ISBN: 978-93-92995-10-1

ARTIFICIAL INTELLIGENCE- AN AUTOMATED CREATION

NANDIGAM KAMALI HARIPRIYA
B.Tech Computer Science
Email ID: kamali.haripriya2021@vitstudent.ac.in

What is Artificial Intelligence?

[1] Artificial Intelligence is a study of Engineering Science that deals in making smart Machines and Computer based programmes. It works by using the computers to understand the human Intelligence, but AI is not only limited to biological methods, it is a part in various platforms and fields.[2] AI is explained as an intelligence displayed by an artificial system to resolve complex problems and such a system is normally supposed to be a computer or a machine. Artificial Intelligence is a combination of computer science and physiology of Intelligence, which can be simply stated as an algorithmic and computerised part of advantage to the today's world.[3]We can create machines which can behave like a human, think like humans, and able to make decisions individually through AI mechanism. The two words Artificial Intelligence commonly means the intelligence made by humans. The field of Artificial Intelligence was formed with an idea that one day the intelligent machines created will be able to match the human intelligence and consciousness. AI is not only evolving in the research sector but also in the modernization of Industries and work as we currently understand. Ai goes through various phases of planning, reasoning, analysing data, prediction of outcomes and acting in accordance. Statistics, Probability and various other mathematical approaches are used in AI for Neural Networks and Machine Learning.

History of Artificial Intelligence?

[4] Artificial Intelligence was first introduced and detailed in 1950, but due to many limitations in the earlier models prevented it from global acceptance and application which overcame by the development of careful research and deep learning.[5]After 1956, Artificial Intelligence researchers began out to identify the standard methodologies that characterised intelligent human behaviour and cognitive abilities in medical diagnosis, playing chess, language understanding in speech processing and other areas in the aim of being able to automate the processes. However, primarily, Artificial Intelligence today, mainly approaches this symbolic method only for the name. Over the course of twentieth century, major part of the foundational commitments and methodologies were forgotten. Human's Intelligence was perhaps most prominently, the primary example upon which early automation mechanism techniques were based. The main goal was to replicate intelligent human behaviour and cognitive abilities into robots and machines by understanding the mechanisms that take place in our own intellect so that they could be automated. However today, most of the researchers want to design and create autonomous systems that can handle well in complex application domains by any possible means instead of using human-like means (Floridi, 2016). In fact, many strong methodologies today intentionally eliminate human activity such as automated game leagues that create remarkable strategies totally by playing only against oneself and keeping a record of moves that are most likely leading to a win, rather than using human inspired techniques or training to play with human operators (Pollack & Blair, 1997; Tesauro, 1995).Machine Learning is said to be today's most powerful and profitable, artificial intelligences created. It exhibits relatively a limited range of intelligent behaviour. Machine Learning algorithms are mostly designed to

perform one task to generate accurate predictions. There is no clear narration of artificial intelligence from the 1950s to the present day.[6] Invention and evolution in engineering and technology, determined and developed Artificial Intelligence. At first it worked on basic problem solving, representing knowledge and theorizing. It was also used in proving theorems, translations, associative memory and other basic algorithms.

Growth of Artificial Intelligence?

[7] Artificial Intelligence is one of the most rapidly emerging and advancing technology today. AI continuously progressed nearly every decade since the 1950's, when the programming language "Lisp" is designed by John McCarthy. It used to carry self-modifying applications. Later in 1970's when Expert Systems (ES) developed, Artificial Intelligence was referred as one of the frontier technologies. And after a decade, again AI was at the lead when the Japanese Government begin its research and development effort to develop an AI based computer architecture, which is called as Fifth Generation Computer System (FGCS). Now in the 2010's Artificial Intelligence is again leading in automation, robotics development, data analytics and so on. The current AI revolution can change the future world in many ways. [8] Artificial Intelligence has become more widely accepted and adopted by leading organisations as a competitive growth component. The capability for introduction of Artificial Intelligence into national economy system is immense and this cannot be relegated to individual companies or businesses. Above all it is the strategic on a national scale such as exploring optimal models of sectoral balance sheets. Formulation of target indicators for large corporations, supply of market and economic forecasting with aggregate demand, monetary-crediting system optimisation and so on. [9] In the latest days Artificial Intelligence (AI) and Machine Learning (ML) have advanced significantly permitting for a broad range of advantageous and useful applications. Now artificial intelligence is the crucial element of regularly used technologies like automatic speech recognition, machine translation, spam filters, and search engines. Driverless automobiles, digital assistants for nurses and doctors, and AI-enabled drones for expediting disaster relief operations are some of the interesting technologies currently being developed and implemented in small-scale pilots. Even, further in the future advanced AI technologies has the ability to reduce the demand for unnecessary labour greatly expediting scientific research, and improving the quality of governance. Artificial intelligence has a lot of advantages and many of these developments excite us but there are also ways through which AI might be exploited negatively. By preventing or minimising this risk we can not only avoid the corresponding problems but can also avoid the delay in the development and growth of AI's positives and advantages.

