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TITLE: Literature review on artificial intelligence, its applications and future scope

Shraddha P. Gadge, Pooja V. Gupta, Prof.M.K.Popat

[1]*Student, Computer Science and Engineering, Jawaharlal Darda Institute of Engineering and Technology, Maharashtra, India, shraddhagadge2017@gmail.com*
[2]*Student, Computer Science and Engineering, Jawaharlal Darda Institute of Engineering and Technology, Maharashtra, India, poojagupta2465@gmail.com*
[3] *Professor, Computer Science and Engineering, Jawaharlal Darda Institute of Engineering and Technology, Maharashtra, India,mohit.popat@rediffmail.com*

Abstract

Many days ago, every kind of work was done by mankind itself. There were no such technologies invented like today. AI has been a dominating field in global research since its existence. Workings were fully dependent on humans. So, they recognized the need of superior technologies. Scope of AI is vast. The ability of machines to be able to think creatively and work on its own by learning itself is termed as AI. It is a field of study which tries to make computers smart and superior. This paper is presented to display a brief analysis of AI and its wide applications.AI systems have the ability to work naturally associated with human intelligence.It is actually created to make the human lives more easier. This survey paper is made on the basis of references of various other papers concluding to concept of AI. It also discusses about its self-learning potentials and predictions in future society.

Index Terms: *AI, learning, intelligence, applications, future.*

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1. INTRODUCTION

"Artificial intelligence is the science and engineering of making intelligent machines, especially intelligent computer programs."   – John McCarthy, father of AI.

Artificial Intelligence (AI) has grown dramatically and becomes more and more institutionalized in the 21st Century. In this era of interdisciplinary science, of computer science, cybernetics, automation, mathematical logic, and linguistics , questions have been raised about the specific concept of AI .[2]According to John McCarthy ,who coined the term "Artificial intelligence" in 1956, said that "It is the combination of science and engineering to make intelligent devices for human welfare."[7].AI is a branch of software engineering worried about influencing PCs to act like people.[5]In 1950, Turing presented the famous ''Turing Test'' which defined of the concept of ''Machine Intelligence''.[2]

AI achieved its greatest successes, albeit somewhat behind the scenes. Artificial intelligence is used for logistics, data mining, medical diagnosis and many other areas throughout the technology industry. The success was due to several factors: the incredible power of computers today (see Moore's law), a greater emphasis on solving the specific creation of new ties between AI and other fields working on similar problems, and above all a new commitment by researchers to solid mathematical methods and rigorous scientific standards.[7]

The principle of Weak AI is that the machines behave as if they are intelligent. Weak AI proves that virtual abilities like thinking, talking, moving can be done by machine if they are programmed in that manner.[7]The principle of Strong AI is that the machines will do calculations and think itself and will predict the answer in future.[7]

AI systems consist of nine different levels of consciousness and are defined as "technology which allows digital systems to monitor, analyse, act, interact, remember, anticipate, feel, moralise and create":

• Monitor – technology that gathers information and records data.

• Analyse – technology that processes information, detects patterns and recognizes trends.

• Act – technology that can carry out tasks and processes

• Interact – technology that is able to listen and respond with a solution.

• Remember – technology that is capable of finding information.

• Anticipate – technology that can recognize and predict patterns pre-emptively.

• Feel – technology that is able to understand and act on human emotions.

• Moralise – technology that can integrate morality into its decision-making process. [8]

2. MAJOR AREAS IN AI

The field of AI is widely distributed over the world in times. So, some of them are discussed here as in every work in some or the other way the applications of AI based systems are used.

