ARTIFICIAL INTELLIGENCE, WHAT IS IT?

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Introduction

Artificial Intelligence has grown to be immensely popular in today's world.AI is a study of how human brain think, learn, decide, and work, when it tries to solve problems. Aim of Artificial Intelligence is to improve computer functions which are connected to human knowledge such as reasoning,learning,problem-solving, belief and linguistic intelligence.

What is Artificial Intelligence?

[1] Artificial Intelligence refers to the science and engineering used to make smart systems, in computer science domain which helping in technological advancements. It is the replica of how the human intelligence works but it does not deliver the methods that are biologically observable.[2] Artificial Intelligence can be thought as a study which deals with the analytical and algorithmic aspect of problems, using the computational models. [3] Artificial Intelligence is a field within computer science which tries to set upenhanced intelligence into various computer systems.

History of Artificial Intelligence?

[4] Artificial Intelligence discovered because of the historic philosophy, imaginations, and demonstrations by some of the leading scientists, researchers of old times. Early inventions were related to the fields like electronics, engineering, mechanics, and many more had severe impact on AI (Artificial Intelligence). Demonstrative Programs were made in various domains like understanding the language, memory association, comprehensive systems, etc. In recent century, the tech industry has been able to build and implement AI based programs in real life problems. Nowadays, we have a practical demonstration of AI in different fields, which once existed as a theoretical possibility.[5] There is a controversy throughout the history of Artificial Intelligence over whether intelligence could be shown by the computer systems. In this generation, modern logic was involved in the evolution of digital computers, that is how we were able to enter the whole concept of AI. [6] Artificial Intelligence was first reported in 1950s. Due to certain limitations at that time it was prevented widespread acceptance and application to medicine. In the early 2000s, many of these limitations were overcome by the advent of Deep Learning. AI systems were able to analyse complex algorithms and self-learning, now AI could be applied in clinical practicethrough risk assessment models, improving diagnostic accuracy and workflow efficiency. DL (Deep Learning)was an important advancement in Artificial Intelligence. AsML (Machine Learning), uses a set number of traits and requires human input, Deep Learning can be trained to classify data on its own. Convolutional neural network (CNN) is a type of Deep Learning algorithm whichwhen applied to image processing that simulates the behaviour of interconnected neurons of the human brain. Multiple Layers of CNN are used to analyse an input image to recognize patterns and create specific filters. Some famous CNN algorithms which are now available are Le-NET, AlexNet, VGG, GoogLeNet, and ResNet.

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Growth of Artificial Intelligence?

[7] Molecular biology and evolutionary theory explains us that all the compelling features of biological agents like intelligence, all these have their roots into Darwinian evolution with some major refinements. When we talk about the AI research community, people think that evolutionary processes are not capable of creating machine intelligence. In the past decade, problem solving performance of algorithms has been advanced to a much larger extent. Algorithms can now even supply competitive results in fields of science and engineering as compared to human intelligence. [8] In the last 25 years, Artificial Intelligence achieved significant growth in the field of education. Growth of Artificial Intelligence was possible because of structured approach of development specifically for education sector. Major focus on general classroom activities, collars with various teachers and taking their suggestions, and diversifying required technologies according to the domains. It was necessary for us to embed available technologies within student's daily life, which supports their practices, goals and communities and keep themselves connected.

AI in Healthcare Appliances

[9] Artificial Intelligence is considered a well-known field in computer science and its capable of enhancing human life in many areas. AI can prevent, detect, diagnose, and even treat disease. Artificial intelligence is extensively used in the treatment of severe diseases like cancer, neurology, cardiology, and diabetes. AI is capable of spotting problems and life threats to patients due to high accuracy and speed. In current scenarios, machine learning which is a subset of artificial intelligence can save lives of many patients. [10] Artificial Intelligence with its cognitive abilities has proved itself as a powerful tool which helps with various analysis techniques to the existing healthcare services. Many medical areas like cancer, neurology and cardiology take artificial intelligence as an assisting instrument after the progressive development. Machine learning and deep learning which are the subsets of artificial intelligence handle structured healthcare data and unstructured datasets managed by Natural Language Processing, etc. [11] Recently researchers of Human-computer interaction studied various applications of AI and proposed various principals for a safe and reliable interaction experience. These AI systems can be further improved by increasing the number of collaborations with various medical departments and organizations. Healthcare Appliances embedded with Artificial Intelligence can perform as good as human doctors in terms of medical image data analysis.

