

ARTIFICIAL INTELLIGENCE AND IT'S APPLICATIONS

H.S. THARIKESH

B.Tech. Chemical

Email ID: tharikesh.hs2021@vitstudent.ac.in

What Is Artificial Intelligence?

[1] Artificial intelligence is used to solve complex problems. AI is created using technologies of computer science and physiology intelligence.[2] Artificial intelligence is not restricted to any natural phenomenon. The goal of artificial intelligence research is to build a better machine which can understand emotions and can work more accurately.

History of AI

[3] Artificial intelligence was myth and stories to everyone. But first one to discover AI was classical philosophers who wanted to describe the process of human thinking into symbols.

Scientists begin with this ideology and they begin to discussing the possibility of electronic brain. The field of AI research started in campus of Dartmouth college during 1956. At first response of AI technology wasn't successful and even scientist had faced many difficulties. Because of constant pressure from government AI research was stopped. After seven years Japanese government started research of AI through inspiring industry and government.

[4] AI were never restricted to single field it even research of AI in medicine started recently. At first there were so many difficulties but in early 2000s, many of those limitations were overcome because of deep learning now AI system is capable to solve complex algorithms and codes. Major applications of

AI which are used in medical are in gastroenterology and endoscopy.[5] IEEE Annals of the History of Computing, 1996 - ieeexplore.ieee.org

Over the course of history, women have slowly begun to hold influential roles in the computing industry. Although progress has been made, the precipitous journey is not yet ...

Key developments in the history of artificial intelligence are described in terms of a model of gender (Man of Reason), drawn from the work of philosopher Genevieve Lloyd. Women's studies and computer science both evolved as academic disciplines in the 1960s, but they evolved along very different paths.

[6] Although achieving full-blown artificial intelligent blown artificial intelligence remains in future, we must maintain the ongoing dialogue about the implications of realizing the promise. Philosophers have floated the possibility of intelligent machines as a literary device to

Help us define what it means to be human. René Descartes, for example, seems to have been more interested in "mechanical man" as a metaphor than as a possibility. Gottfried Wilhelm Leibniz, on the other hand, seemed to see the possibility of mechanical reasoning devices

Using rules of logic to settle disputes. Robots, and artificially created beings such as the Golem in Jewish tradition and Mary Shelley's Frankenstein, have always captured the public's imagination, in part by playing on our fears. Mechanical animals and dolls—including a mechanical trumpeter for which Ludwig van Beethoven wrote a fanfare—were actually built from clockwork mechanisms in the seveneenth century. Although they were obviously limited in their performance and were intended more as curiosities than as demonstrations of thinking, they provided some initial credibility to mechanistic views of behavior and to the idea that such behavior need not be feared. As the industrial world became more mechanized, machinery became more sophisticated.

Growth of AI

[7] Role of Artificial intelligence in business is huge. AI is not only in demand because of its human abilities. But when compared to human it can complete work or algorithm in minimum time and more accurately. [8] AI based clinical tools are also developing to control many difficulties such as unavailability of organs such as brain heart. Many of the projects of curing human problems such as handicaps and all. Huge project of test tube baby uses principles of AI. This all of the things are possible because of AI. It's how AI is demanding and needed to society. [9] Artificial Intelligence (AI) is considered to be the fourth industrial revolution. Artificial Intelligence with the help of big data has transformed all industries around the world. Artificial intelligence refers to the simulation of human or animal intelligence in computational systems so that they are programmed to think like intelligent beings and mimic the actions of intelligent entities. Computational systems which have programmed intelligence can solve different real-world problems far more accurately and efficiently than computational systems that are deterministic and hardcoded. Since many problems in business and business analytics cannot be solved by deterministic systems, AI plays a major role in tackling problems in the business world. Machine learning and deep learning which are subsets of the field of AI is widely used to solve and optimize many problems in business such as marketing, credit card fraud detection, algorithmic trading, customer service, portfolio management, product recommendation according to the needs of customers, insurance underwriting. AI and big data have revolutionized the business world and this paper discusses some AI and big data technologies that are currently being used to accelerate business growth. [10] Artificial intelligence as a factor of competitiveness growth is beginning to be widely used by leading companies today. The potential for introduction of artificial intelligence into the national economy system is enormous and cannot be limited to individual companies. First of all, it is the possibility of strategic planning on the scale of the entire economy, that is, the search for optimal models of sectoral balance sheets, building target indicators for large businesses, forecasting of aggregate demand and supply, optimization of the monetary-crediting system, etc. Thus, introduction of strategic planning based on artificial intelligence into the national economy system, would build a model of extended reproduction, without distortions between different sectors of the economy, and thus implement a model of its sustainable, crisis-free growth.

