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A Brief Introduction of Artificial Intelligence

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ABSTRACT: Artificial intelligence is a branch of science and engineering that is concerned with theory and the practice of designing systems that exhibit intelligence-related characteristics in human behavior. Starting with a brief history of artificial intelligence, this paper explores this broad interdisciplinary field, organized around the major modules of the fictional architecture of intelligent agents: knowledge representation, problem solving and planning, knowledge acquisition and learning provides a general overview of the relevant areas. Natural Language, Language and Vision Action Processing and Robotics) focuses on both themain research areas in the field of artificial intelligence, the development and application of, and their integration.

KEYWORDS: Artificial Intelligence, Deep Learning, Neural Network , IOT, Machine Learning, Robotics

I.   INTRODUCTION

Artificial intelligence (AI) is the ability of machines to replicate or augment human intelligence, such as: B. Reasoning and learning from experience. Artificial intelligence has been used in computer programs for years and is now being applied to many other products and services. For example, some digital cameras can use artificial intelligence software to identify objects present in an image. Moreover, experts predict that there will be many more innovative artificial intelligence applications in the future, such as smart grids.AI uses techniques from probability theory, economics, and algorithm design to solve real world problems. Additionally, the AI field utilizes computer science, mathematics, psychology, and linguistics. Computer science provides tools for designing and creating algorithms, and mathematics provides tools for modeling and solving the resulting optimization problems.

The concept of AI has existed since his 19th century, but when Alan Turing first proposed the "imitation game" for evaluating the intelligence of machines, computing power and data for training AI was has only become viable in recent decades due to the increased availability of system.

To understand the thinking behind AI, consider what distinguishes human intelligence from that of other organisms: the ability to learn from experience and apply those lessons to new situations. We are able to do this thanks to our high intelligence. We have more neurons than any animal species.

AI helps you focus on the tasks that matter most and make better decisions based on the data you collect about your use cases. It can be used for complex tasks such as B. Predict maintenance needs, detect credit card fraud, and find optimal routes for delivery trucks. In short, AI can automate many business processes so you can focus on your core business.

II.   LITERATURE SURVEY

Artificial Intelligence dates back to his late 1940s, when computer pioneers such as Alan Turing and John von Neumann first began studying how his machine could "think". But in 1956 an important AI milestone happened. Researchers have proven that a machine with unlimited memories can solve any problem. The result was a program called General Problem Solver (GPS). For the next two decades, his research efforts focused on applying artificial intelligence to real-world problems. This development has resulted in expert systems that allow machines to learn from experience and make predictions based on the data they collect. Expert systems are less complex than the human brain, but they can be trained to recognize patterns and make decisions based on that data. They are now widely used in the pharmaceutical and processing industries.

A second major milestone came in 1965 with the development of programs such as Shaky for Robots and his ELIZA for automating simple man-machine conversations. These early programs paved the way for more advanced speech recognition technology that eventually led to Siri and his Alexa. table. All tables should be numbered with Arabic

numerals. Each table should have a captionHeadings should be left aligned above the table. Within tables, only horizontal lines should be used to separate the column headings from the body of the table, and just above and below the table. Tables must be embedded in the text and cannot be provided separately.

Simply put, artificial intelligence is the science of creating intelligent machines and intelligent computer programs that can think and act like humans. The idea of artificial intelligence is based on the human philosophy of whether machines can become as intelligent as humans. The term "artificial intelligence" was coined in 1956 by an American scientist named John McCarthy.

Less than a decade after he cracked the Nazi cipher machine Enigma and helped the Allies win World War II, mathematician Alan Turing discovered his Changed history for the second time. Turing's subsequent tests established a fundamental goal and vision for AI.

AI is essentially a field of computer science aimed at answering Turing's questions affirmatively. An attempt to replicate or simulate human intelligence in a machine. AI's ambitious goals have raised many questions and debates. As such, no single definition of a field is universally accepted.

III. POWERFUL EXAMPLE OF ARTIFICIAL INTELLIGENCE

[1] Siri
   Siri is one of Apple's most popular personal assistants for iPhone and iPad. A friendly voice-activated assistant interacts with users on a daily basis. It helps you find information, get directions, send messages, make voice calls, launch applications, and add events to your calendar.

