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AI: Up-to-Date Technology

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SYNOPSIS:

Artificial Intelligence is a significant technology that supports in daily life as well as in industry. Now a days AI is very emerging technology in our life and has become a buzz word in the field of new technology. It will change the life style of everyone from Technology Industry to normal people. The AI redesigns the shape of human in every discipline of life.

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Preface:

Artificial Intelligence Involves using computers to do things that traditionally require human intelligence. AI can process large amounts of data in ways that human cannot normally do. The goal of AI is to enable computer to do things like recognized patterns, make decisions, and judge like humans.

Aider

This article is written with the Knowledge gained through analysing many national and international science journals and with the information from numerous social, electronic, print and online Medias. It basically focuses on different aspects. Artificial Intellence, its utility and its immense opportunities are noticed in every arena of daily life.

AI

AI is intelligence demonstrated by machines, as opposed to intelligence of humans and other animals. Example tasks in which this is done include speech recognition, computer vision, translation between languages, as well as other mappings of inputs- Wikipedia

John McCarthy Offers the following prominent definition for AI amongst the definitions surfaced in last few decades

"2004 paper (PDF,106 KB)(link resides outside IBM),It is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable.''

John McCarthy was one of the most influential people in the AI field. He is known as the "father of artificial intelligence'' because of his excellent contribution in Computer Science and AI. McCarthy coined the term "artificial intelligence'' in the 1950s.

The ideal characteristic of artificial intelligence is its ability to rationalize and take actions that have the best chance of achieving a specific goal. A subset of artificial intelligence is machine learning (ML), which refers to the concept that computer programs can automatically learn from and adapt to new data without being assisted by humans. Deep learning techniques enable this automatic learning through the absorption of huge amounts of unstructured data such as texts, images, or videos.

Memoir-AI

The concept of inanimate objects endowed with intelligence has been around since ancient times. The Greek God Hephaestus was depicted in myths as forging robot-like servants out of gold. Engineers in ancient Egypt built statues of gods animated by priests. Throughout the centuries, thinkers from Aristotle to the13th century Spanish theologian Ramon Llull to René Descartes and Thomas Bayes used the tools and logic of their times to describe human thought processes as symbols, as symbols, laying the foundation for Al concepts such as general knowledge representation.

The late 19th and first half of the 20th centuries brought forth the foundational work that would give rise to the modern computer. In 1836, Cambridge University mathematicians Charles Babbage and Augusta Ada Byron, Countess of Lovelace, invented the first design for a programmable machine.

1940s. Princeton mathematician John Von Neumann conceived the architecture for the stored-program computer -- the idea that a computer's program and the data it processes can be kept in the computer's memory. And Warren McCulloch and Walter Pitts laid the foundation for neural networks.

1950s. with the advent of modern computers, scientists could test their ideas about machine intelligence. One method for determining whether a computer has intelligence was devised by the British mathematician and World War II code- breaker Alan Turing. The Turing Test focused on a computer's ability to fool interrogators into believing its responses to their questions were made by a human being.

In 1956.The modern field of artificial intelligence is widely cited as starting this year during a summer conference at Dartmouth College. Sponsored by the Defense Advanced Research Projects Agency (DARPA), the conference was attended by 10 luminaries in the field, including Al pioneers Marvin Minsky, Oliver Selfridge and John McCarthy, who were credited with coining the term artificial intelligence. Also in attendance were Allen Newell, a computer scientist, and Herbert A. Simon, an economist, political scientist and cognitive psychologist, who presented their groundbreaking Logic Theorist, a computer program capable of proving certain mathematical theorems and referred to as the first Al program.

1950s and 1960s. In the wake of the Dartmouth College conference, leaders in the fledgling field of Al predicted that a man-made intelligence equivalent to the human brain was around the corner, attracting major government and industry support. Indeed, nearly 20 years of well-funded basic research generated significant advances in Al: For example, in the late 1950s, Newell and Simon published the General Problem Solver (GPS) algorithm, which fell short of solving complex problems but laid the foundations for developing more sophisticated cognitive architectures; McCarthy developed Lisp, a language for Al programming that is still used today. In the mid-1960s MIT Professor Joseph Weizenbaum developed ELIZA, an early natural language processing program that laid the foundation for today's chatboats.

1970s and 1980s. But the achievement of artificial general intelligence proved elusive, not imminent, hampered by limitations in computer processing and memory and by the complexity of the problem. Government and corporations backed away from their support of Al research, leading to a fallow period lasting from 1974 to 1980 and known as the first "Al Winter." In the 1980s, research on deep learning techniques and industry's adoption of Edward Feigenbaum's expert systems sparked a new wave of Al enthusiasm, only to be followed by another collapse of government funding and industry support. The second Al winter lasted until the mid-1990s.