Applications of AI in Health Care

[11] Big data technology is part of AI and nowadays big data is used as a fundamental unit of biomedical and health care research. It is hectic to store large amount of data in the files and that's why big data technology is used. You can store data in large scale and even you can find it in minutes. Big data application provides cloud system which gives you space to protect your files and information in particular way to do your work more easily. [12] Application such as machine learning is brain for health care. With the help of machine learning doctors got advance technology which helps them in their complex operations. Which are like robotics hand, robotics legs, robotics brain and heart. Even operations like dialysis, heart transplantation, organ transplantation done using machines. There is no restriction of using AI as a cure to human beings it is working really abnormally and helping us. Machine learning and big data was the applications of first three types in AI and the fourth type of AI used in health care is living assistant. This application is really worth and useful for older and disabled peoples. With the help of this application many peoples. [13] AI techniques are also being applied to the costly problem of dosage errors—where our findings suggest AI could generate \$16

billion in savings. In 2016, a ground breaking trial in California found that a mathematical formula developed with the help of AI had correctly determined the correct dose of immunosuppressant drugs to administer to organ patients. Determining the dose has traditionally depended on a combination of guidelines and educated guesswork—and dosing errors make up 37% of all preventable medical errors. While this type of AI technique is nascent, the example is powerful considering that the correct dose is critical to making sure a graft is not rejected after an organ transplant. Using AI to aid clinical judgement or diagnosis still remains in its infancy, but some results are emerging to illustrate the possibility. In 2017, a group at Stanford University tested an AI algorithm against 21 dermatologists on its ability to identify skin cancers. The clinical findings, as reported by Nature last year, “achieve performance on par with all tested experts ...demonstrating an artificial intelligence capable of classifying skin cancer with a level of competence comparable to dermatologists.” Our findings suggest AI could yield \$5 billion in annual savings by doing a preliminary diagnosis before a patient enters the emergency department.

[14] AI also holds promise for helping the health care industry manage costly back-office problems. Activities that have nothing to do with patient care consume over half (51%) of a nurse’s workload and nearly a fifth (16%) of physician activities.

Technologies, such as voice-to-text transcription, can improve administrative workflows and eliminate time-consuming non-patient-care activities, such as writing chart notes, writing prescriptions, and ordering tests. We estimate that these applications could save the industry \$18 billion annually.

AI in Manufacturing and Production

[15] There is rapid growth of AI in manufacturing and production. It is era of ‘internet plus AI’Which shows everything is possible with the help of AI. It includes design, Production, management, testing and integration. There are unique patterns to work in production through AI. There are five types of manufacturing system technology which are general technology, intelligent manufacturingplatform technology, ubiquitous network technology, product life cycle intelligentmanufacturing technology and supporting technology.

[16] AI applications notonly for manufacturing but also useful for distribution. It overcomes the stress of distributionand overcome the mistakes done during distribution. It finds appropriate solution for problemsduring any distribution. It works on CAD information. [17] It is used because it provides truevalue and paper work which is really important for factories. It utilizes all process like planningand control, predictive maintenance, quality control, with the help of situ process andoptimization with provides all products more efficiently. [18] The traditional production paradigm of large batch production does not offer flexibility toward satisfying the requirements of individual customers. A new generation of smart factories is expected to support new multi variety and small-batch customized production modes. For this, artificial intelligence (AI) is enabling higher value-added manufacturing by accelerating the integration of manufacturing and information communication technologies, including computing, communication, and control. The characteristics of a customized smart factory are: self-perception, operations optimization, dynamic reconfiguration, and intelligent decision-making. The AI technologies will allow manufacturing systems to perceive the environment, adapt to the external needs, and extract the process knowledge, including business models, such as intelligent production, networked collaboration, and extended service models. This article focuses on the implementation of AI in customized manufacturing (CM). The architecture of an AI-driven customized smart factory is presented. Details of intelligent

manufacturing devices, intelligent information interaction, and construction of a flexible manufacturing line are showcased. The state-of-the-art AI technologies of potential use in CM, that is, machine learning, multi agent systems, Internet of Things, big data, and cloud-edge computing, are surveyed. The AI-enabled technologies in a customized smart factory are validated with a case study of customized packaging. The experimental results have demonstrated that the AI-assisted CM offers the possibility of higher production flexibility and efficiency. Challenges and solutions related to AI in CM are also discussed.