AI in Manufacturing and Production

[12] With the rapid development in the technologies in this generation of 'Internet and AI' triggered a profound change in the existing models, means and the whole ecosystem of manufacturing industry. These days intelligent manufacturing is encouraged by integrating Artificial Intelligence with information and communication technology, manufacturing, and other related domains. For any nation manufacturing industry is the major source of national economy, security, and development. [13] In the recent years, Artificial Intelligence has become a crucial thing for accelerating the development of intelligent industrial manufacturing.Advanced concepts of artificial intelligence like deep neural networks and machine learning are used these days to support diagnostics and predictive maintenance of the entire process. AI is considered as a critical technology which can lead to further evolution of industrial manufacturing. There are three major aspects of production monitoring like fault diagnosis, useful life prediction, and quality inspection where artificial intelligence is

applicable.[14] Artificial Intelligence is having major influence on manufacturing and production processes. Multiple Researches are going on all around the globe due to which we were able to see tremendous growth in artificial intelligence in recent years. Most of it focused majorly on the varieties of AI technologies, and less on pre-requisites for adoption of AI at corporate level. That is the reason for the consistent struggles which many companies still face while implementingartificial intelligence in their production. When it comes to the implementation of AI in production factors like digital skills, company size, and R&D intensity plays a crucial role.

AI in Security and Surveillance

[15] When it comes to artificial intelligence in security and surveillance, China is one of the first country in this domain due to their vision of applying AI technologies to build an ever-growing and trustworthy surveillance state. They created a novel model of network authoritarianism. Xinjiang a western part of China can be considered as a real-life experiment - in this area individual freedom, liberty, and security is not there. It is being replaced by the state surveillance system. Facial recognition software is considered as an essential technology in Mongolia for management of prisoners in high security prisons. Chinese company Sense Time specializes in AI and Face Recognition domain and they are striving to achieve innovation supremacy. [16] The learning approach that we human beings use to obtain knowledge is imitated by Deep Learning which is a subset of artificial intelligence. Previously, human supervision was neededwith all surveillance systems but now with advancements we have seenCCTV (closed circuit television) based theft detection along with tracking of various objects. Image processing is used to detect theft and motion, without using motion sensors. Major emphasis on object detection and real-time tracking and analysis of every action. [17] Currently, Artificial intelligence is getting its pace in the industrial builds. AI technique used in cyber-attacks seems to be quite difficult, due to its self-learning capabilities AI is a major problem to the cyber world. Most of the time, AI enabled cyber-attacks are performed with the help of advanced malware which consist of advanced invasion techniques to crack the security of the system.

AI in Education

[18] Association for Computing Machinery (ACM), International Society for Computing have codes of ethics that can be used for the development of Artificial Intelligence Systems for education. It can be also applied towards the development of various computer systems in general but AI systems for education is a specific application of it. We need to understand that AI in education can lead us to potential for harm which cannot be ignored, so we need to use compassionate and wise principles during the implementation. [19] The major concern for Artificial Intelligence in education is that there is an absence of sociological thinking within the field itself because of many external and structural pressures on education systems. Let us take an example, if AI systems for personalised learning is introduced into a sector of education where there is lack of resources and qualified teachers, there is a possibility of exploitation of the provided technology. Apart from these concerns, AI has its own benefits that are self-reinforcing: It will reduce teachers' workload and this will increase the recruitment rate. [20] By Implementing Artificial Intelligence, Educational technologist are figuring out ways to create convenient teaching tools that consists of ideas of more encouraging environments that can offer instructional approaches, various representation of given learning materials and variety of beginner support tools. Recently, educational environments like Udemy,

Coursera, etc are developed that not only stores and uses large amount of data, but also provides the flexibility to the users while learning on their platform. [21] If AI enabled systems are successful, then it will also lead to the most significant social challenge that AI in general has already brought - the consistent replacement of jobs and occupations with brilliant algorithms and robots. For implementation of Artificial Intelligence in education has been the subject of academic research for more than 30 years. To promote the development of convenient learning environment and various other educational tools that are personalised, flexible, effective, and easy to use.