1990s through today. Increases in computational power and an explosion of data sparked an Al renaissance in the late 1990s that has continued to present times. The latest focus on Al has given rise to breakthroughs in natural language processing, computer vision, robotics, machine learning, deep learning and whatnot. Moreover, Al is becoming ever more tangible, powering cars, diagnosing disease and cementing its role in popular culture. In 1997, IBM's Deep Blue defeated Russian chess grandmaster Garry Kasparov, becoming the first computer program to beat a world chess champion. Fourteen years later, IBM's Watson captivated the public when it defeated two former champions on the game show Jeopardy!. More recently, the historic defeat of 18-time World Go champion Lee Sedol by Google Deep Mind's Alpha Go stunned the Go community and marked a major milestone in the development of intelligent machines,

Notion-AI

AI is based on the principle that human intelligence can be defined in a way that a machine can easily mimic it and execute tasks, from the most simple to those that are even more complex. The goals of artificial intelligence include mimicking human cognitive activity. Researchers and developers in the field are making surprisingly rapid strides in mimicking activities such as learning, reasoning, and perception, to the extent that these can be concretely defined. Some believe that innovators may soon be able to develop systems that exceed the capacity of humans to learn or reason out any subject. But others remain skeptical because all cognitive activity is laced with value judgments that are subject to human experience.

As technology advances, previous benchmarks that defined artificial intelligence become outdated. For example, machines that calculate basic functions or recognize text through optical character recognition are no longer considered to embody artificial intelligence, since this function is now taken for granted as an inherent computer function.

Al is continuously evolving to benefit many different fields. Machines are wired using a cross-disciplinary approach based on mathematics, computer science, linguistics, psychology, and more.

Algorithms often play a very important part in the structure of artificial intelligence, where simple algorithms are used in simple applications, while more complex ones help frame strong artificial intelligence.

Category-Al

AI can be categorized into one of four types.

- **Reactive Al** uses algorithms to optimize outputs based on a set of inputs. Chess-playing AIs, for example, are reactive systems that optimize the best strategy to win the game. Reactive AI tends to be fairly static, unable to learn or adapt to novel situations. Thus, it will produce the same output given identical inputs.

- **Limited memory Al** can adapt to past experience or update itself based on new observations or data. Often, the amount of updating is limited (hence the name), and the length of memory is relatively short. Autonomous vehicles, for example, can "read the road" and adapt to novel situations, even "learning" from past experience.

- **Theory-of-mind Al** is fully-adaptive and has an extensive ability to learn and retain past experiences. These types of AI include advanced chat-bots that could pass the Turing Test, fooling a person into believing the AI was a human being. While advanced and impressive, these AI are not self-aware.

- **Self-aware Al**, as the name suggests, become sentient and aware of its own existence. Still in the realm of science fiction, some experts believe that an AI will never become conscious or "alive".

Prior Conditions for AI

- As a beginner, here are some of the basic prerequisites that will help get started with the subject.

- 1. A strong knowledge on Mathematics - namely Calculus, Statistics and probability.

- 2. A good amount of experience in programming languages like Java, or Python.

- 3. A strong knack in understanding and writing algorithms.

- 4. A strong background in data analytics skills.

- 5. A good amount of knowledge in discrete mathematics.

- 6. The will to learn machine learning languages.

How does the Al effect work?

- As the hype around Al has accelerated, vendors have been scrambling to promote how their products and services use Al. Often what they refer to as Al is simply one component of Al, such as machine learning. Al requires a foundation of specialized hardware and software for writing and training machine learning algorithms. No one programming language is synonymous with Al, but a few, including Python, R and Java, are popular.

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

- Al programming focuses on three cognitive skills: learning, reasoning and self-correction.

- **Learning processes**. This aspect of Al 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.

Inflictions of Al

Artificial intelligence has made its way into a wide variety of markets. Here are   nine   examples.

Medical care: The biggest bets are on improving patient outcomes and reducing costs. Companies are applying machine learning to make better and faster diagnoses than humans. One of the best-known healthcare technologies is IBM Watson. It understands natural language and can respond to questions asked of it. The system mines patient data and other available data sources to form a hypothesis, which it then presents with a confidence scoring schema. Other Al applications include using online virtual health assistants and chatbots to help patients and healthcare customers find medical information, schedule appointments, understand the billing process and complete other administrative processes. An array of Al technologies is also being used to predict, fight and understand pandemics such as COVID-19.

Trade & commerce: Machine learning algorithms are being integrated into analytics and customer relationship management (CRM) platforms to uncover information on how to better serve customers. Chatbots have been incorporated into websites to provide immediate service to customers. Automation of job positions has also become a talking point among academics and IT analysts.

