

General Concept for Future of Machines with Artificial Intelligence

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Abstract— Machine Learning (ML) is a subset of Artificial Intelligence Artificial intelligence (AI) seeks to create machines that can mimic human behavior and carry out human-like acts, in contrast to human intelligence, which tries to adapt to new surroundings by combining various cognitive processes. In Recent years, Artificial intelligence (AI) has been developing rapidly. AI is combination of software algorithms and hardware implementation of that software. AI application is in a range of ways, drawing on principles and tools, including from maths, logic, and biology. An important feature of current AI technologies is that they are ever more able to create sense of varied and unstructured kinds of data, such as natural language text and images. It is also the field of study in computer science that develops and studies intelligent machines. "AI" may also refer to the machines themselves. Every day, artificial intelligence improves the effectiveness of our lives. Many applications and services that assist us in performing routine tasks, including contacting friends, utilizing email, or using ride-sharing services, are powered by AI. In This paper, I will discuss the basics concepts of AI, how it works. Also covers applications, limitation and benefits of AI.

Keywords— AI, machine learning, AI applications, limitations, Robotics benefits of AI.

I. INTRODUCTION

There is no single, accepted definition of AI. The phrase broadly refers to computer systems that mimic cognitive functions like reasoning, learning and adaptation, sensory understanding, and interaction. The majority of AI apps today are limited, only capable of completing predefined tasks or resolving predefined issues. John McCarthy is regarded as the founding father of artificial intelligence. John McCarthy was a computer scientist from the United States. He was the one who first used the term "artificial intelligence." Along with Alan Turing, Marvin Minsky, Allen Newell, and Herbert A. Turing, he is one of the creators of artificial intelligence. In the 1960s, Professor H.N. Mahabala's writings allowed AI to spread to India. India was able to concentrate on AI thanks to the Knowledge-Based Computing Systems (KBCS) that UNDP developed in 1986. Machine Learning (ML) is a subset of Artificial Intelligence. ML is a science of designing and applying algorithms that are able to learn things from past cases.

If some behaviour exists in past, then you may predict if or it can happen again. Means if there are no past cases then there is no prediction.

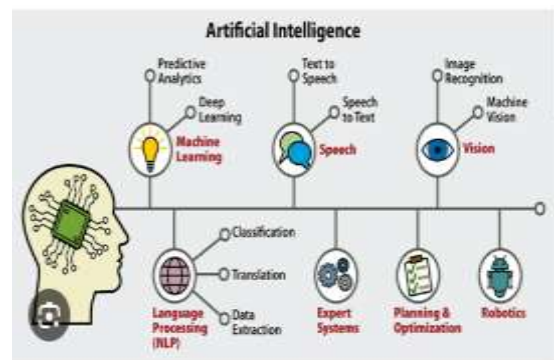


Figure 1 Artificial intelligence

The science and engineering of creating intelligent machines using algorithms or a set of rules that the computer follows to replicate human cognitive processes, such as comprehension, learning, and problem solving, can be defined as artificial intelligence (AI). AI systems have the capacity to anticipate issues or address them as they arise. The strength of AI lies in its capacity to extract correlations, recognize patterns, and learn from massive multidimensional and multimodal datasets. AI systems are dynamic and self-sufficient; they learn and modify as new data become available. The science and engineering of creating intelligent machines using algorithms or a set of rules that the computer follows to replicate human cognitive processes, such as comprehension, learning, and problem solving, can be defined as artificial intelligence (AI). AI systems have the capacity to anticipate issues or address them as they arise. The strength of AI lies in its capacity to extract correlations, recognize patterns, and learn from massive multidimensional and multimodal datasets. AI systems are dynamic and self-sufficient; they learn and modify as new data become available. Artificial intelligence (AI) technologies seek to duplicate or outperform capabilities (in computational systems) that would necessitate intelligence if performed by people. These include:

- Learning and adaptation
- Sensory understanding and interaction



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- Reasoning and planning
- Search and optimization
- autonomy
- Creativity

II. WORKING OF ARTIFICIAL INTELLIGENCE SYTEM

Algorithms and statistical models are used to analyze data and uncover patterns in order to create artificial intelligence, which enables robots to carry out tasks that otherwise require human intelligence. The steps involved in generating AI are as follows:

Data collection: Gathering a lot of data that is pertinent to the job the machine will do.

