ARTIFICIAL INTELLIGENCE AND ITS APPLICATIONS THAT ARE CHANGING THE WORLD

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What is Artificial Intelligence?

[1] It is basically the science of developing smart machines in the form of different computer programs. It is related to making computer so intelligent that they can understand humans but it does not mean that they should also be biologically related to human.[2] Artificial Intelligence is the ability of digital computers to solve problems that are associated with high thinking ability which cannot be solved by human beings at the present time.[3] AI is a field of computer science that allows us to create intelligent machines that behave like humans, think like humans and make their own decisions. Artificial intelligence is composed of two words, artificial which defines artificial things and intelligence which expresses the ability to think for oneself, so artificial intelligence is "artificial thinking power". This field was founded on the idea that someday machines will be able to think, that is, they will be able to reproduce intellect and intelligence, along with consciousness, the functions that make us human. It may sound like science fiction or a concept of a new era, but in fact there are references to them in myths as well as other text, scriptures, and artefacts. Artificial Intelligence is not just a turning point in the field of research but also in the revolutionary industry and work as we know it today. With the ultimate goal of creating consciousness, AI goes through different stages: planning, reasoning, data analysis, predicting outcomes and acting accordingly. Artificial Intelligence includes the use of statistics and probability, as well as many mathematical tools (neural networks and machine learning are mostly based on them).

History of AI

[4] Artificial intelligence (AI) missions start with dreams, like all missions. People have long imagined machines with human capabilities - automatic cars that move and the devices that work for it. Human-like machines are depicted in many stories and depicted in sculptures, paintings and drawings. You may be familiar with many of them, but let me mention a few. Homer's Iliad speaks of self-propelled chairs known as "tripods" and gold "carts" built by Hephaestus, the lame blacksmith god, to help him move. Metamorphosis, Pygmalian sculpts an ivory statue of a beautiful young girl, Galatea, which Venus brought to life. [5] In 1847, George Boole became the first person to describe formal language for logical reasoning. In 1950, Alan Turing gave a theory to check software's intelligence. According to his theory any software is considered intelligent if a human being talking to it cannot predict whether he is talking to a computer or a person. This test was called the Turing test. [6] People realized that the intelligent machine is an idea whose time has come, and it is not only this computer that presents a vehicle with which such a dream can be realized. There is a constellation of events, most notably the change from the dominant model, the energy physicist's concept, to a new model, the cybernetics' concept, and has constant efforts to describe psychology and biological phenomena mathematically. Because of these convergence points, a young associate professor of mathematics at Dartmouth College named John McCarthy, who had been fascinated by these questions for quite some time, suggested for his friends that real

progress can be realized if only everyone is solving these problems. Those three friends, Marvin Minsky, another young researcher were Harvard Junior Fellows in Mathematics and Neuroscience, Nathaniel Rochester, director of information studies at the IBM Research Centre in Poughkeepsie, N, Y., and Claude Shannon, then, a mathematician at Bell Laboratories who was heavily involved in the model transformation from energy to information, agreed that perhaps it was it's not a bad idea , and together with McCarthy submitted a proposal to the Rockefeller Foundation for "a study of ten two-month-old men on artificial intelligence conducted in the summer of 1956 in Dartmouth College in Hanover, New Hampshire. Research must be conducted on the basis of conjecture that any aspect of learning or any other characteristic of intelligence can in principle be described precisely so accurate that could bring a machine to mimic". This is the first time the term artificial intelligence has been officially used. Work going on in this area, he has promoted the term and despite several other proposals and one number of grumbles, artificial intelligence is still blocked. In addition, others made short visits to talk about related work. Among those visitors were Alex Bernstein, then programmers from IBM in New York City were invited to talk about the chess program he was working on, which would receive a lot of the public then, causing IBM, people to fear that the idea of smart machines was so threatening that it would deter customers from buying computers.

Growth of AI
[7]Artificial Intelligence is growing rapidly as a factor of competitiveness and is being used by large companies rapidly. It cannot be confined only to individual companies but also has a high potential to contribute in national economy system. [8] Artificial intelligence (AI) is considered as the Fourth Industrial Revolution. Artificial intelligence with big data has changed all industries around the world. Artificial intelligence refers to the simulation of human or animal intelligence in a computer system, thinking of it as an intelligent entity and programmed to mimic the behaviour of the intelligent entity. Computer systems with programmed intelligence can solve a variety of real-world problems much more accurately and efficiently than deterministic and hard-coded computer systems. AI plays an important role in solving problems in the business world, as many problems in business and business analytics cannot be solved by the deterministic system. Machine learning and deep learning, a subset of the realm of AI, solves and optimizes many business issues such as marketing, Credit card fraud detection, algorithmic trading, customer service, portfolio management, product recommendation and many more. AI and big data revolutionized the business world.