Artificial Intelligence in Health Care Appliances

[10] Artificial intelligence generated medical and biological technologies are rapidly developing into applications for medical practices. Intelligent computer programmes and algorithms can deal with increasing amounts of information which can be provided by smart phones, wearables and other mobile monitoring sensors in different areas of medicine. Currently, only very specific settings in clinical practice benefit from the application of artificial intelligence, such as the detection of atrial fibrillation, epilepsy, seizures, hypoglycemiaand some other organ diagnosis based on medical examination.[11] Today's modern health care and its medicine includes monitoring of and benchmarking with predefined quality indicators which results on the implementation of the best practice. There is a chance of microbiological findings which result in healthcare-associated

infections (HAIs) but with the help of MOMO, a modern microbiology analytics software, as well as with MONI, a fully automated detection and monitoring system an automated detection and monitoring system, we can detect the HAIs. This results a high systematic care of the patients and their safety with no type of error.[12] AI track, trace and monitor patients. Information systems related to AI are the new yielding sources of the medical evolution and building of a global economy. Internet of things (IOT) acts as an important role in the growth of Information systems. However, it is really important that the medical institutions trust the IoT systems regarding their performance, security, privacy, reliability and return-on-investment, which are an open challenge of current IoT systems. [13] Forms of Artificial Intelligence (AI) such as algorithms and neural networks are thoroughly investigated for new medical applications in areas like imaging and diagnostics, risk analysis, lifestyle management and monitoring, health care information management and virtual remote health care assistance. Increased speed in image processing, better vision into predictive screening, and decreased healthcare expenditures and inefficiencies include as expected benefits in this field. On the other hand, AI automated medical and clinal techniques create a lot of new circumstances wherein commonly-held values and ethical principles may be challenged.

Artificial Intelligence Manufacturing and Production

[14] AI is called to be the fourth Industrial revolution. Computational Systems with programming Intelligence can resolve various complex problems in the real world. Artificial Intelligence with the help of big data changed all the industries and revolutionised the business around the world which resulted in increase of the economic growth.[15] There are many new innovative technologies like Cloud Computing, Internet of Things involved (IoT), the Industrial Internet of Things; Big Data; Blockchain; Cyber-Physical Systems; Artificial Intelligence in the fourth industrial revolution. Artificial Intelligence mainly plays a really important and significant role in this Industry 4.O model. AI in manufacturing is observed two peroids:1979-2010 and 2011-2019 which are considered as before and after origination of industry 4.O. It mainly includes things like big data, cyber-physical systems and smart manufacturing and real time algorithms.[16] Advanced analytical computing and deep learning made the evolution of manufacturing system applications in an automated way. Industries and manufacturing units are seeking opportunities to replace the traditional research approaches to newly developed concepts and technologies of the Internet of Things (IoT), and cyber-physical systems.[17] Artificial Intelligence (AI) accelerates the combination of manufacturing of information and communication technologies, including computing, communication, and control, enabling high value-added manufacturing to the next generation of smart factories to support new varieties and small customized production modes. AI technology enables manufacturing systems to recognize the environment, adapt to external requirements, and extract process knowledge, including business models such as smart production, network collaboration, and extended service models.[18] Intelligent Manufacturing is a new advanced manufacturing representation and the practical means by which new information and communication technologies intelligent science and technology, large manufacturing technology (including design, production, management, testing, and integration), system engineering technology, and related product technology are assimilated with the entire system and product development lifestyle. To allow the assimilation and improvement different components of a manufacturing organisation or group, the life cycle of industrial production uses autonomous sensing interconnection, collaboration, learning, analysis, cognition, decision-making, control, and