Data processing: removing mistakes and inconsistencies from the data through cleaning and processing.

Training: the machine learning system is trained to find patterns and generate predictions using the processed data.

Testing and evaluation: Analyzing the model's performance in relation to predetermined metrics and testing the model to make sure it is accurate.

Deployment: using the AI model to automate processes or generate predictions in real-world applications.

III. MAIN AREAS OF ARTIFICIAL INTELLIGENCE

A broad range of fields and approaches are covered by the phrase "artificial intelligence" (AI). We have selected key and actively researched subfields in AI, despite the difficulty of distilling them down to only seven major areas:

1 – Machine Learning: The Core of AI

A key component of artificial intelligence (AI) is machine learning (ML), which focuses on creating algorithms that let computers learn from data and make predictions or judgments based on it. With each new dataset, ML models get better at performing through this iterative process, eventually becoming more precise and effective.

Key concepts within Machine Learning are

- Supervised Learning:* involves utilizing labeled data to train an algorithm while the final result is already known.
- Unsupervised Learning:* It makes use of unlabeled data to find patterns and organizational structures in the dataset.
- Reinforcement Learning:* Models pick up new skills by interacting with their surroundings and getting positive or negative feedback.

2 – Deep Learning: A Hierarchical Approach

Artificial neural networks are used in Deep Learning, a type of Machine Learning, to mimic the hierarchical organization and operation of the human brain. This method makes it possible to process enormous amounts of data and discover intricate patterns or features.

Key applications of Deep Learning are:

a. Image Recognition: Convolution neural networks (CNNs), a type of deep learning approach, have transformed computer vision by enabling object detection, facial recognition, and image classification..

b. Natural Language Processing (NLP): Recurrent neural networks (RNNs) and transformers are two methods that have greatly enhanced language comprehension, translation, and generation.

c. Generative Adversarial Networks (GANs): By learning from current datasets, GANs are able to produce realistic photos, movies, and other sorts of data.

3 – Robotics: AI Meets the Physical World

Robotics combines artificial intelligence (AI) with mechanical design and engineering to bridge the gap between the digital and physical worlds. Robots are able to process information, sense their surroundings, and carry out actions determined by AI.

Main advancements of Robotics are:

a. Autonomous Vehicles: AI is used by self-driving cars and drones to navigate, recognize obstacles, and make decisions.

b. Humanoid Robots: These robots imitate human look and behavior, which improves their capacity for communication and teamwork.

c. Robotic Process Automation (RPA): Software bots are used in RPA to automate routine, rule-based processes, increasing productivity and minimizing human error.

4 – Expert Systems: AI for Decision Support

In order to simulate human expertise in a particular field, expert systems use artificial intelligence. They provide decision assistance and suggestions based on a knowledge base and a set of rules or heuristics. These systems have found use in a number of fields, including law, medicine, and finance.

The main components of Expert Systems are given below:

a. Knowledge Base: holds the knowledge and experience specific to a given subject that is needed for decision-making.

b. Inference Engine: processes user input and the knowledge base to produce suggestions or judgments.

c. User Interface: allows for input and results to be communicated between the user and the expert system.

5 – Natural Language Processing: AI and Human Language

A branch of artificial intelligence called "natural language processing" (NLP) is concerned with how computers and human language interact. By using NLP approaches, text or speech can be understood, interpreted, and produced by machines in a way that is both meaningful and beneficial.

These are the key applications of NLP:

a. Sentiment Analysis: analyzing the mood or emotion included in text data, which is helpful in contexts like customer service and social media surveillance.

b. Text Summarization: automatically producing succinct summaries of lengthy articles or papers to improve knowledge retrieval and understanding.

c. Chatbots and Virtual Assistants: Conversational bots powered by AI that can comprehend user questions and provide a natural, human-like response.

6 – Computer Vision:

Machines that Teach Vision The goal of the artificial intelligence field of computer vision is to imitate how people perceive, analyze, and comprehend visual data from their environment. Computer Vision algorithms can glean insightful information by processing and examining photos or movies.