Systemic instruction: Al can automate grading, giving educators more time. It can assess students and adapt to their needs, helping them work at their own pace. Al tutors can provide additional support to students, ensuring they stay on track. And it could change where and how students learn, perhaps even replacing some teachers.

Funding: Al in personal finance applications, such as Intuit Mint or TurboTax, is disrupting financial institutions. Applications such as these collect personal data and provide financial advice. Other programs, such as IBM Watson, have been applied to the process of buying a home. Today, artificial intelligence software performs much of the trading on Wall Street.

Enactment: The discovery process -- sifting through documents -- in law is often overwhelming for humans. Using Al to help automate the legal industry's labor - intensive processes is saving time and improving client service. Law firms are using machine learning to describe data and predict outcomes, computer vision to classify and extract information from documents and natural language processing to interpret requests for information.

Industrial production: Manufacturing has been at the forefront of incorporating robots into the workflow. For example, the industrial robots that were at one time programmed to perform single tasks and separated from human workers, increasingly function as cobots: Smaller, multitasking robots that collaborate with humans and take on responsibility for more parts of the job in warehouses, factory floors and other workspaces.

Bank service: Banks are successfully employing chatbots to make their customers aware of services and offerings and to handle transactions that don't require human intervention. Al virtual assistants are being used to improve and cut the costs of compliance with banking regulations. Banking organizations are also using Al to improve their decision-making for loans, and to set credit limits and identify investment opportunities.

Transit: In addition to Al's fundamental role in operating autonomous vehicles, Al technologies are used in transportation to manage traffic, predict flight delays, and make ocean shipping safer and more efficient.

Free from threat: Al and machine learning are at the top of the buzzword list security vendors use today to differentiate their offerings. Those terms also represent truly viable technologies. Organizations use machine learning in security information and event management (SIEM) software and related areas to detect anomalies and identify suspicious activities that indicate threats. By analyzing data and using logic to identify similarities to known malicious code, Al can provide alerts to new and emerging attacks much sooner than human employees and previous technology iterations. The maturing technology is playing a big role in helping organizations fight off cyber attacks.

Career amenities in Al

Establisher/ Engineer : Al & ML **Establisher** / **Engineer** is responsible for performing statistical analysis, running statistical tests, and implementing statistical designs. Furthermore, they develop deep learning systems, manage ML programs, implement ML algorithms, etc.

So, basically, they deploy Al & ML-based solutions for the company. For becoming n Al & ML developer, you will need good programming skills in Python, Scala, and Java. You get to work on frameworks like Azure ML Studio, Apache Hadoop, Amazon ML, etc. If you proceed on the set ai engineer learning path, success is all yours!

Al inquisitor/ Consultant : The role of an ai inquisitor/ Consultant is similar to that of an ai engineer. The key responsibility is to cater to Al-oriented solutions and schemes to enhance the services delivered by a certain industry using the data analyzing skills to study the trends and patterns of certain datasets. Whether you talk about the healthcare industry, finance industry, geology sector, cyber security, or any other sector, Al analysts or specialists are seen to have quite a good impact all over. An Al Analyst/Specialist must have a good programming, system analysis, and computational statistics background. A bachelor's or equivalent degree can help you land an entry-level position, but a master's or equivalent degree is a must for the core Al analyst positions.

Data Reseacher: Owing to the huge demand for data reseacher, there are high chances that you are already familiar with the term. The role of a data scientist involves identifying valuable data streams and sources, working along with the data engineers for the automation of data collection processes, dealing with big data, analyzing massive amounts of data to learn the trends and patterns for developing predictive ML models. A data scientist is also responsible for coming up with solutions and strategies for the decision-makers with the help of intriguing visualization tools and techniques. SQL, Python, Scale, SAS, SSAS, and R are the most useful tools to a data scientist. They are required to work on frameworks such as Amazon ML, Azure ML Studio, Spark ML lib, and so on.

Fact-finding Scientist: Fact-finding scientist is one of the other fascinating artificial intelligence jobs. This ai job position holds responsibilities related to researching the field of Artificial Intelligence and Machine Learning to innovate and discover Al-oriented solutions to real-world problems. As we know, research in whatever streams it may be demands core expertise. Likewise, the role of a research scientist calls for mastery in various Al disciplines such as Computational Statistics, Applied Mathematics, Deep Learning, Machine Learning, and Neural Networks. A research scientist is expected to have Python, Scala, SAS, SSAS, and R programming skills. Apache Hadoop, Apache Signa, Scikit learn, H20 are some common frameworks to work on as a research scientist. An advanced master's or doctoral degree is a must for becoming an Al research scientist.