AI in Healthcare appliances
[9] The experts observed that out of more than 50 patients per day, which can be very debilitating for people considering the amount of advice and information needed for people. Unlike physicians, AIs are not episodic by number of patients, hours of work, and are redundant in duties. AI helps doctors assess how dangerous a patient's health is and then uses intelligence to not only develop quality of care, but also observe and advise patients on the effects side effects of certain drugs. The global impact of AI is very challenging, with high-tech developed tools to improve decision making, disease detection and management of diseases such as chronic diseases and acute diseases. Doctors and other medical professionals use AI for more accurate diagnosis. In medicine, AI uses arithmetic algorithms as well as human body data science to diagnose, better than doctors can do. This gives professionals the ability for to take immediate action on illnesses that could become serious. Health

systems need to be understood about the variety of systems that are heterogeneous, distributed and common, speak different languages, integrate medical devices and are personalized by different entities, respectively identified by people living in different contexts and aiming for different goals. Analysis of tests, X-rays, CT scans, records entry and different habitual obligations can all be achieved much quicker and with extra precision via way of means of robots. Cardiology and radiology are regions where the quantity of records to bear in mind can be overwhelming and tedious. Future cardiologists and radiologists ought to bear in mind only the maximum complicated cases for which human tracking are useful. IBM got here up with any other set of rules called Medical Sieve. It is a bold long-time period investigative project that targets to create the subsequent technology of "cognitive assistants" with analytical and reasoning competencies and a variety of medical knowledge. Medical Sieve is certified to aid medical choice making in Radiology and Cardiology. The "cognitive fitness assistant" is that may test X-ray pictures for markers and discover complications quicker and greater reliably [10] AI is nowadays been used in the orthognathic surgery as intra-oral scanner software which helps in faster and more efficient acquisition. Also the use of AI in 3D radiology improves the signal to noise ratio and gives a higher quality image which eventually helps to lower the doses of radiations.[9]Artificial Intelligence is being used in machines like echocardiograms, MRIs, CT scans, etc to test screening results. It helps to measure the accurate working and analysis from the beginning till the end of the healing process. [11] AI devices mainly divide into two main categories. The first category includes machine learning (ML) techniques that analyze structured data such as imaging, genetics, and EP data. In medical applications, ML procedures attempt to group patient's characteristics or infer probability of disease. The second category includes natural language processing (NLP) takes information from the unstructured data like medical journals to complete and enrich structured medical data. NLP procedures are used for converting text into machine-readable structured data, which can then be analyzed using ML techniques.

AI in Manufacturing and Production

[12]Smart technologies like Internet of Things, Cloud Computing, Big data and Cyber-Physical systems lead to the emergence of intelligent manufacturing as a new version of Smart manufacturing. [13] Modern production and logistics systems are supported by increasingly widespread and powerful computer networks. In these networks, the constant ocean of data is generated by sensors, machines, systems, smart devices, and people. With increasing computing power, this Big Data is being analyzed faster, wider and deeper than ever before. These advancements have redefined the value of artificial intelligence (AI) technologies and ushered in a new era known as Industry 4.0 or Smart Factory. Advanced cognitive computing and deep learning methods have begun to find applications in manufacturing systems for automated visual inspection, fault detection, and maintenance. Active efforts are being made to apply reinforcement learning methods to material handling and production planning systems. Industries that hope to transform real-time data into actionable decisions are looking for opportunities to integrate AI methods with traditional operations research approaches, concepts and technologies Internet of Things (IoT) as well as network physical systems. [14]AI technologies could assist the production planner in choosing the best production process which not only reduces the cost of production but also increases the quality and efficiency of the production process. It also helps to build an intelligent system which automatically adapts the process parameters according to changing conditions. [15]

Intelligent method designing may be a dynamic and sophisticated activity. Method designing provides a close description of manufacturability and needs for changing raw materials stock into finished product. Intelligent method designing includes computer-aided process planning (CAPP) and layout of facilities and locations. Method designing is that interface between Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM). CAPP is important in achieving the final word goal of totally integrated factories within the future. The CAPP system contains an outsized quantity of data as well as rules for organization of machine operations and factual information concerning the shop. Inventory management is additionally thought of during these sections as a result of palmy inventory management is important to palmy producing and needs refined strategies for handling dynamical surroundings. The literature is choked with articles on freelance theoretical models of demand inventory; however it lags behind these developments. AI will play a very important role in serving to practitioners implement such models and conjointly overcome the issues related to large-scale inventory management.