the execution of human, machine, material, and environmental information which include three elements (people/organizations, operational management, and equipment and technology) and five flows (information flow, logistics flow, capital flow, knowledge flow, and service flow). This facilitates production and deliver customers high efficiency, high quality, cost-effective, and environmentally friendly service for consumers, and increases the competitiveness of the manufacturing company. In the field intelligent manufacturing, artificial intelligence technology supports the advancement of new models, means, and forms, system architecture, and technology systems (Li *et al.*, 2014; NMSAC and SAC-CAE, 2016).

New Models: An advanced manufacturing approach that is internet-based, service-oriented, collaborative, customizable, flexible, and socialized to the consumers.

New Means: Digitalization, Internet of Things (IOT), virtualization, service, collaboration, customization, flexibility and intelligence are all components of human intelligence machine-oriented manufacturing systems.

New form: The features of an intelligent industrial environment comprise ubiquitous interconnection, data-driven Ness, cross-border integration, autonomous intelligence, and mass innovation.

The strong combination of multiple systems, techniques and concepts will ultimately form an intelligent manufacturing community.

Artificial Intelligence in Security and Surveillance

[19] The human eye is a very efficient device that scans large amounts of low-level visual sensory data and delivers selective information to the brain for high-level semantic explanation and context recognition. But over the past few decades, the computer vision community has tried to provide similar perceptual functionality to artificial visual sensors. Considerable efforts have been made to understand the consistent images and processes of each individual object in the human visual system. An important application for video analysis and understanding which is a part of intelligent surveillance aimed at automatically interpreting human activities and detecting abnormal events that can pose a threat to public security and safety is developed. [20] Current Achievements and developments in Artificial intelligence influenced the military equipment and power with deliberate competition effected the world politics widely. AI can be a major potential source of unpredictability and vulnerability which results in huge demanding strategic competitions around the world. AI can have a great impact on military applications from a tactical and diplomatic battlefield perspective to a deliberate level.[21] The environment of security and possible risk for citizens, organizations, and states is changing in response of Artificial Intelligence (AI) and Machine Learning (ML). Illegal use of AI could affect digital security (example: through criminals training machines and algorithms to hack or social engineer victims at human or superhuman levels of performance), physical security (example: non-state actors weaponizing consumer drones) and political security (example: through privacy-eliminating surveillance, profiling, and repression, or through automated and targeted disinformation campaigns). The negative use of Artificial Intelligence will have consequences for how we develop and maintain our digital internet platform, as well as how we design and spread AI intelligence systems and will definitely require policy and other institutional responses.[22] Change in military superiority, information superiority and economic superiority will affect the national security due to advances in Artificial Intelligence. For a military advantage, the development of AI will enable new capabilities and make existing

capabilities more accessible to broader extent of people. Activities that currently require a lot of advanced labour, such as continuous threats in the cyber sector, will be mostly automated in the future and can be easily accessible in the black market. Forgery of audio and video media enhanced by AI is rapidly improving in quality and also easily affordable today. This results in loss of trust over many institutions.