Product Executive: Nowadays, in every leading company, the job of a product executive incorporates a significant role of artificial intelligence. Resolving challenging issues by strategically collecting data falls under the duty of a product manager. You are supposed to have the skill of identifying relevant business impeding problems and further gather related datasets for data interpretation. Once the data interpretation is made, the product manager implements effective Al strategies to evaluate the business impacts depicted by the inferences drawn from data interpretation. In view of the crucial job role, every organization needs an efficient product manager. Thus, we can say that a product manager ensures that a product is actively running. One must have good hands-on programming languages like Python, R, SQL, and other essential ones..

Robotics Integrator: Following the lead of global automation trends and the emergence of robotics in the field of ai, we can tell it is definitely a sign of sprouting demand for robotics scientists. In this fast-paced world where technology is becoming the pioneer, robots are indeed stealing the job of people handling manual or repetitive & boring tasks. On the contrary, it is giving employment to professionals having expertise in the field of robotics. In order to build and manage these robotic systems, we need a robotics engineer. To pursue a career as a robotics engineer, you must have a master's degree in robotics, Computer Science or Engineering. A robotics scientist is among one of the other interesting and high paying ai careers take upon. Since we are already aware of how complicated robots are, tackling them demands knowledge in different disciplines. If the field of robotics intrigues you and you are good at programming, mechanics, electronics, electrics, sensing, and psychology and cognition to some extent, you are good to go with this career option.

Applicability and Inapplicability-AI

Artificial neural networks and deep learning artificial intelligence technologies are quickly evolving, primarily because Al processes large amounts of data much faster and makes predictions more accurately than humanly possible.

While the huge volume of data being created on a daily basis would bury a human researcher, Al applications that use machine learning can take that data and quickly turn it into actionable information. As of this writing, the primary disadvantage of using Al is that it is expensive to process the large amounts of data that Al programming requires.

Applicability

- Good at detail-oriented jobs;

- Reduced time for data-heavy tasks;

- Delivers consistent results; and

- Al-powered virtual agents are always available.

Inapplicability

- Expensive;

- Requires deep technical expertise;

- Limited supply of qualified workers to build Al tools;

- Only knows what it's been shown; and

- Lack of ability to generalize from one task to another.

How can be sure AI is doing the duties?

We can base the human-likeness of an AI entity on the

- Turing test

- The Cognitive Modelling Approach

- The Law of Thought Approach

- The Rational Agent Approch

The Afterlife of Al

While Artificial General Intelligence remains a long way off, more and more businesses will adopt Al in the short term to solve specific challenges. Gartner predicts (link resides outside IBM) that 50% of enterprises will have platforms to operationalize Al by 2025 (a sharp increase from 10% in 2020).

Knowledge graphs are an emerging technology within Al. They can encapsulate associations between pieces of information and drive upsell strategies, recommendation engines, and personalized medicine. Natural language processing (NLP) applications are also expected to increase in sophistication, enabling more intuitive interactions between humans and machines.

Moral issues in AI

While Al tools present a range of new functionality for businesses, the use of artificial intelligence also raises ethical questions because, for better or worse, an Al system will reinforce what it has already learned.

This can be problematic because machine learning algorithms, which underpin many of the most advanced Al tools, are only as smart as the data they are given in training. Because a human being selects what data is used to train an Al program, the potential for machine learning bias is inherent and must be monitored closely.

Anyone looking to use machine learning as part of real-world, in-production systems needs to factor ethics into their Al training processes and strive to avoid bias. This is especially true when using Al algorithms that are inherently unexplainable in deep learning and generative adversarial network (GAN) applications.

Explainability is a potential stumbling block to using Al in industries that operate under strict regulatory compliance requirements. For example, financial institutions in the United States operate under regulations that require them to explain their credit-issuing decisions. When a decision to refuse credit is made by Al programming, however, it can be difficult to explain how the decision was arrived at because the Al tools used to make such decisions operate by teasing out subtle correlations between thousands of variables. When the decision- making process cannot be explained, the program may be referred to as black box Al.

Closure

AI holds the key to unlocking a impressive future where, driven by data and computers that understand our world, we will all make more informed decisions. These computers of the future will understand not just how to turn on the switches but why the switches need to be turned on.

Abbreviations

AI:

Artificial Intelligence

ML:

Machine Learning

SIEM:

Security Information and Event Management

SQL:

Structured Query Language

SAS:

Statistical Analysis System

SSAS:

SQL Server Analysis Services

GAN:

Generative Adversarial Network

NLP:

Natural Language Processing

R:

The ”R” name is derived from the first letter of the names of its two developers Ross Ihaka and Robert Gentleman

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