ARTIFICIAL INTELLIGENCE: THE INESCAPABLE

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What is Artificial Intelligence?

[1] It can be outlined as the analysis of mental and psychological abilities by using various computational patterns and sequences. The term "intelligence" in this field can be very deceptive. For instance, we usually apply this word when we want to describe someone displaying unusual inventiveness and mind-blowing skills. This results in giving the impression that artificial intelligence is a reliable method for generating loads of clever ideas and insights but in reality, AI revolves around the basic idea of duplicating the physiological and mental abilities of the "ordinary" people. [2] Artificial Intelligence can also be defined as the science of creating sophisticated machines and devices as well as various computerised programmes to analyse human intelligence. It doesn't routinely restrict itself to systems of biological significance. Human intelligence does not necessarily have to be about manipulating human intelligence. Its more about using what we know to publicly create something that would help solve the practical problems that the world presents us with. Although the ultimate aim of artificial intelligence is to create devices that have human-level intelligence, some might think that this practice isimmoral and indecent.

History of AI

[3] The initial stages of artificial intelligence are connected to philosophy, creative imagination and fiction. The invention made in the early ages related to various fields of engineering have influenced the creation of AI. Many philosophers have circulated the idea that the meaning of what it is to be human can be evaluated by using intelligent machines. In various science fiction stories, writers have used the concept of advancing technologies to develop fantasies of their own that allows us to think about our own human character. Artificially created characters like robots, mechanical dolls and animals, Mary Shelly's Frankenstein and many other artificially made things have always grabbed the public's attention. In the seventeenth century, these dolls were actually based on the clockwork mechanisms. In the twentieth century, the crowd saw the several inventions in the electronics field and modern computers were recognised post World War-II. In the 1940s these computers were known as the "giant brains" owing to the fact that they had a brilliant calculating power. In the 1950s, Allen Newell, Herb Simon and J. Clifford Shaw wrote programs that were quite ahead of their time and were able to give proof for various logic theorems. Knowledge-based systems came into view around the 1960s and 1970s. The explanation of the logical proof of the Dendral program was presented by Ira Goldstein and Seymour Papert and was said to be a "paradigm shift" in the field of knowledge-based systems. 'Computers and Thoughts' was the first book that had all the collected information about working AI programmes and was written by Edward Feigenbaum and Julian Feldman in 1963.[4] Around 1490, Leonardo da Vinci had mapped and designed a humanlike robot which had been in the form of a medieval knight. This form was able to do the basic movements like moving its jaw, arms and head as well sit up. In 1854, George Boole had published a book in which he describes the Boolean Algebra. In this, he considered that 0 would stand for *falsehood* and 1 would stand for *truth*. This Boolean Algebra has contributed to the

innovation of telephone switching circuits as well as computers.Vaucanson's duck in 1844 was an extraordinary engineering gadget which was assigned the function of eating, drinking and digesting. He called it the *Automaton.* Unfortunately, the original version of it was burnt in a museum but several copies of it were made beforehand.

Growth of AI

[5] AI has been in progress for over 200 years and it has been the key aspect of economic development since the Industrial Revolution. Through the years, the common people have seen the spinning jenny, the steam engine, production of electricity and development of computer chips. Looking over these past years we can say that the economic growth has been significantlypowered by automation. During the Industrial Revolution, industrial and production processes used steam to automate their machines and then the use of electricity was observed. This process was then progressed by using transistors, semiconductors and relays. The current world now sees MRI machines, computerized automobile machines and self-driving vehicles. [6] Since the 1970s, expansion of AI has taken place into various research fields, machine learning, and intelligent control. The rapid advancement and growth of AI is boosted by the research and by IT resources. Since the Internet and the online world is experiencing a rising population of users, the society saw the emergence of sensors, e-commerce development and the steady advancement of the information community. This has led to a new phase and an evolutionary stage termed as AI 2.0. As demands made by the society keep on increasing and changing, there have been respective modifications made in the AI research especially since many fields of constant activity require AI development. The idea of AI is being used to produce new gadgets and idea that will be useful in the present as well as in the future.