[2] Tesla
   Not only smartphones, but also cars are moving in the direction of artificial intelligence. Tesla is something you miss if you're a car geek. This is the and one of the best cars available today. The car has not only won many awards, but also features such as self-driving, predictive functions, and absolute innovation.

[3] Cogito
   Cogito was originally co-founded by Dr. Sandy and Joshua and is one of the best examples of a behavioral version of account manager intelligence enhancement currently on the market. The company integrates machine learning and behavioral science to improve customer collaboration for phone professionals. Cogito applies to millions of voice calls made every day. AI solution analyzes human voice and provides real-time guidance to improve behavior

[4] Netflix
   Netflix needs no introduction. It is a ubiquitous content-on-demand service that uses predictive technology to provide based recommendations based on consumer reactions, interests, choices, and behaviors. The technology examines a series of data sets and recommends movies based on previous likes and reactions. Getting smarter every year. The only downside of this technology is that the big movies grow and spread across the platform while the smaller movies get overlooked. But as I wrote before, it's still improving and learning to get smarter.

[5] Flying Drone
   Flying Drone is already delivering products to customers' homes, albeit in test mode. They point to a powerful machine learning system that can transform the environment into a 3D model through sensors and video cameras. The sensor and camera can be mounted on the ceiling to determine the position of the drone in space. A trajectory generation algorithm guides how and where Drone moves. A Wi-Fi system can be used to control the drone and use it for specific purposes (product delivery, video production, or news reporting).

IV. APPLICATIONS OF ARTIFICIAL INTELLIGANCE

AI in healthcare, the biggest bet is improving patient outcomes and reducing costs. Companies are using machine learning to make better diagnoses faster than humans. His one of the most famous healthcare technologies is IBM Watson. It understands natural language and can answer questions. The system searches patient data and other available data sources to form hypotheses, which it presents with a confidence level rating scheme. Other AI applications include using online virtual health assistants and chabots to help patients and healthcare customers find medical information,

schedule appointments, understand billing processes, and manage other help you complete the process. Various AI technologies are also being used to predict, respond to, and understand pandemics such as COVID-19.

AI in Business. Machine learning algorithms are integrated into analytics and customer relationship management (CRM) platforms to reveal pieces of information about how to better serve your customers. Chabots are integrated into your website and serve your customers instantly. Job automation is also a hot topic among academics and IT analysts.

AI in Education. AI can automate grading and give educators more timeAssess students and adapt to their needs so they can learn at their own pace. AI Tutors provide extra support to students to keep them on track. It could also change where and how students learn, and could even replace teachers.

AI in Finance. AI in personal finance apps like Intuit Mint and TurboTax is disrupting financial institutions. Applications like thiscollect personal information and provide financial advice. Other programs such as IBM Watson have been applied to the home buying process. Today,artificial intelligence software processes much of Wall Street trading.

AI on the right. The process of discovery (searching for documents) is often overwhelming for people. Save time and improve customer service by using AI to automate labor-intensive processes in thelegal industry. Law firms use machine learning to describe data, predictoutcomes, use computer vision to classify and extract information from documents, and use natural language processing to interpret information requests. increase.

AI in Manufacturing. Manufacturing is at the forefront of integrating robots into workflows. For example, industrial robots that were once programmed for a single task and separate from human workers are increasingly functioning as robots. Small multitasking robots that work alongside humans to do more in warehouses, factory floors, and other workspaces.

AI in banking. Banks successfully use Chabot to inform customers of services and offers, and process transactions without human intervention. Virtual AI assistants are being used to improve bank compliance and reduce costs. Bankingorganizations are also using AI to improve credit decisions, set credit limits, and identify investment opportunities.

AI in Transportation. In addition to AI's fundamental role in the operation of self-driving vehicles, AI technology will be used in transportation to control traffic, predict delays on Flight, and make maritime transport safer and more efficient. Security. AI and machine learning are high on the buzzword list security vendors are currently using to differentiate their products. These terms are also shorthand for really useful technologies. Organizations use machine learning in security information and event management (SIEM) software and related areas to detect anomalies and identify suspicious activity that indicates a threat. By analyzing data and using logic to identify similarities to known malicious code, can detect newly emerging attacks much faster than human workers or previous technology iterations. can issue a warning about Mature technologies play a key role in helping AI organizations defend against cyberattacks.