AI in Security and Surveillance

[19] The aim of researches was to save peoples from fake calls and fake companies that's whythey created cyber security it was not bounded to particular topic it was help for every problemsuch as harassing illegal videos and all with the help of AI and cyber security we can getinformation about geographical area, sample size. With the help of AI many wars were able toavoid. It is useful for army. They can make sure where is terrorist they can easily check contactand illegal sites. [20] it is used as information superiority. With the help of artificial intelligencepeople can predict the bomb inside the car with the help of underside vehicle bomb detection. Most useful and easily available device is security cameras which can easily predict the thief iteven works on internet and you can access it through anywhere. Military reconnaissance thisare especially called as drones this are perfect source for security it can work as bothtransportation and watching it is easier to use and most helpful for military. Border control liedetector is the is the device to check person is lying or not. As many of devices are invented touse and it really protects your security.[21] Strategic studies deals intimately with the topic of power. Most scholars in the discipline work with a concept of power as an adversarial zero-sum competition. This is natural and necessary. However, other conceptions of power developed within political science and sociology could enrich strategic studies. Approaching two typical, traditional tasks of strategy – alliance building and war-fighting – this article demonstrates the heuristic mileage of theories of collective power. In particular, we can shed new light on the post-Cold War transformation of NATO as well as state-building as a strategy in counter-insurgencies with new ideas of power. Broadening the palette of theories of power is thus valuable if strategic studies are to prosper as an independent field of study. Recent developments in artificial intelligence (AI) suggest that this emerging technology will have a deterministic and potentially transformative influence on military power, strategic competition, and world politics more broadly. After the initial surge of broad speculation in the literature related to AI this article provides some much needed specificity to the debate. It argues that left unchecked the uncertainties and vulnerabilities created by the rapid proliferation and diffusion of AI could become a major potential source of instability and great power strategic rivalry. The article identifies several AI-related innovations and technological developments that will likely have genuine consequences for military applications from a tactical battlefield perspective to the strategic level.

AI in Education

[22] Artificial Intelligence is a growing technology capable of altering every aspect of our social life. In education, AI has begun producing new teaching and learning solutions that are now undergoing testing in different contexts.[23] The field of Artificial Intelligence in Education (AIED) has undergone significantdevelopments over the last twenty-five years.[24] The teaching of artificial intelligence (AI) topics in schools is important globally to educate the next generation. Also,the

application of artificial intelligence in early teaching resulted in the intelligent teaching system.[25] Though only a dream a while ago, artificial intelligence (AI) has become a reality, being now part of our routines and penetrating every aspect of our lives, including education. It is still a field in its infancy, but as time progresses, we will witness how AI evolves and explore its untapped potential. Against this background, this chapter examines current insights and future perspectives of AI in various contexts, such as natural language processing (NLP), machine learning, and deep learning. For this purpose, social network analysis (SNA) is used as a guide for the interpretation of the key concepts in AI research from an educational perspective. The research identified three broad themes: (1) adaptive learning, personalization and learning styles, (2) expert systems and intelligent tutoring systems, and (3) AI as a future component of educational processes. AI, as a broad and advanced term for computer intelligence, started to be discussed between the 1950s and 1980s, which was followed by the introduction of Machine Learning technology between the 1980s and 2010, where learning through algorithms was brought to the agenda, and finally, after 2010, Deep Learning emerged as a breakthrough technique for implementing Machine Learning via neural networks to complete tremendously complex thinking tasks. In this context, the following sections examine the two vital technologies of machine learning and deep learning to better comprehend and explore the world of AI.

Advantages of AI

[26] AI can do stressful and complex work that humans may struggle are may not be able to do.

[27] AI applications can be utilized in making decisions or solving any problems.

[28] The decisions of AI are based on facts rather than emotions. Even after our utmost efforts, it is a well-known fact that human decisions are always affected in a negative way by our emotions.[29] AI has showed powerful capacity in detecting and diagnosing faults of building energy systems as it is built based on fault detection and diagnosis (FDD). [30] AI is modernly approached as it covers the design and development of multiagent and distributed AI systems.

Challenges or Disadvantages of AI

[31] AI is getting into our everyday lives as a challenge such as capabilities in driving, finding a job, controlling our lives etc.... [32] The new adoption of Artificial Intelligence (AI) in the public sector is opposed in many ways, but while there is increasing speculation about both its dangers and its benefits. [33] It sometimes can be misused leading to mass scale destruction may require a lot of time and money, also leads to increase in Technological dependency.[34] AI could counter the risks of bias in algorithm development and issues related to data sharing, storage etc.... [35] AI comes with the risks of cyberattacks and nowadays hackers tend to take advantage over digital life. [36] AI is replacing the majority of the repetitive tasks and other works with robots human interference is becoming less which may cause a significant problem within the utilization standards. Every organization is looking to exchange the minimum qualified individuals with AI robots which may do similar work which also leads to unemployment. [37] We have been living with the basic formalizations made by McCulloch and Pitts (1943) for over fifty years now. Their formalization included that the activity of the neuron is an "all-or-none" process, that a certain led number of synapses must be excited within the period of latent addition in order to excite a neuron at any time, and this number is independent of the synapses' previous activity and position on the neuron, that the only significant delay within the nervous system is synaptic delay, that the activity of any inhibitory synapse absolutely prevents excitation of the neuron at that time, and that the structure of the net