These are the main techniques in Computer Vision:

a. Object Detection and Recognition: recognizing and categorizing items in pictures or videos, with uses in production, retail, and monitoring.

b. Optical Character Recognition (OCR): transforming printed or handwritten text into a machine-readable format, which makes data extraction and digitization easier.

c. Scene Reconstruction: Making 2D pictures or videos into 3D models of scenes or objects for usage in virtual reality, gaming, and architectural modeling.

7 – AI Ethics and Safety: The Human Factor

With time, ethical and safety concerns are becoming more and more significant. Addressing the societal and ethical ramifications of AI development and use is the main goal of this branch of artificial intelligence.

These are the main concerns in artificial intelligence ethics and safety:

a. Fairness and Bias: ensuring that society's current prejudices and injustices are neither exacerbated nor sustained by AI systems.

b. Transparency and Explain ability: creating AI models that can justify their choices in a way that is transparent and understandable, encouraging accountability.

c. Privacy and Security: preserving the efficacy of AI applications while retaining user data and privacy protections, and protecting AI systems from hostile assaults or abuse.

IV. APPLICATIONS OF AI SYSTEMS

The applications of AI systems, including but not limited to machine learning, are diverse, ranging from understanding healthcare data to autonomous and adaptive robotic systems, to smart supply chains, video game design and content creation. This research area primarily covers fundamental of AI technologies, while applications of such technologies are captured within other subject domains. Artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems. Figure 2 shows application of AI. Specific applications of AI include expert systems, natural language processing, speech recognition and machine vision robotics, defense, transport, healthcare, marketing, automotive, business, gaming, banking, chatbots, etc.

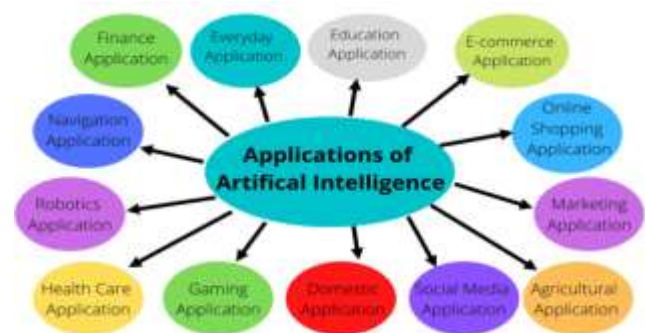


Figure 2 Application of AI

V. BENEFITS OF ARTIFICIAL INTELLIGENCE

One of the biggest benefits of Artificial Intelligence is that it can significantly reduce errors and increase accuracy and precision. The decisions taken by AI in every step is decided by information previously gathered and a certain set of algorithms. When programmed properly, these errors can be reduced to null.

Importance of AI: Artificial Intelligence (AI) is becoming increasingly important in today's world, and its impact is being felt across many different industries. Here are some of the 5 reasons

Automation

AI is enabling the automation of many routine and repetitive tasks, freeing up humans to focus on more creative and strategic work. This is leading to increased productivity and efficiency in many industries.

Personalization

AI is being used to personalize products and services, based on individual preferences and behavior. This is leading to better customer experiences and higher levels of customer satisfaction.

Predictive Analytics

AI is being used to analyze large amounts of data and make predictions about future events, enabling businesses to make more informed decisions and identify opportunities for growth.

Healthcare

AI is being used to improve healthcare outcomes by analyzing patient data and providing more personalized treatment options. AI is also being used to develop new drugs and treatments for a range of diseases.

Safety and Security

AI is being used to improve safety and security in a range of settings, including transportation, public safety, and cyber security. Besides above, AI has the potential to transform many aspects of our lives, leading to increased efficiency, better decision-making, and improved outcomes across a range of industries and sectors.