Advantages of Artificial Intelligence

[22] Artificial Intelligence provides every learner their own personalised learning experience, teachers are provided with their own AI teaching assistant, consistent support to keep learning on track and intelligent support for collaborative learning. [23] Artificial Intelligence provide us with the advantages reliability and cost-effectiveness. AI technologies which are currently in use include converting traffic sensors into intelligent agents that can automatically detect accidents and useful in prediction of traffic conditions. [24] Artificial Intelligence can solve stressful and complex problems that humans may not be able to do. AI can complete assigned task much faster than a human being. Error possibilities are reduced to almost null with the help of proper implementation of AI. [25] Artificial Intelligence make decisions based on data rather than emotions. AI enabled machines does not require any sleep, thus increasing productivity of a workspace. Within AI itself it is easier to spread knowledge. [26] Currently, Artificial Intelligence techniques are quite efficient in fashion companies as they deal with different data with many complex connections and dependencies between them. AI used in fashion industry covers a wide scope from design support systems to fashion recommendation systems through intelligent tracking systems, textile quality control, decision making, socialising and fashion e-marketing, etc.

Challenges or Disadvantages of AI

[27] Artificial Intelligence can replace human jobs. If AI is not programmed properly then it can malfunction and do opposite to what it is supposed to do. AI can be misused leading to mass destruction and it may corrupt younger generations. [28] Due to Artificial Intelligence unemployment problems are increased. AI lacks the human touch and requires a lot of time and money. AI can increase the technological dependency of any organization. [29] Artificial Intelligence lacks creativity in responses, malfunctioning can result in failure of AI and lead to various problems. AI is unable to explain the logic and reasoning in certain scenarios. [30] Machines equipped with AI takes a lot of effort and resourcesas equipment's are also expensive. Repairing or customising a pre-existing machine again takes time and money. Unemployment issues are increasing rapidly due to the Artificial Intelligence. Machines are unable to develop a bond with humans which is a critical part of Team Management. [31] Artificial Intelligence is becoming a major reason for loss of jobs in various industries, lacks human touch and emotional intelligence when we consider its application in field of medicine.

Conclusion

In my opinion, Artificial Intelligence is getting everywhere. Its application could be seen in Healthcare Industry, Manufacturing & Production, Fashion Technology, Education, Security and Surveillance, etc. And it continues to evolve as more research is being currently going on Artificial

Intelligence. AI has become the most trending topic of discussion when we talk about Computer Science in general. More companies are focusing on improving AI in their products and systems to overall make a better User Experience (UX). Whether it be Google Assistant or Siri or Alexa or any other virtual assistant all are based on the concept of Artificial Intelligence.AI assistance improved radiologists' performance in distinguishing coronavirus disease 2019 pneumonia from non-coronavirus disease 2019 pneumonia at chest CT (Computed Tomography). Nowadays even video games are using AI, which serves to improve game-player experience rather than machine learning or decision making. AI has a bright future ahead.

References

Aiken, R. M., & Epstein, R. G. (2000). Ethical guidelines for AI in education: Starting a conversation. *International Journal of Artificial Intelligence in Education*, *11*, 163-176.

Amisha, P. M., Pathania, M., & Rathaur, V. K. (2019). Overview of artificial intelligence in medicine. *Journal of family medicine and primary care*, *8*(7), 2328.

Andriessen, J., & Sandberg, J. (1999). Where is education heading and how about AI. International Journal of Artificial Intelligence in Education, 10(2), 130-150.

Arivudainambi, D., KA, V. K., & Visu, P. (2019). Malware traffic classification using principal component analysis and artificial neural network for extreme surveillance. *Computer Communications*, *147*, 50-57.

Bhbosale, S., Pujari, V., & Multani, Z. (2020). Advantages And Disadvantages of Artificial Intelligence. *Aayushi International Interdisciplinary Research Journal*, 227-230.

Buchanan, B. G. (2005). A (very) brief history of artificial intelligence. Ai Magazine, 26(4), 53-53.

Charniak, E. (1985). *Introduction to artificial intelligence*. Pearson Education India.

Chowdhury, M., & Sadek, A. W. (2012). Advantages and limitations of artificial intelligence. Artificial intelligence applications to critical transportation issues, 6(3), 360-375.