AI in Healthcare Appliances

[7] The fast-developing sensing techniques as well as many organic electronics have the most splendid properties such as fantastic flexibility, affordability, and many other identities. Their contribution to the development of pressure sensors is what makes them so significant in the modern world.A splendid application of pressure sensors is mobile biomonitoring. The pressure sensors made of flexible organic material is the reason why many applications of it have been appearing. Since pressure sensors have been doing so well in the past few decades, they have also been used in electronical devices as well. E-skin which have been improved and worked on are used in artificially intelligent systems. It's a challenge to create pressure sensors which have dependable sensitivity and stability but these pressure sensors have proved to be a major part of future electronics. [8] Human life has strengthened to a great extent with the increasing development in AI. Many life-threatening diseases such as cancer and diabetes have been detected, cured and prevented using technology developed by artificial intelligence. They assist in finding right treatments and allow a physician to make the efficient decision to provide suitable care to patients. It also provides some relief to doctors as they don't have to push in information into their brains as they had in the early years. As the excellence of AI increases by time, so does the quality of service that is given to the patients. The advanced arithmetical algorithm that is used in AI allows doctors to give a better and faster diagnosis. The time that is taken to discover drugs used for treatment has decreased as AI supports the discovery of new compounds in a much cheaper, faster and safer way. These days, surgical procedures have been facilitated by introducing computer-assisted surgery or robot-assisted surgery. In this, the surgeon or doctor uses the computer to control the robotic arms which uses manipulators

and end-effectors to perform the actual surgery on the patient. [9] AI has shown some potential and innovative applications in the field of medicine and healthcare.The reason why AI becomes more superior than actual human surgeons and doctors is because nowadays, huge sets of data are required for a patient. So, it is safe to say that AI can help doctors to in productive decision making as well as necessary personalized medicines. However, in the long run, overdependence on AI carries severe risks. The critical thinking and experience of an actual human being may be ignored at times but in reality, the critical reasoning of a human is required at all times especially when the patient's life is at risk. In the 1980s, a system of AI called 'expert systems' was introduced and was highly promoted in Japan by the government. Although this form had not produced any economical breakthrough, key developments were made and the AI research benefited from this. More efficient image recognition was observed when Convolutional Neural Networks were equipped with labelled datasets. When Google, Amazon, Facebook, Apple and Microsoft (GAFAM) made heavy investments in the field of healthcare, the clinical studies have been more accurate than the 'classical' clinical studies. Virtual software has allowed professionals to get a better understanding of the patient's condition before moving ahead which allows them to give proper treatment accordingly. Intra-oral scanners, which use software designed by various machine learning types, are used to see two dental images side by side. Artificial intelligence has been used for the transition of 2D to 3D images which allows the professionals perform their task with much more efficiency and accuracy.

AI in Manufacturing and Production

[10] Advancement in manufacture and production takes place every day. To keep up with this advancement, new mechanisms have come into the picture. This new era sees the collaboration of manufacture with new AI technologies. The fusion of AI information and data with the physical world has led to a new evolutionary stage: AI 2.0. Artificial intelligence allows the development of models and architecture in the field of intelligent manufacturing. Intelligent manufacturing can be referred to the integration of new technology as well as intelligent information and science with the system of production. [11] The Industry 4.0 has urged the concept of smart manufacturing to be the industrial revolution which has led to the considerable expansion of the global economy. The gradual shift from digital manufacturing to intelligent manufacturing has started in several enterprises. In the present time, AI based technologies have become the foundation of intelligent manufacturing. Algorithms are used to manufacture desired products in various smart industries. [12] AI has led to the massive improvement of current items and products as well as invention of new industrial products of better quality. The growing demand of better-quality food products of high quality as well as those that are healthy has been escalating. Of course, as time goes by and more people start educating themselves, the production of higher quality food becomes an absolute must. To meet these demands, intelligent machines have been developed to view products in an equivalent way that the customers do. Those who have employed the fundamental idea of AI in their manufacturing system have seen an increase in their success rate. Multiple AI techniques have been and still are being used such as artificial neural networks, hybrid methodology and data mining procedures.