2.1. Natural Language Processing (NLP):

NLP is the process of understanding human language and converting to machine understandable form.[3] Natural language falls within the domain of artificial intelligence with the goal of understanding and creating meaningful expressions in the human language.[10] For example, Speech Recognition in smart phones[3] like there is siri by apple, Google now by Google, Watson by IBM and Cortina by windows mobile for various operating systems[7] can understand human language and process the information as per our requirement.[3]

2.2 Knowledge Representation and Reasoning

KRR is used for representing information in computer understandable form in order to complete a specified task. Intelligence means knowledge that is acquired and stored in a knowledge base that is used for making decisions on its own .[3]

2.3 Machine Learning

ML deals with study, analysis and construction of algorithms to make a machine to learn for making decisions on its own[3] in spite of like Computer Science concentrates on manually programming computers.[11] ML algorithms use input as past data i.e.., specifically called as training data .For example, the autonomous self-driving car that can take directions on its past inputs.[7,3]The "Waymo" is an example of self-driving car which is a google initiative drives on the road without driver.[7]

2.4 Pattern Recognition

PR is the phenomenon of classifying particular data into different classes based on their specific attributes. For example, there are two different classes A and B. Assume a new data point X, and now it has to be classified whether it belongs to class A or class B that is based on attributes of data point X. The following diagram illustrates about pattern recognition.[3]

2.5 Artificial Neural Networks

ANN is developed with the inspiration of biological neuron that is how a human brain works. It mainly contains Input layer, Hidden layer and output layer. Whereas all these layers helps in thinking process. Input layer takes training data, then ANN is trained with it and now prediction can be done from the built model. The following diagram represents ANN [3].
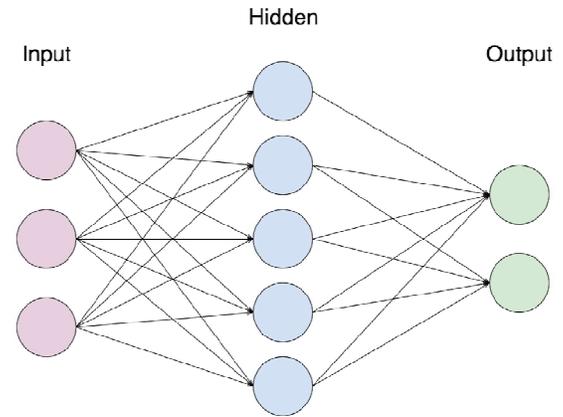

Fig. 2.5.1 Artificial Neural Networks [20]

3. APPLICATIONS OF AI

As Artificial Intelligence is commonly being used by the mankind, there are many applications. The growing trends in the field of AI impacts on various other fields in many ways. They impact positively and sometimes it can be negative too. Some of the applications are discussed below.

3.1 Education

Since the beginning of the 1980s, and until recently, educational applications of AI have mainly focused on the knowledge-based approach. The most prominent line of research has been concerned with intelligent tutoring systems, or ITS.[13]These systems have traditionally used the knowledge-based approach, now commonly known as "gofai" (good-old-fashioned-AI). They have been successful mainly in relatively limited and unambiguous domains, such as mathematics and physics. As student behaviour and learning can also be monitored in ITS environments in great detail, intelligent tutoring environments have also been an important source of data for research on learning. The difficulty in developing ITS for broad learning domains has also switched the focus to the more narrow problem of using AI and machine learning to generate teacher interfaces for student and learning monitoring, and learning diagnostics. This is commonly known as learning analytics and educational data mining (EDM).[13]

Fig. 3.1.1 Use of AI in Education [9]

3.2 Healthcare

AI or machine learning is certainly going to carter greater services in the healthcare sector. The implementation of the advanced technologies in the healthcare sector is a bliss for the society as it will help ease all the challenges. The AI-based applications are useful in understanding medical data and reaching the right conclusion without direct human input. These applications are applied in diagnosis processes, treatment protocol development, drug development, personalized medicine, and patient monitoring and care.[16]

3.3 Military

Some robots work autonomously or remote-controlled which are specifically designed for military applications. Such intelligent systems are currently being researched by a number of militaries related members. Already remarkable success has been achieved with unmanned aerial vehicles (UAV) like the predator, which are capable of doing Surveillance photographs, and even accurately launching pilotless missiles at ground targets. A subclass of these is unmanned aerial combat vehicles, which are designed to carry out strike missions in combat. The military forces of the future will use multi-agent robotic workforces for reconnaissance and surveillance, logistics and support, communications infrastructure, forward-deployed offensive operations, and as tactical decoys to conceal manoeuvre by manned assets .[3]