AI in Security and Surveillance
[16]Michael Rogers', the director of National Security Agency (NSA) said that the agency sees AI as the foundation to the future of cyber security. In December 2016, DRDA held a head to head fight challenge between autonomous machines. Each machine was capable of automatically finding and making use of cyber vulnerabilities in its opponents and at the same time mending its own vulnerabilities and protecting itself from external cyber attacks. As a result of this tournament DoD began the 'Project Voltron' to develop such systems to scan and patch vulnerabilities in the U.S. military. [17]Activities such as Advanced Persistent Threat operations, which are currently more labour intensive in the coming times, may become largely automated and easily available on the black market with the increasing development in AI. [18] The application of AI- based techniques has great potential to boost the security and potency of data-driven Intelligent Transportation Systems (ITS) further as new services and rising of the Internet of Vehicles (IoV). This text discusses the sensible implementation of deep learning strategies to reinforce safety and security in very specific ITS scenarios such as railway crossings. This work presents the projected system named Artificial Intelligence-based Surveillance System for Railway Crossing Traffic (AISS4RCT). It supports a mixture of detection and classification strategies and specializes in numerous image processing inputs such as vehicle presence, pedestrian presence, vehicle chase, rail barriers at level crossings, scene railway signals and signal fire system. The system is meant to use properly positioned cameras to capture the complete crossing space at a given intersection. By utilizing GPU-accelerated image process and deep neural networks, the system mechanically detects risky and dangerous things at railway crossings in real time. Additionally, camera modules send information to a central server for additional process further as notification to interested parties like police, emergency services and railway operators. In addition, the system design uses privacy and security based practices deliberately to secure all communication interfaces, shield personal information and increase everyone's privacy, i.e., pedestrians and motorists.

Artificial Intelligence in Education
[19]Intelligent Tutoring Systems (ITS) uses artificial intelligence technologies to stimulate individualized human learning and provides educational activities that best match the analytical needs of the learner. In addition to this it also provides targeted and timely feedbacks without the presence of any individual faculty. Some ITS put learners in control of their own learning to help

students develop self-regulation skills; others use instructional strategies to extend learning so that learners are appropriately challenged and supported. For example, BUGGY, a revolutionary system designed to teach basic addition and subtraction, used a model of possible misconceptions that learners could present among learn their procedure. This "error library", is in fact the system's domain model, used to diagnose any student errors so that appropriate tutoring can be provided**.** Modern model-driven adaptive systems can be much more flexible. They allow the rationale for all system decisions to be made unambiguously and understandable by humans (and thus applicable to classroom instruction). Over the past decade, increasingly complex learner models, pedagogies, and domains have been introduced into many adaptive tutors to support personalized learning. For example, the iTalk2Learn system, designed to help young students learn fractions, used a learner model that included information about math knowledge, cognitive needs, status affective (emotional) state, the feedback they receive, and their reaction to those comments**.** [20]Intelligent Tutoring Systems (ITS) offers great flexibility in the presentation of material and has a good ability to respond to the individual needs of the student. These systems achieve their intelligence by representing the decisions about how to teach a particular student as well as gives information about the learner. This allows great diversity by changing the way system interacts with the student. [21] Squirrel a famous company in China uses AI in education. For every course that the company offers, the engineering team works with a group of master teachers to break down the subject into the smallest possible conceptual pieces known as knowledge points. The purpose is to diagnose the student gap in understanding as accurately as possible. Once knowledge points are established, they are paired with video presentations, notes, edited examples and exercises.