AI in Security and Surveillance

[13] Terrorism these days have become a serious menace to national security, society and theeconomy. The information technology field has made several developments and useful tools like

image and video processing, data integration and data mining. When we compare intelligence and security informatics (ISI) with biomedical informatics, we see that they both have a lot in common. Both of them are looking for new methods and approaches to make useful innovations of existing technologies. While biomedical informatics contribute to medicine and biology, ISI contribute in the art of criminology and research based on terrorism. [14] The National Security Agency (NSA) in October of the year 2016, Director Michael Rogers expressed that the agency views artificial intelligence to be the "groundwork to the future of cybersecurity." Cybersecurity has proved to be less labour-based than the conventional human surveillance. AI also plays a major role in the field of information security. Natural language perceptive as well as numerous forms of machine language can permit a computer to detect unknown data and its respective amplifiers. AI based technological systems have already been incorporated into the forces of militaries. AI can predict the stresses that may be implied on the force as well as predict if they will face psychological or physical harm. [15] Many incidents go unnoticed and undetected during the time of the unfortunate event due to human operators or eyeballing CCTV cameras.In such instances, we don't really find the use of them when fearful crimes happen at a that particular moment. Consequently, CCTV camera footage are just used asreliable evidence for investigation. Intruder detection is based on the system of fence trespassing detection which gives signal to an operator that they have an intruder that has passed the fence. The system of 'Loitering detection' can detect individuals who stay in an area of control for an extended period of time. In the current situations, many technologies give false alarms in various situations. To solve this situation, emerging techniques are being developed using AI.

AI in Education

[16] AI has made many progressions over the past 25 years in the field of education. The main challenge is to create a special kind of one-on-one tutoring system where there is a student can learn without needing much physical things around them. 'Faster classrooms' have been built in this process which saves a lot of energy as well as valuable time. Students can now easily access their required document or reference any time they want without having to wait for the actual physical document. With the introduction of AI in the education system, teachers are no longer required to collect every piece of information for their learners. Instead, they guide as well as support their pupil in seeking the required information, making them the desired independent developers. Files can be accessed by both teachers and students that makes it easier to cooperate with each other. [17] The significant upgrade in this system of learning has impacted the content of learning and the curriculum personalized by the student's needs. AI has also made the instructor's jobs smoother as they can perform their duties with much more ease. Correcting papers becomes much more efficient and time-saving for the educators and students can observe their corrected paper at an instant. Fast communication between the instructor and the learner allows the learner to gain the knowledge at a particular desired instant. [18] The computer assisted learning (CAL) allows the functioning of alternatives that allows the proper support of student's learning with digital technology. The Education Management Information System (EMIS) is a group of services that can collect, store and examine information for educational uses. The advanced functioning of Education Management Information System (EMIS) allows an educational community to access files and documents that can be also be stored for future use.

Advantages of AI

[19] One important advantage of artificial intelligence is that the strategic decisions that are made are fact based rather than opinions. This makes them a more reliable source rather than asking

people who usually base their ideas based on their own opinions. Machines, who do not require any sleep like humans, overcome the disadvantage of being tired and unable to work. When we train an artificial mind with a specific subject, it can be replicated with ease by reducing the time that would rather be required. [20] It also assures permanency and is also cost-effective. The speed that is seen while trying to solve problems is also very convenient, thus saving time. Valuable information can also be easily stored and saved that prevents it from getting lost. For instance, many technologies tend to save files even if we forget to physically save it for further usage. AI also allows the development of a system which can increase its performance and relevance. [21] It takes on the stressful work that humans often struggle with. One can use AI technologies to look into undiscovered places, like the various places in the depths of ocean and the outer space. This ensures the safety of human beings as well as allows us to find out useful information. While working with AI we find less errors in the outputs making them a more reliable source. [22] Machine learning allows many companies to make better and crucial decisions and also assists them in solving problems. Not only do companies benefit from this but the entire world is able to find some assistance through suitable devices. Human intervention is not required for machine learning and can easily identify various trends and patterns. There are vast numbers of diverse applications of machine learning. [23] AI is used to analyze molecular composition of many medicinal drugs and so it is able to ensure the utmostsafety of patients creating a lesser chance of severe after effects. Hospitals also use computer devices to detect the patients that are at the most risk enabling them to save a patient's life. It also reduces the potential risk of human life while working for the mining industries. These mining companies are able to create numerous devices that could be operated underground in the unbearable and dangerous conditions without the presence of any human being.