Artificial Intelligence in Education

[23] Artificial Intelligence in Education (AIED) covers a broad range of advanced Technology and Innovations from AI-driven, sequential effective learning and dialogue structures. By AI assisted effective Learning student writing analysis, cognitive computing agents like bots in gaming scenarios and student support chat bots in such a way the students are in complete control of their own learning. It also allows students to engage and interact with one another through computers, the entire techniques, students using devices like mobile phone out of the classroom and lot more. Furthermore, AIED gives an insight on educational and learning approaches. AIED is derivative and innovative at the same time. It combines theories and approaches from sectors like Artificial Intelligence, Cognitive sciences and Education.[24] In the last twenty-five years Artificial Intelligence in Education (AIED) sector has undergone major advancements. There are two simultaneous components that needs to emerge in order to have an influence on education in the next twenty-five years. One is an adaptive and evolutionary process that focuses on present classroom approaches, interaction with teachers, and enhancing advanced technologies and ranges. The other is a transformative process, where we insist to integrate technologies within students' everyday lives, encouraging their cultures, goals, practices, and communities.[25] Web Intelligence (WI) is an important aspect of Artificial Intelligence in Education (AIED). WI addresses the basic roles as well as limited impacts in both Artificial Intelligence (AI) and Information Technology (IT) sectors in the coming generation of Web-insisted products, systems, services, and activities. WI is highly advantageous in the field of AIED as a direction for scientific research and development. Some main elements such as ontologies, adaptivity and personalization, and agents are the fundamental components that attracted AIED researchers for quite some time. WI focuses on other issues like intelligent Web services, semantic mark up, and Web mining in AIED.[26] Artificial Intelligence is a branch of study which developed in computers, machines and others systems possessing human-like intelligence distinguished by cognitive abilities, learning, adaptability, and decision-making capabilities. According to the results, commonly recognised and applied in education, especially by educational institutions in multiple kinds. AI actually started in the form of computer kind of technologies proceeding to web based online intellectual educational standards and ultimately with the use of embedded computer systems, together with other technologies the use of humanoid robots and web-based chat bots to perform instructor's tasks and functions independently or in cooperation with the instructors. Instructors were able to implement many management responsibilities such as monitoring and grading student's assignments, using these platforms more effectively and efficiently, which to improve the quality of their instructional activities. On the other hand, the system utilises machine learning and flexibility, content and curriculum have been adjusted and modified to meet student needs improving overall learning experiences as well as increasing learning effectiveness and maintenance.

Advantages of Artificial Intelligence

[27] Artificial Intelligence (AI) applications are used to integrate human intelligence in order to solve problems or taking decisions. AI allows the advantages of permanency, reliability, and cost-effectiveness which also resolves uncertainty and speed in solving problems or taking decisions. AI is applied and developing in various fields and professions like Engineering, Economics, Linguistics, Law, Manufacturing, Medicine, and for a variety of modelling, Prediction, decision support and control applications. The use of Internet in search engines has been rigorous and became one of the most emerging applications of AI.[28] Despite the utmost efforts it is well known that humans exhibit many emotions in their day to day lives which affects their work in a negative way. But machines and programs with artificial intelligence do not require sleep and doesn't get tired eradicating the basic disadvantage of humans. Artificial Intelligence makes decisions and works based on facts rather than emotions. Through artificial intelligence knowledge can be conveyed and spread more easily. Once a programs or application gets updated or trained for something, it can be readily available to others which saves the time and efforts.[29] Artificial Intelligence has many benefits. It allows an opportunity to develop completely and automate to the history of artificial robots. Finishing the given task faster than humans, can complete the stressful and exhausting work easily, solving complex problems in short period of time, multi-tasking, high success ratio compared to humans, less errors in task and defects, more accuracy in short time, calculations of long term and complex situations and discovering unexplored things like outer space are some of the main advantages of Artificial Intelligence.[30] Human labour can be reduced by replacing people by computers and machines. Continuously programming, self-writing, self-modifying makes humans exhausted. By using AI, the work will be fast and profitable. AI can be implemented easily. Modern advanced companies use digital assistants or bots to engage with people minimizing the need for human resources. Many online websites are also designed and runed using digital assistants to provide customers with the item they desire. We can make computers make decisions by merging AI and other technologies to perform actions faster than humans. Many people actually who are unaware of Artificial Intelligence use the applications such as Apple's Siri, Microsoft's Cortana, Google's OK Google commonly and easily to find locations, taking a selfie, making a phone call and for many other uses.[31] Robotics is a study of Artificial Intelligence (AI) and Machine Learning (MI). Machine Learning is said to be today's most powerful and profitable, artificial intelligences created. It exhibits relatively a limited range of intelligent behaviour. Machine Learning algorithms are mostly designed to perform one task to generate accurate predictions. In today's world people opt for automation in every aspect possible. Robots and Intelligent machines can not only provide assistance and convenience but also lifesaving capabilities. Robots are used in medical diagnostics purposes which have high accuracy. They are also used to examine dangerous activities and objects using remote control and integrated camera systems. In situations like defusing a bomb without a human being in close with it, robots are a very good use. The 'Robo Gas Inspector,'23 a robot equipped with remote gas detecting technology, can inspect technical infrastructure even in difficult-to-reach regions without endangering humans, such as to detect leaks in above-ground and underground gas pipelines.[32] Furthermore, it will have a substantial impact on business and employment, leading to high interconnecting organizations with decision making based on the analysis and utilization of big data as well as increased global competitiveness among business. People will be able to buy things and get services from anywhere around the globe using Internet and other AI oriented innovations. Significant competitive advantage will continue to accumulate for those who want to take entrepreneurial risks to make extensive use of the Internet and transform innovative products/services into global commercial success stories.