Advantages of AI

[22] Artificial intelligence (AI) applications are used to simulate human intelligence to solve a problem or make a decision. AI provides the benefits of permanence, reliability, and cost-effectiveness while addressing uncertainty and speed in solving a problem or making a decision. AI has been used in fields as diverse as engineering, economics, linguistics, law, manufacturing, and medicine, and for a wide range of modelling, prediction, and decision support applications, regulation and control. One of the most promising applications of AI has been rigorously used on the Internet, as well as in search engines. In an organization where human intelligence is tied to a particular person or to a group of people, AI applications can provide the permanence that knowledge is not lost as individuals or group members retire or are no longer available to the organization. The lifespan of knowledge encapsulated within an AI framework can be extended as long as the relevance of the problems and decision scenarios remains unchanged. AI also enables the development of learning capabilities that can be used to extend the life and relevance of applications. Learning from real-world successes and failures is an enabling trait of application tools. AI is called "reinforcement learning" and has the advantage that it increases the reliability of tools as they are used more in applications. [23] AI already has many applications in the medical field such as online bookings of appointments for various doctors, online check-in at the medical centres, digitization of medical records, follow-ups for booking and even vaccination reminders for children and pregnant women. It is also being used to give warnings of the side effects to the doctors when prescribing combination of several medicines. [24] One of the great things about Artificial Intelligence is that it makes decision based on facts and not on emotions. It is a much known fact that even after our best efforts; human decisions are always adversely affected by the emotions. [25] The area of robotics is often referred to as the sub-area of AI that deals with perceptual and motor tasks. A robot is a mechanical device that performs an automated task under the direct supervision of a human being, under a predefined program, or under a set of common guidelines using artificial intelligence technology. [26] Today, as clients become more sophisticated and knowledgeable, they

prefer to make financial transitions with less human interactions. The technical field is much broader and has the potential to improve the overall efficiency of the financial system. One of the most popular tools is the smart contract, a computer program that can execute contract terms (Idelberger, Governatori, Riveret & Sartor, 2016). Fully automated smart contracts can complement or completely replace common legal contracts. This is clear as Smart contracts are becoming increasingly important in multiple industries such as healthcare, real estate and securities. There are about possible uses for banking systems, insurance, management, etc.

Disadvantages of AI

[27] Artificial Intelligence makes people lazy because applications automate most of the work. People tend to push themselves into these inventions, which can weigh on future generations. Since AI replaces the majority of repetitive tasks and other jobs with robots, with less human intervention, which can be a significant problem in usage standards. Every organization seeks to exchange the minimum number of skilled individuals with AI bots that can do the same job more efficiently. There is no doubt that machines are much better when it comes to efficiency, but they cannot replace the human connections that make up the team. Machines cannot bond with humans, which is an important attribute when it comes to team management. Machines can only perform the tasks for which they were designed or programmed to attempt; anything they tend to fail or produce irrelevant outputs can be a context of serious scene**.** [28] The high cost of developing AI-based applications can mean that the first impulse comes from the private sector. Needless to say, businesses can earn revenue from areas with large profit pools without having to deal with socially relevant issues such as equal access. [29] Given all the possible events in the real world, big data learning takes a long time, so AI is usually limited to one frame or type of problem. For example, if we limit the algorithm to only applying to chess, image recognition, or speech, we can only expect specific results. However, in the real world there are infinite possibilities that we have to anticipate when trying to handle all phenomena, so database overload will make the search time infinite. [30] One of the ethical dilemmas that can be identified is the issue of unemployment. The development of specialized machines has led to the fact that more and more workplaces have been replaced from the Industrial Revolution to the present. Starting with less skilled and repetitive task that requires little reasoning to perform to even surgical precision and more complex tasks are being replaced by economically more efficient machines. [31] Computers cannot handle unexpected situations. For students, the learning environment is diverse and constantly changing. Due to the limitations of computer artificial intelligence, computer technology does not respond to students' unexpected learning problems as teachers do and also does not immediately answer students' questions.

Conclusion

From the above discussion, we can see that artificial intelligence technologies make human's life easier and that by, future artificial intelligence technologies may bring greater competitive advantage. In this way, Artificial Intelligence can make great discoveries and breakthroughs for mankind thanks to its many capabilities. Most of the AI systems are capable of learning, which allows people to improve their performance over time. Evidence shows that AI can bring real added value to our lives. AI works on the basis of accessing huge amounts of information, processing it, analyzing it and, according to its operational algorithms, performing tasks to solve certain problems. Finally, during this research, we went through AI definitions, brief history, growth of AI, AI in healthcare appliances, AI in security and surveillance, AI in education, some advantages and disadvantages of AI. This is not the top of AI, there is more to learn, who knows what AI can do for us in the future maybe that will be a whole robotics company**.**

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