does not change with time. With the addition of changing synaptic weights by Hebb (1949) we pretty much have the modern computational model of neurons used by most researchers. [38] With 50 years of additional neuroscience, we now know that there is much more to real neurons. Can newer models provide us with new computational tools, and will they lead to new insights to challenge the learning capabilities that we see in biological learning. Over time we become trapped in our shared visions of appropriate ways to tackle problems, and even more trapped by our funding sources where we must constantly justify ourselves by making incremental progress. Sometimes it is worthwhile stepping back and taking an entirely new (or perhaps very old) look at some problems and to think about solving them in new ways. This takes courage as we may be leading ourselves into aren't sorts of solutions that will for many years have poorer performance than existing solutions. With years of perseverance, we may be able to overcome initial problems with the new approaches and eventually leapfrog to better performance. Or we may turn out to be totally wrong. That is where the courage comes in.

Conclusion

In my opinion Artificial Intelligence would play a key role in many fields which would

Make work easier. It has been successful in many fields and will be promoted in many other Fields too. Though it has some disadvantages but still gives us more benefit.

References

- Abdulov, Rafael. "Artificial intelligence as an important factor of sustainable and crisis-free economic growth." *Procedia Computer Science* 169 (2020): 468-472.
- Adam, Alison. "Constructions of gender in the history of artificial intelligence." *IEEE Annals of the History of Computing* 18, no. 3 (1996): 47-53. Goyal, Amita. "Women in computing: historical roles, the perpetual glass ceiling, and current opportunities." *IEEE Annals of the History of Computing* 18, no. 3 (1996): 36-42. Estrin, Thelma. "Women's studies and computer science: Their intersection." *IEEE Annals of the History of Computing* 18, no. 3 (1996): 43-46.
- Adams, Julie A. "Multiagent systems: A modern approach to distributed artificial intelligence." *AI Magazine* 22, no. 2 (2001): 105-105.
- Aghion, P., Jones, B. & Jones, C. I. (2019). 9. Artificial Intelligence and Economic Growth (pp. 237-290). University of Chicago Press.
- Alhayani, B., Mohammed, H. J., Chaloob, I. Z., & Ahmed, J. S. (2021). Effectiveness of artificial intelligence techniques against cyber security risks apply of IT industry. *Materials Today: Proceedings*.
- Benko, A., & Lányi, C. S. (2009). History of artificial intelligence. In the *Encyclopedia of Information Science and Technology*, Second Edition (pp. 1759-1762). IGI Global.
- Bhbosale, S., V. Pujari, and Z. Multani. "Advantages And Disadvantages Of Artificial Intellegence." *Aayushi International Interdisciplinary Research Journal* (2020): 227-230.
- Buchanan, Bruce G. "A (very) brief history of artificial intelligence." *Ai Magazine* 26, no. 4 (2005): 53-53.
- Charniak, E. (1985). *Introduction to artificial intelligence*. Pearson Education India.
- Chien, C. F., Dauzère-Pérès, S., Huh, W. T., Jang, Y. J., & Morrison, J. R. (2020). Artificial intelligence in manufacturing and logistics systems: algorithms, applications, and case studies.