Challenges or Dis-advantages of AI

[24] One concerning disadvantage of AI is the effect of the reduced number of job opportunities. As more devices start replacing human work, the rapid increase in unemployment comes into the picture. Logically speaking, machines and technologies may have the ability to translate human like behavior but the creativity and the appropriate communication skills cannot be displayed by artificially made technologies. In various cases, interaction between two creative minds becomes reasonably essential, which AI based devices cannot be trusted with. AI replacing human minds in the field of medicine is a serious topic of concern as the benefits that are needed from it may be disturbed causing extreme harm. [25] If AI soon starts replacing human, then it will cause a huge rise in the rate of unemployment, leading to poverty, depression and more criminal activities. The over reliance on AI can lead to various problems. For instance, if a system malfunctions, then incorrect answers will be produced and one cannot find the reason behind the error killing a lot of time. While using AI based technologies, one may notice the lack of creativity in its outcomes. [26] The constant development of machines and advanced technologies can lead to unemployment. Surgical processes which need immense precision have been replaced by appropriate technologies which work 'more efficiently'. This is when the thought of 'robots taking over the planet' haunts our minds. The fear of constant judgement also takes place as devices are designed to record the things happening around them at every second. [27] A lot of money, time and energy is also used up while trying to create such AI based devices but it has also made a human being both mentally and physically inactive. While trying to work in teams, machines cannot have the same communicative skills or develop bonds with a person. Machines, at times, do not have the ability to 'think out of the

box' which is a crucial aspect of success. The whole purpose of creation is to make something that is unique and something that stands out from the rest. [28] AI based learning and education can lead to many disadvantages. Depending on the idea of E-learning as the source of education can lead to lack of interaction because of the remoteness surrounding the student and teacher. This can cause a decrease in the learning outcome and therefore, the value of e-learning deteriorates. A student's communication skills are affected when there is no face-to-face interaction. The teacher fails to find out whether the student is gaining from virtual lessons or not especially during the class time. A child's discipline can also never be monitored through the process of E-learning. A teacher cannot keep a record of what the student does and it becomes difficult to penalize the student for what they have done that is considered immoral.

Conclusion

From what I know, artificial intelligence has its ups and downs but at the end of the day it has made human life much simpler. We are able to contact the people we know at an instant and share our experiences and knowledge with the universe. As time goes on, better and stronger devices come into existence and never fail to show ustheir worth in the current complex society but there is always a fear of artificial intelligence 'taking over the world'. We tend to believe that soon "robots" will replace human work. This leads to the decrease of human value as a whole. Moreover, it becomes very unsafe to have complete reliance on such devices.As we think about how artificial intelligence contributes to our daily lives, we think about the devices which help us with our everyday activities and we realize how inconvenient it would become if they never were created.They assist us in uncountable daily activities starting from the moment we open our eyes and hear the ringing sound of the alarm clock. The world has seen many advancements in the field of artificial intelligence. Some may have had treacherous impacts on society but the learning gained from such creations have led to the making of a smarter world. The problem-solving minds of human beings have put them on top of the triangle and so we believe that it is our duty to create and control. Artificial intelligence has proved to human beings that both work and time can be saved by using meaningful devices and that the advantages served by these machines can never be ignored.Hence, the concept of artificial intelligence becomes inescapable.

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