3.4 Entertainment

The media and entertainment landscape is changing. From the creative process behind the scenes, to content delivery and audience engagement, artificial intelligence (AI) is having a profound effect on the industry. [17]
AI or machine learning has brought a big change in the entertainment industry. Of late, we can consume the media when we want, where we want and how we want, thanks to the emerging technologies. AI is everywhere and it is making a big difference in our lives. When it comes to the entertainment, the algorithms being used by various applications make our life much simpler. AI has really changed the entertainment industry and it will make it more lively in the days to come.[16]
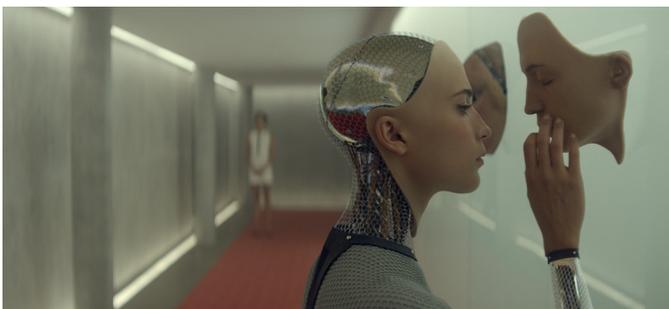

Fig. 3.4.1   AI in Entertainment industries [19]

3.5 Space

In recent years, our exploration of the Solar System has involved more orbiters and rovers than human astronauts. This

trend should continue in the future and this is why we need more 'intelligent' or autonomous robots. But of course, these robots will be controlled by advanced on-board software. Planetary aerobots could transform the way we explore those planets and moons which support an atmosphere. Traditional orbiters offer a 'bird's eye view' of the planet, covering vast swathes of land, with limited resolution. On the other hand, rovers or Landers provide a highly detailed characterization of their local surroundings. Bridging this gap, the planetary aerobat can travel large distances whilst at an altitude which allows for the acquisition of extremely high resolution images. The following is the image of rovers and Exomars that are using AI:[3]

Fig. 3.5.1   An artist's concept illustrates what the Mars rover Curiosity will look like on the Red Planet [18]

3.6 Banking

Banks and other financial institutions have been showing interest in the adoption of AI or machine learning. It has a huge impact on the business and commerce of the banking industry. Many major banks across the world have implemented these emerging technologies for the automation and use these are powerful tools for their effective operations. The technologies have been successful in equity capital market and help the organizations in the enhancement of their organizational structure. The implementation of the AI in the banking helped in the payment efforts and reduced complex process through simple chatbots conversation to continue the operations without any hassles. Some leading banks also used the AI technology in the field of intelligent virtual assistant to improve their customer services. While some financial institutions have been using to prevent fraud and monitor potential threats to customers in commerce.
[16]

4. FUTURE PREDICTIONS FOR AI

There is a great increase in the discussion about the importance of AI in the recent time leading to future discussions about the existence of Artificial Intelligence in the world.
The idea of creating AI is aimed at making human life easier. However, there is still a big debate about advantages and disadvantages of AI in the whole [14][15]. With the introduction and successful implementation of Artificial

Intelligence (AI) solutions, many industries in the world are and will benefit from increased profitability and will still have good economic growth rates. In addition, artificial Intelligence opportunities will be aiming at innovative, human centered approaches and measuring the applicability of robotic technology to various industries and companies in the entire world. Artificial Intelligence will also revolutionize the way different companies in the world grow and compete by representing new production ideas that will derive profitability in businesses . So as to realize such opportunities, it will require most of the companies in the world to become more active in the development of various Artificial Intelligence strategies such as placing human factors to central nucleus. In addition, they will focus on developing various responsible Artificial Intelligence machines having moral and ethical values which will result into positive results and empowerment of people to do things that they are well versed with. Construction of various Artificial Intelligence systems will help the entire world to industrial sector to presuppose the available symbolic structures such as, the ability to reason and also knowledge existence. In addition, at the time Artificial Intelligence acquires intelligence greater or equal to that of human beings, there will be a concern about social and political change .In furthermore, AI will have all the advantages of colonize the world without the help of human beings. In the near future, self-replicating AI could be made where human colonies beyond the earth will never have potentials to fight in the free space with critical terms. The future Artificial Intelligence in various regions in the world may be as a result of various investigation technologies such as stellar travel, teleportation and others.[14]