- Chiu, Thomas KF, and Ching-sing Chai. "Sustainable curriculum planning for artificial intelligence education: A self-determination theory perspective." *Sustainability* 12, no. 14 (2020): 5568.
- Hu, Yanrong, and Zineng Liao. "Design of Knowledge Base and Curriculum Planning Based on Artificial Intelligence Teaching System." In *Proceedings of the 2020 International Conference on Computers, Information Processing and Advanced Education*, pp. 327-330. 2020.
- Chowdhury, Mashrur, and Adel W. Sadek. "Advantages and limitations of artificial intelligence." *Artificial intelligence applications to critical transportation issues* 6, no. 3 (2012): 360-375.
- Ghimire, Awishkar, Surendrabikram Thapa, Avinash Kumar Jha, Surabhi Adhikari, and Ankit Kumar. "Accelerating business growth with big data and artificial intelligence." In *2020 Fourth International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud)(I-SMAC)*, pp. 441-448. IEEE, 2020.
- Goksel, Nil, and Aras Bozkurt. "Artificial intelligence in education: Current insights and future perspectives." In *Handbook of Research on Learning in the Age of Transhumanism*, pp. 224-236. IGI Global, 2019.
- Haugeland, J. (1989). *Artificial intelligence: The very idea*. MIT press.
- Johnson, James. "Artificial intelligence & future warfare: implications for international security." *Defense & Security Analysis* 35, no. 2 (2019): 147-169.
- Kalis, Brian, Matt Collier "10 promising AI applications in health care." *Harvard Business Review* (2018).
- Kaul, V., Enslin, S., & Gross, S. A. (2020). History of artificial intelligence in medicine. *Gastrointestinal endoscopy*, 92(4), 807-812.
- Khanzode, Ku Chhaya A., and Ravindra D. Sarode. "Advantages and Disadvantages of Artificial Intelligence and Machine Learning: A Literature Review." *International Journal of Library & Information Science (IJLIS)* 9, no. 1 (2020): 3.
- Kiener, Maximilian. "Artificial intelligence in medicine and the disclosure of risks." *Ai & Society* (2020): 1-9.
- 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
- Luo, J., Wu, M., Gopukumar, D., & Zhao, Y. (2016). Big data application in biomedical research and health care: a literature review. *Biomedical informatics insights*, 8, BII-S31559.
- Mogali, Shivaranjini. "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. 2014.
- Nils J. Nilsson. "Challenge problems for artificial intelligence." In *Proceedings of the National Conference on Artificial Intelligence*, pp. 1340-1345. 1996.
- Panch, Trishan, Heather Mattie, and Rifat Atun. "Artificial intelligence and algorithmic bias: implications for health systems." *Journal of global health* 9, no. 2 (2019) and Moore, Phoebe V. "OSH and the future of work: benefits and risks of artificial intelligence tools in workplaces." In *International Conference on Human-Computer Interaction*, pp. 292-315. Springer, Cham, 2019.

- Pedro, Francesc, Miguel Subosa, Axel Rivas, and Paula Valverde. "Artificial intelligence in education: Challenges and opportunities for sustainable development." (2019).
- Perc, Matjaž, Mahmut Ozer, and JanjaHojnik. "Social and juristic challenges of artificial intelligence." *Palgrave Communications* 5, no. 1 (2019): 1-7.
- Racine, E., Boehlen, W., & Sample, M. (2019, September). Healthcare uses of artificial intelligence: Challenges and opportunities for growth. In *Healthcare management forum* (Vol. 32, No. 5, pp. 272-275). Sage CA: Los Angeles, CA: SAGE Publications.
- Richard Fu "10 promising AI applications in health care." *Harvard Business Review* (2018).
- Roll, Ido, and Ruth Wylie. "Evolution and revolution in artificial intelligence in education." *International Journal of Artificial Intelligence in Education* 26, no. 2 (2016): 582-599.
- Rong, G., Mendez, A., Assi, E. B., Zhao, B., &Sawan, M. (2020). Artificial intelligence in healthcare: review and prediction case studies. *Engineering*, 6(3), 291-301.
- Selman, Bart, Rodney A. Brooks, Thomas Dean, Eric Horvitz, Tom M. Mitchell
- Shih, W., & Srihari, K. (1995). Distributed artificial intelligence in manufacturing systems control. *Computers & Industrial Engineering*, 29(1-4), 199-203.
- Strong, A. I. "Applications of artificial intelligence & associated technologies." *Science [ETEBMS-2016]* 5, no. 6 (2016).
- Sun, Tara Qian, and Rony Medaglia. "Mapping the challenges of Artificial Intelligence in the public sector: Evidence from public healthcare." *Government Information Quarterly* 36, no. 2 (2019): 368-383.
- Tadapaneni, N. R. (2020). Artificial Intelligence Security and Its Countermeasures. *International Journal of Advanced Research in Computer Science & Technology*, 8(1).
- Wan, Jiafu, Xiaomin Li, Hong-Ning Dai, Andrew Kusiak, Miguel Martínez-García, and Di Li. "Artificial-intelligence-driven customized manufacturing factory: key technologies, applications, and challenges." *Proceedings of the IEEE* 109, no. 4 (2020): 377-398.
- Zhao, Yang, Tingting Li, Xuejun Zhang, and Chaobo Zhang. "Artificial intelligence-based fault detection and diagnosis methods for building energy systems: Advantages, challenges and the future." *Renewable and Sustainable Energy Reviews* 109 (2019): 85-101.