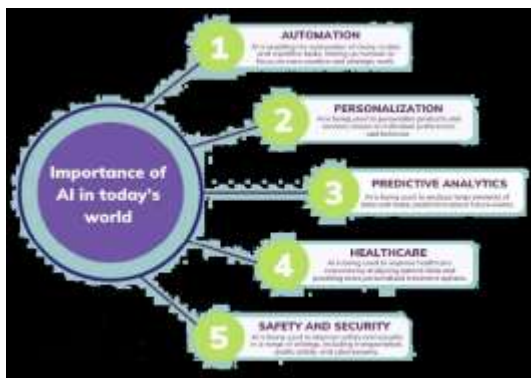


Figure 3 Benefits of artificial intelligence system

VI. LIMITS OF AI

AI depends on digital data, so inconsistencies in the availability and quality of data restrict the potential of AI. Also, significant computing power is required for the analysis of large and complex data sets. While many are enthusiastic about the possible uses of AI in the NHS, others point to the practical challenges, such as the fact that medical records are not consistently digitized across the NHS, and the lack of common sense, creativity & interoperability, decision making limitation, and standardization in NHS IT systems, digital record keeping, ethics considerations, and data labelling.⁵ There are questions about the extent to which patients and doctors are comfortable with digital sharing of personal health data. Humans have attributes that AI systems might not be able to authentically possess, such as compassion. AI currently is unable to replicate, such as contextual knowledge and the ability to read social cues. There is also debate about whether some human knowledge is tacit and cannot be taught. Claims that AI will be able to display autonomy have been questioned on grounds that this is a property essential to being human and by definition cannot be held by a machine. figure 4 shows some Limitation of Artificial Intelligence



Figure 4 Limitation of Artificial Intelligence

VII. CONCLUSION

Today, the Artificial Intelligence is highly involved in our daily life. Every machine is embedded with Artificial Intelligence techniques such as in smart phones. Now Artificial intelligence is reached on significant point. We believe that trending form the past, it continues swimming upwards in future.

Artificial Intelligence is a vast and multifaceted field, with numerous sub-disciplines and applications shaping our world. By understanding these seven main areas of AI, we can appreciate the breadth and depth of this transformative technology, as well as its potential to create a brighter, more efficient future for all. As we know researchers very rapidly work with machine with AI concept. AI is predicted to grow increasingly pervasive as technology develops, revolutionising sectors including healthcare, banking, and transportation. The work market will change as a result of AI-driven automation, necessitating new positions and skills. In future machines used AI concept and we can see the another world which will witness of power of AI