5. CONCLUSION

In this paper ,we have studied about the various applications and uses in this field of artificial intelligence. This review does not contain all literature in this field. Need of AI in this running times is growing so fast as it is being used in many fields like military, medicine, space, education, etc as discussed in the paper. It can be concluded that on one hand it have more advantages but on the other hand it also have disadvantages .Like, at places where AI systems are in use the person there is replaced by a machine. Whereas, this revolutionary increase will provide the employment to the programmers, scientists etc.   AI is definitely a continue learning process. AI is mainly responsible for the digitalization in the world.Future of AI is vast ahead. The best out of AI is yet to come.

REFERENCES

[1]. K. HemaShankari , Dr. R.Thirumalaiselvi,” A Survey on Using Artificial Intelligence Techniques in the Software Development Process”, ISSN : 2248-9622, Vol. 4, Issue 12(Part 6), December 2014, pp.24-33

[2]. JIAYING LIU1, XIANGJIE KONG 1, (Senior Member, IEEE), FENG XIA 1, (Senior Member, IEEE), XIAOMEI BAI 2, LEI WANG1, QING QING1, AND IVAN LEE3, (Senior Member, IEEE),” Artificial

Intelligence in the 21st Century”, Digital Object Identifier 10.1109/ACCESS.2018.2819688

[3]. Dr. K. F. Bharati,” A Survey on Artificial Intelligence and its Applications”, An ISO 3297: 2007 Certified Organization, Vol. 5, Issue 6, June 2017

[4]. E. S. Brunette, R. C. Flemmer and C. L. Flemmer,” A Review of Artificial Intelligence”, Proceedings of the 4th International Conference on Autonomous Robots and Agents, Feb 10-12, 2009, Wellington, New Zealand

[5]. Shruthi Anand, “Artificial Intelligence – Literature Review”

[6]. Steve Chien, Robert Morris,” Space Applications of Artificial Intelligence”, ISSN 0738-4602

[7]. Mahind Rupali1, Patil Amit,”A Review Paper on General Concepts of “Artificial Intelligence and Machine Learning”, IARJSET, Vol. 4, Special Issue 4, January 2017, ISSN (Online) 2393-8021 ISSN (Print) 2394-1588

[8]. Dr. P. Harini,” Supervised Learning using Artificial Intelligence Methodologies”, Vol. 10, 04-Special Issue, 2018

[9]. https://www.vostory.com/applications-and-uses-of-artificial-intelligence-in-education/

[10]. Samta Tembhekar, Monika Kanojiya,” A Survey Paper on Approaches of Natural Language   Processing (NLP)”, ISSN: 2454-132X Impact factor: 4.295 (Volume3, Issue3)

[11]. Kajaree Das1, Rabi Narayan Behera2,” A Survey on Machine Learning: Concept, Algorithms and Applications”, Vol. 5, Issue 2, February 2017

[12]. https://www.pwc.in/assets/pdfs/consulting/technology/data-and-analytics/artificial-intelligence-in-india-hype-or-reality

[13]. Tuomi, I. The Impact of Artificial Intelligence on Learning, Teaching, and Education. Policies for the future, Eds. Cabrera, M., Vuorikari, R & Punie, Y., EUR 29442 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-97257-7, doi:10.2760/12297, JRC113226.

[14]. Jahanzaib Shabbir, and Tarique Anwer,” Artificial Intelligence and its Role in Near Future”, JOURNAL OF LATEX CLASS FILES, VOL. 14, NO. 8, AUGUST 2015

[15]. Vincent C. Müller & Nick Bostrom,” Future Progress in Artificial Intelligence: A Survey of Expert Opinion”,

[16]. https://learntechx.com/blog/

[17]. https://insidehpc.com/2018/09/ai-changing-entertainment-industry/

[18]. https://www.space.com

[19]. https://snakkomtro.com/hva-er-da-et-menneske-2/

[20]. https://jsfeeds.com/details/neural-networks-in-javascript-5a37a3e104959cec4923fa1d