ISBN: 978-93-92995-10-1

Challenges or Disadvantages of Artificial Intelligence

[33] Some of the main disadvantages of Artificial Intelligence (AI) is that it can be misused resulting in large scale disaster, affecting Human careers and jobs, it is sometimes done in opposite way to the given command and mismatches, increased Unemployment, no creativity, it lacks Human touch, people become adapted to the automation and gets lazy and technological reliance increased.[34] Some of the equipment are expensive and it isn't easy to develop the machines. It costs time and resources to create, rebuild and repair which involves humans to lead the entire process. Humans addict to these innovations and technologies which effects the future generations in a negative way. Many companies and organizations are trying to replace the least skilled employees to AI robots that can perform similar work more effectively. Machines are definitely best when it comes to effective performance but replacing human connection that create the team. Machines cannot develop bond with humans which is a crucial aspect when it comes to Team Management. Machines can only work and accomplish it' s tasks for which they are built or programmed, anything beyond their limit causes them to crash or deliver unrelated outputs and errors which is a serious drawback.[35] It is a fact that rise of AI technology not only give automated products but will also automate people jobs which eventually leads to massive unemployment. In future there would be no source for programmers. As told the goal, after all, should be a technology that benefits people but not one that destroys them. [36] An emerging iteration of Autonomous Weapon Systems (AWS) combining with AI systems foreshadows a strong interaction of increased range, accuracy, mass, adjustment, intelligence and speed in future collisions. As a result, the risk of increasing use-them-or-lose-them scenarios between nuclear-armed military forces and the attendant dangers posed by the use of unreliable, unverified and dangerous AWS will increase, resulting in potentially terrible strategic outcomes. It disturbs the World peace and affects many people around the world if utilised in a wrong way.[37] Though Artificial Intelligence is automated it still has to gain trust of humans in many aspects. According to human nature, people tend to stand away from things that are complicated. AI still should be reliable and easy to understand in various fields. The industrial sector also lacks advanced technical staff related to this technology, so owners must be able to train employees properly to ensure the benefits of artificial intelligence. We know that humans are not perfect but how can a manmade machine can be totally perfect? In case of any technology's software or hardware crashes, it is too hard to find the main cause of the problem sometimes. AI can't replace everything but can increases the productivity of all tasks. AI can manage everyday life, many tasks, many processes, and even minute thing but this may be true to some extent only, not all tasks can be managed by AI. The biggest challenge facing society and businesses is to take advantage of the benefits of using AI technology to provide vast opportunities for new products or services and tremendous productivity improvements. Every technology has its own limitations. AI is still in its early and initial phases and has a lot to deliver and progress.

Conclusion

In my opinion, even if Artificial Intelligence isn't completely developed it is showing its strong potential in various sectors of our lives. Many Big companies today run-on Artificial Intelligence. AI today influenced many daily activities in a human life both personally and professionally. People of almost all ages depend on AI for their daily needs. As humans can't give an automated work always, he chooses an automated machine to work for him. Most of the comforts people experiencing now a days are delivered by AI. Although the intelligent machines and gaming

software were created and developed by humans, it is really tough to a human to compete with an AI oriented application or bots. The good thing about AI is that it can solve problems ranging from simple to complex applicative difficulties, as well asmake decisions in real world situations allowing people to use this more efficiently.