REFERENCES

- [1] Al Ghasemi, Y.; Jeong, H.; Choi, S.H.; Park, K.-B.; Lee, J.Y. Deep learning-based object detection in augmented reality: A systematic review. *Comput. Ind.* 2022, 139, 103661. [Google Scholar] [CrossRef]
- [2] Widdows, D.; Kitto, K.; Cohen, T. Quantum mathematics in artificial intelligence. *J. Artif. Intell. Res.* 2021, 72, 1307–1341. [Google Scholar] [CrossRef]
- [3] Panetto, H.; Jung, B.; Ivanov, D.; Weichhart, G.; Wang, X. Challenges for the cyber-physical manufacturing enterprises of the future. *Annu. Rev. Control.* 2019, 47, 200–213. [Google Scholar] [CrossRef]
- [4] Izonin, I.; Tkachenko, R.; Peleshko, D.; Rak, T.; Batyuk, D. Learning-based image super-resolution using weight coefficients of synaptic connections. In Proceedings of the 2015 Xth International Scientific and Technical Conference “Computer Sciences and Information Technologies” (CSIT), Lviv, Ukraine, 14–17 September 2015; pp. 25–29. [Google Scholar]
- [5] Shen, D.; Wu, G.; Suk, H.-I. Deep learning in medical image analysis. *Annu. Rev. Biomed. Eng.* 2017, 19, 221–248. [Google Scholar] [CrossRef][Green Version]
- [6] Tuncer, T.; Ertam, F.; Dogan, S.; Aydemir, E.; Plawiak, P. Ensemble residual network-based gender and activity recognition method with signals. *J. Supercomput.* 2020, 76, 2119–2138. [Google Scholar] [CrossRef]
- [7] Barakhnin, V.; Duisenbayeva, A.; Kozhemyakina, O.Y.; Yergaliyev, Y.; Muhamedyev, R. The automatic processing of the texts in natural language. Some bibliometric indicators of the current state of this research area. In *Journal of Physics: Conference Series*; IOP Publishing: Bristol, UK, 2018; p. 012001. [Google Scholar]
- [8] Hirschberg, J.; Manning, C.D. Advances in natural language processing. *Science* 2015, 349, 261–266. [Google Scholar] [CrossRef]
- [9] Abdullahi, M.; Baashar, Y.; Alhussian, H.; Alwadain, A.; Aziz, N.; Capretz, L.F.; Abdulkadir, S.J. Detecting Cybersecurity Attacks in Internet of Things Using Artificial Intelligence Methods: A Systematic Literature Review. *Electronics* 2022, 11, 198. [Google Scholar] [CrossRef]
- [10] Kim, D.; Kim, S.-H.; Kim, T.; Kang, B.B.; Lee, M.; Park, W.; Ku, S.; Kim, D.; Kwon, J.; Lee, H. Review of machine learning methods in soft robotics. *PLoS ONE* 2021, 16, e0246102. [Google Scholar] [CrossRef]
- [11] Torres, E.P.; Torres, E.A.; Hernández-Álvarez, M.; Yoo, S.G. EEG-based BCI emotion recognition: A survey. *Sensors* 2020, 20, 5083. [Google Scholar] [CrossRef]
- [12] Kuchin, Y.; Mukhamediev, R.; Yakunin, K.; Grundspenkis, J.; Symagulov, A. Assessing the impact of expert labelling of training data on the quality of automatic classification of lithological groups using artificial neural networks. *Appl. Comput. Syst.* 2020, 25, 145–152. [Google Scholar] [CrossRef]
- [13] Kotsiantis, S.B.; Zaharakis, I.; Pintelas, P. Supervised machine learning: A review of classification techniques. *Emerg. Artif. Intell. Appl. Comput. Eng.* 2007, 160, 3–24. [Google Scholar]
- [14] Hastie, T.; Tibshirani, R.; Friedman, J. *Unsupervised learning*. In *The Elements of Statistical Learning*; Springer: Berlin/Heidelberg, Germany, 2009; pp. 485–585. [Google Scholar]
- [15] Van der Maaten, L.; Hinton, G. Visualizing data using t-SNE. *J. Mach. Learn. Res.* 2008, 9, 2579–2605. [Google Scholar]
- [16] Adopting, Deploying, and Applying AI. Available online: <https://www.mckinsey.com/featured-insights/artificial-intelligence/ai-adoption-advances-but-foundational-barriers-remain> (accessed on 21 April 2022).
- [17] Zhao, H. Assessing the economic impact of artificial intelligence. ITU Trends. In *Emerging Trends in ICTs*; Morgan Kaufmann Publishers: Burlington, MA, USA, 2018. [Google Scholar]
- [18] Financial Climate in the Republic of Kazakhstan. Available online: https://www2.deloitte.com/kz/ru/pages/about-deloitte/articles/financial_climate_in_kazakhstan.html (accessed on 21 April 2022).
- [19] Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. Available online: <https://stat.gov.kz/search> (accessed on 21 April 2022).
- [20] Strategic Development Plan of the Republic of Kazakhstan until 2025. Available online: <https://adilet.zan.kz/rus/docs/U1800000636> (accessed on 21 April 2022).
- [21] Hidalgo, C.A.; Hausmann, R. The building blocks of economic complexity. *Proc. Natl. Acad. Sci. USA* 2009, 106, 10570–10575. [Google Scholar] [CrossRef][Green Version]
- [22] List of Countries by Economic Complexity. Available online: https://en.wikipedia.org/wiki/List_of_countries_by_economic_complexity (accessed on 21 April 2022).
- [23] The Global Competitiveness Report 2019. Available online: http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf (accessed on 21 April 2022).
- [24] The Socio-Economic Impact of AI in Healthcare, October 2020. Available online: https://www.medtecheurope.org/wp-content/uploads/2020/10/mte-ai_impact-in-healthcare_oct2020_report.pdf (accessed on 21 April 2022).
- [25] Haseeb, M.; Mihardjo, L.W.; Gill, A.R.; Jermisittiparsert, K. Economic impact of artificial intelligence: New look for the macroeconomic assessment in Asia-Pacific region. *Int. J. Comput. Intell. Syst.* 2019, 12, 1295. [Google Scholar] [CrossRef][Green Version]