AI Robot that can do the dangerous tasks for us, we can transcend many of humanity's risky limits. It can be utilized efficiently in every type of natural or man-made disaster, whether it is travelling to Mars, defusing a bomb, exploring the deepest regions of the oceans, mining for coal and oil.

- For Example*:* Have you heard about the explosion at the Chernobyl nuclear power facility in Ukraine? There were no AI-powered robots available at the time to assist us in minimizing the effects of radiation by controlling the fire early on, since any human who came near to the core died in minutes. They ultimately used helicopters to drop sand and boron from a safe distance. AI Robots can be utilized in circumstances when human interaction is risky.

C. Available 24x7
Without breaks, an average human will labor for 4–6 hours every day. Humans are created in such a manner that they can take time off to replenish themselves and prepare for a new day at work, and they even have weekly off days to keep their professional and home lives separate. But, unlike humans, we can use AI to make robots work 24 hours a day, seven days a week with no breaks, and they don't grow bored.

- For Example :Educational institutions and helpline centres get a large number of requests and difficulties that AI can successfully address.

D. Digital Assistance
Some of the most cutting-edge businesses interact with customers using digital assistants, which minimizes the need for human staff. Digital assistants are being used by a lot of websites to deliver products that customers want. We can talk to them about what we're looking for. Certain chatbots are designed in a way that makes it hard to identify if we are speaking with a computer or a human.

As an illustration, it is well knowledge that companies employ customer service representatives who are in charge of responding to inquiries and grievances from clients. Businesses can utilize AI to build chatbots or speech bots that can answer all of the customers' questions. They are already being used by numerous businesses on their websites and mobile applications.
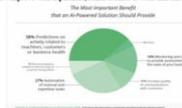
VII. DISADVANTAGES OF AI

A. High Cost of Implementation
The intricacy of the engineering involved in developing AI-based equipment, computers, etc. makes their setup extremely expensive. Not only that, but upkeep and repairs can cost thousands of dollars. The outrageous cost doesn't end there.

D. Risk of Unemployment

Our intuitive brain wonders if AI will eventually replace humans given how quickly the field is developing. To be honest, I have no idea if artificial intelligence will result in increased unemployment. However, the bulk of repetitious tasks—which are mostly binary in nature and require little subjectivity—are probably going to be handled by AIs.

CONCLUSION

As a conclusion, it can be examined how artificial intelligence (AI) has advanced computer science by focusing machines' attention on philosophical debates through artificial psychology. Artificial intelligence (AI) completes tasks more quickly than humans, and its main objective is to develop technology intelligently. Artificial intelligence has been demonstrated to have computer knowledge with human characteristics; yet, these machines and computers support environmental development and act logically to assist humans. AI has already had an impact on people's lives in a variety of industries, and it will undoubtedly have more in the

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