References

Abdulov, R. (2020). Artificial intelligence as an important factor of sustainable and crisis-free economic growth. *Procedia Computer Science*, *169*, 468-472.

Allen, G., & Chan, T. (2017). *Artificial intelligence and national security*. Cambridge, MA: BelferCenter for Science and International Affairs.

Alshehri, F., & Muhammad, G. (2020). A Comprehensive Survey of the Internet of Things (IoT) and Edge Computing in Healthcare. *IEEE Access*.

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

Briganti, G., & Le Moine, O. (2020). Artificial intelligence in medicine: today and tomorrow. *Frontiers in medicine*, *7*, 27.

Brundage, M., Avin, S., Clark, J., Toner, H., Eckersley, P., Garfinkel, B., ... &Amodei, D. (2018). The malicious use of artificial intelligence: Forecasting, prevention, and mitigation. *arXiv preprint arXiv:1802.07228*.

Buchanan, B. G. (2005). A (very) brief history of artificial intelligence. *Ai Magazine*, *26*(4), 53-53.[5]

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

Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *Ieee Access*, *8*, 75264-75278.

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.

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

Devedžić, V. (2004). Web intelligence and artificial intelligence in education. *Educational technology & society*, *7*(4), 29-39.

Dick, S. (2019). Artificial intelligence.

Furman, J. (2016). Is this time different? The opportunities and challenges of artificial intelligence. *presentation, AI Now: The Social and Economic Implications of Artificial Intelligence Technologies in the Near Term, New York, NY*.

Ghimire, A., Thapa, S., Jha, A. K., Adhikari, S., & Kumar, A. (2020, October). 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.

Gong, S., Loy, C. C., & Xiang, T. (2011). Security and surveillance. In *Visual analysis of humans* (pp. 455-472). Springer, London.

Jaakkola, H., Henno, J., Mäkelä, J., &Thalheim, B. (2019, May). Artificial intelligence yesterday, today and tomorrow. In *2019 42nd International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO)* (pp. 860-867). IEEE.

Johnson, J. (2019). Artificial intelligence & future warfare: implications for international security. *Defense& Security Analysis*, *35*(2), 147-169.

Johnson, J. (2020). Artificial intelligence, drone swarming and escalation risks in future warfare. *The RUSI Journal*, *165*(2), 26-36.

Katare, G., Padihar, G., & Qureshi, Z. (2018). Challenges in the integration of artificial intelligence and internet of things. *International Journal of System and Software Engineering*, *6*(2), 10-15.

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.

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.

Koller, W., Rappelsberger, A., Willinger, B., Kleinoscheg, G., &Adlassnig, K. P. (2021). Artificial Intelligence in infection control—healthcare institutions need intelligent information and communication technologies for surveillance and benchmarking. In *Soft Computing for Biomedical Applications and Related Topics* (pp. 37-48). Springer, Cham.

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.

Makridakis, S. (2017). The forthcoming Artificial Intelligence (AI) revolution: Its impact on society and firms. *Futures*, *90*, 46-60.

McCarthy, J. (1998). What is artificial intelligence?.

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.

Roll, I., & Wylie, R. (2016). Evolution and revolution in artificial intelligence in education. *International Journal of Artificial Intelligence in Education*, *26*(2), 582-599.

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

Wan, J., Li, X., Dai, H. N., Kusiak, A., Martínez-García, M., & Li, D. (2020). Artificial-intelligence-driven customized manufacturing factory: key technologies, applications, and challenges. *Proceedings of the IEEE*, *109*(4), 377-398.

Wisskirchen, G., Biacabe, B. T., Bormann, U., Muntz, A., Niehaus, G., Soler, G. J., & von Brauchitsch, B. (2017). Artificial intelligence and robotics and their impact on the workplace. *IBA Global Employment Institute*, *11*(5), 49-67.

Woolf, B.P. (2010). Building Intelligent Interactive Tutors: Student-Centered Strategies for Revolutionizing e-Learning. Morgan Kaufmann, 11.

Zeba, G., Dabić, M., Čičak, M., Daim, T., & Yalcin, H. (2021). Technology mining: Artificial intelligence in manufacturing. *Technological Forecasting and Social Change*, *171*, 120971.