Davies, H. C., Eynon, R., & Salveson, C. (2021). The mobilisation of AI in education: A Bourdieusean field analysis. Sociology, 55(3), 539-560.

Ding, H., Gao, R. X., Isaksson, A. J., Landers, R. G., Parisini, T., & Yuan, Y. (2020). State of AI-based monitoring in smart manufacturing and introduction to focused section. *IEEE/ASME Transactions on Mechatronics*, *25*(5), 2143-2154.

Husbands, P., Harvey, I., Cliff, D., & Miller, G. (1997). Artificial evolution: A new path for artificial intelligence? *Brain and cognition*, *34*(1), 130-159.

Kakadiya, R., Lemos, R., Mangalan, S., Pillai, M., & Nikam, S. (2019, June). Ai based automatic robbery/theft detection using smart surveillance in banks. In *2019 3rd International conference on Electronics, Communication and Aerospace Technology (ICECA)* (pp. 201-204). IEEE.

Kaul, V., Enslin, S., & Gross, S. A. (2020). History of artificial intelligence in medicine. *Gastrointestinal endoscopy*, *92*(4), 807-812.

Khanzode, K. C. A., & Sarode, R. D. (2020). Advantages and Disadvantages of Artificial Intelligence and Machine Learning: A Literature Review. *International Journal of Library & Information Science (IJLIS)*, *9*(1), 3

Kinkel, S., Baumgartner, M., & Cherubini, E. (2021). Prerequisites for the adoption of AI technologies in manufacturing–Evidence from a worldwide sample of manufacturing companies. *Technovation*, 102375.

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Li, B. H., Hou, B. C., Yu, W. T., Lu, X. B., & Yang, C. W. (2017). Applications of artificial intelligence in intelligent manufacturing: a review. *Frontiers of Information Technology & Electronic Engineering*, *18*(1), 86-96.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). Intelligence unleashed: An argument for AI in education.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). Intelligence unleashed: An argument for AI in education.

McCarthy, J. (2007). What is artificial intelligence?

Mogali, S. (2014). Artificial Intelligence and its applications in Libraries. In Conference: Bilingual International Conference on Information Technology: Yesterday, Today and Tomorrow, At Defence Scientific Information and Documentation Centre, Ministry of Defence Delhi.

Mogali, S. (2014). Artificial Intelligence and its applications in Libraries. In Conference: Bilingual International Conference on Information Technology: Yesterday, Today and Tomorrow, At Defence Scientific Information and Documentation Centre, Ministry of Defence Delhi.

Murali[1], N., & Sivakumaran, N. (2018). Artificial intelligence in healthcare–a review.

Newell, A. (1982). *Intellectual issues in the history of artificial intelligence*. CARNEGIE-MELLON UNIV PITTSBURGH PADEPT OF COMPUTER SCIENCE.

Nilsson, N. J. (2009). *The quest for artificial intelligence*. Cambridge University Press.

Romaniuk, S., & Burgers, T. (2018). How China's AI Technology Exports Are Seeding Surveillance Societies Globally. *The Diplomat*, *18*.

Satpathy, S., Nandan Mohanty, S., Chatterjee, J. M., & Swain, A. (2021). Comprehensive Claims of AI for Healthcare Applications-Coherence Towards COVID-19. In *Applications of Artificial Intelligence in COVID-19* (pp. 3-18). Springer, Singapore.

Spector, L. (2006). Evolution of artificial intelligence. *Artificial Intelligence*, *170*(18), 1251-1253.

Strong, A. I. (2016). Applications of artificial intelligence & associated technologies. *Science [ETEBMS-2016]*, *5*(6).

Strong, A. I. (2016). Applications of artificial intelligence & associated technologies. *Science [ETEBMS-2016]*, *5*(6).

Thomassey, S., & Zeng, X. (2018). Introduction: Artificial Intelligence for Fashion Industry in the Big Data Era. In *Artificial intelligence for fashion industry in the big data era* (pp. 1-6). Springer, Singapore.

Wang, D., Maes, P., Ren, X., Shneiderman, B., Shi, Y., & Wang, Q. (2021, May). Designing AI to Work WITH or FOR People? In *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems* (pp. 1-5).