V. TYPE OF ARTIFICIAL INTELLIGENCE

1. Reactive Machines

Purely reactive machines are the most basic type of artificial intelligence. Such AI systems do not store memories or past experiences for future actions. These machines focus solely on current scenarios and react to them as the best possible action. IBM's Deep Blue system is an example of a reactive machine. Google's AlphaGo is another example of a reactive machine.

2. Limited Memory

Machines with limited memory can store past experiences and some data for a short period of time. These machines can only use the stored data for a limited period of time. Self-driving cars are a classic example of systems with limited memory. These cars can store the current speed of nearby cars, distance from other cars, speed limits, and other information for navigating the roads.

3 Theory of Mind

Theory of Mind AI must be able to understand human emotions, people, beliefs and how people interact socially. His AI machine of this type has not yet been developed, but researchers have made great efforts and improvements in the development of such AI machines

4. Trust

Trust AI is the future of artificial intelligence. These machines are highly intelligent and have their own consciousness, emotions and self-awareness. These machines will be smarter than the human brain Self-aware AI does not exist in reality yet. This is a hypothetical concept.

refers to the process by which computers develop or continually learn to recognize patterns and make predictions based on data without being specially programmed to make adjustments

VI. DIFFERENT FIELDS UNDER AI

Machine Learning

Machine learning, a form of artificial intelligence, effectively automates the process of creating analytical models, allowing machines to adapt to new scenarios on an individual basis.
 Four steps to building a machine learning model:
1 Select and prepare the training datasets needed to solve the problem. This data may or may not be labeled.
2. Select an algorithm to run on the training data. Algorithms can be regression, decision tree, or instance-based if the data are labeled. If the data is   unlabeled, the algorithm could be a clustering algorithm, an association algorithm, or a neural network.
3. Train an algorithm to build a model.
4. Use and improve the model.There are three methods of machine learning. "Supervised" learning works with labeled data and requires less training. "Unsupervised" learning is used to classify unlabeled data by identifying patterns and relationships. Semi-supervised learning uses a small labeled data set to guide the classification of a larger unlabeled data set.

Deep Learning

Deep learning is a form of machine learning and artificial intelligence (AI) that mimics the way humans acquire certain kinds of knowledge. Deep learning is a key component of data science, including statistics and predictive models. This is a huge benefit for data scientists responsible for collecting, analyzing, and interpreting large amounts of data. Deep learning makes this process faster and easier. In its simplest form, deep learning can be thought of as a way to automate predictive analytics. While traditional machine learning algorithms are linear, deep learning algorithms are built with layers of increasing complexity and abstraction. To understand deep learning, imagine a toddler whose first word is dog. Toddlers learn what dogs are by pointing to objects and saying the word "dog" Parent says "Yes, it's a dog" or "No, it's not a dog" As toddlers keep pointing things out, they notice traits that all dogs have. What toddlers unconsciously do is clarify a complex abstraction (the dog concept) by building hierarchies in Each level of abstraction is created using knowledge gained from the previous level in the hierarchy. Neural Network Inspired by the biological neurons in the human brain, her neural network consists of layers of connected nodes called "neurons" that process input data and predict output values. . Contains her artificial neural network math functions that learn by example just as humans learn from their parents, teachers and peers. They consist of at least three layers: an input layer, a hidden layer, and an output layer. Each layer contains nodes (aka neurons) with weighted inputs that compute the output. Traditional machine learning model performance is stagnant and inserting more data does not improve performance. The Deep Learning model continues to perform better with more data. These fields have different algorithms depending on the application. Examples include machine learning such as decision trees, random forests, boosting, support vector machines (SVM), and k-nearest neighbors (KNN). Neural networks include convolutional neural networks (CNN), recurrent neural networks (RNN), and long short-term memory networks (LSTM).

Robotics

This is becoming a very hot area of artificial intelligence. Interesting areas of research and development focus primarily on the design and manufacture of his robot. Robotics is an interdisciplinary field of science and engineering that includes mechanical engineering, electrical engineering, and computer science. Robotics governs the design, manufacture, operation and use of robots. Handle computer systems for control, intelligent results, and information transformation.

Robots are often used to perform tasks that would be tedious for humans to perform continuously. The primary robotics task was to move large objects through space on assembly line at NASA's automobile manufacturing facility. AI researchers are also developing robots that use machine learning to set up societal-level interactions. Combined Internet of Things (IoT) infrastructure. The goal of AIoT is to create more efficient his IoT operations, improve human-machine interaction, and improve data management and analysis. AI is the simulation of human intelligence processes by machines, especially computer systems, and is typically used in natural language processing, speech

Recognition and Machine vision.

IoT is a system of interrelated computing devices, mechanical and digital machines or objects with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. A thing in IoT can be a person's heart monitor implant, an automobile with built-in sensors to alert the driver when tire pressure is low, or any other object that can be assigned an Internet Protocol address and transfer data over a network. AIoT is transformational and mutually beneficial for both types of technology, as AI adds value to IoT through machine learning capabilities and improved decision-making processes, while IoT adds value to AI through connectivity, signaling and data exchange AIoT can improve companies and their services by creating value from IoT-generated data.

FUTURE RANGE OF AI

Considering the computational costs and technical data infrastructure running behind artificial intelligence, it is a complex and expensive business to actually run on the AI. Fortunately, while the cost of computers has halved, computer technology has made great strides, as Moore's law states that the number of transistors on a microchip doubles about every two years. The advent of AI is changing the business environment and changing people's livesfor the better. In the next few years, most industries will experience major transformations due to new age technologies such as cloud computing, Internet of Things (IoT), and big data analytics. All of these factors have had a significant impact on how businesses operate today and have applications in other areas such as military, healthcare, and infrastructure development. To build an immersive metaverse that appeals to the millions of users who want to learn, create, and live in virtual worlds, AI must be used to enable realistic simulations of the real world. there is. People need to feel immersed in the environment in which they participate. AI can help achieve this reality by making objects look more realistic and enabling computer vision. This allows users to interact with simulated objects using their body movements. Concerns Regarding Further Development and Use of AI.

AI is a very powerful idea, but it is not magic. The most important thing to remember about AI is that it learns from data. The underlying models and algorithms are only the same as the data they contain. This means that data availability, bias, improper labeling, and privacy issues can severely impact AI model performance. Data availability and quality are essential for training AI systems Some of the biggest concerns related to AI today relate to biased datasets that can produce unsatisfactory results or exacerbate gender/racial bias in AI systems . Examining different types of his machine learning models, we find that certain models are more prone to bias than others. For example, when working with deep learning models (such as neural networks), the training process can introduce bias into the model if a biased dataset is used during training.

However, other machine learning models (such as random forests) may be less susceptible to data bias during training. For example, if your data set contains information about many different variables, but only one variable is used for decision making (such as gender), the model will weight all variables equally. It tends to be more biased on that variable than the random forest you have. Original on account

VII. CONCLUSION AND FUTURE WORK

AI is a very powerful and exciting field. It will only become more and more important and ubiquitous in the future, and will undoubtedly continue to have a tremendous impact on modern society until Artificial Neural Networks (ANNs) and more complex deep learning techniques are They are some of the most powerful AI tools for solving complex problems and will continue to be developed and used. Artificial Intelligence (AI) is the intelligence of machines, and the Computer Science Division aims to create them. AI is a key technology today and will continue to be a key enabler in many industries. As AI systems become more sophisticated, their impact on is not only poised to disrupt multiple industries, but it also raises concerns about how this incredible power should be harnessed. 's artificial intelligence and technology always keep us interested and surprise us with new ideas, topics, innovations, products and more. AI isn't implemented as much as the movies they portray (intelligent robots, etc.), but there are many significant attempts to reach levels like and compete in the market. Still, hidden projects and developments of industrial enterprises. Artificial intelligence systems are becoming more powerful as they grow in size and complexity. AI analysts are constantly working on building software systems for various applications such as automated learning, knowledge, natural language, and speech recognition. explored his six areas under the umbrella of artificial intelligence, depending on how AI systems work. Six areas are now buzzwords in industries and organizations. Many companies are taking advantage of it to drive a much better approach to serving people.

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