The role of Artificial Intelligence in future technology

Abstract — *Artificial Intelligence is the branch of Computer Science which simulates the human intelligence processed by Machines and Computer Systems. In this essay we begin with introducing the field of Artificial Intelligence, its origin, development throughout the history. We then move on to explore its role on some less mainstream fields and industries which are not related to Information technology and Artificial Intelligence along with its advancements and evolution in these fields. The essay will discuss new products, tools and applications developed powered by AI along with current research going on in application of AI in these industries. We will also highlight some limitations alongside positive development of AI. In conclusion, we describe several current areas of research within these field and recommendations for future research.*

Keywords: Artificial Intelligence, SIRI, CORTANA, Agro Tech, Unmanned aeronautical vehicles, Amplified Intelligence, Machine Learning, Deep Learning, Precision Medicine, Smart Microgrids, Renewable Energy.

INTRODUCTION

The term 'Artificial Intelligence' has been the buzz word since it's inception in 1956 when it was coined by an American Scientist John McCarthy and since then, there has been significant advancements in this field. From the development of 'Shakey' the first general-purpose mobile robot in 1969, 'Deep Blue' the supercomputer designed and developed by IBM in 1997 which defeated the World Chess champion in a match, and developing a vaccine during the early stages of the SARS-CoV-2 (COVID-19) pandemic by using an Artificial Intelligence Algorithm developed by Baidu 'LinearFold AI algorithm' which predict the RNA sequence of the virus in only 27 seconds, which is 120 times faster than other conventional methods. [1]

AI has been adopted rapidly by multiple industries around the world such as Finance, Healthcare, Defence, Real Estate etc in order to address the increasing competition, reduce the cost, manage human resource. Covid-19 pandemic has also impacted the pace of adoption of AI technologies and many firms are looking towards AI to position them to be more competitively stronger than they were before. It has been predicted that AI technologies will increase global economic output by $13 trillion by 2029. [2]

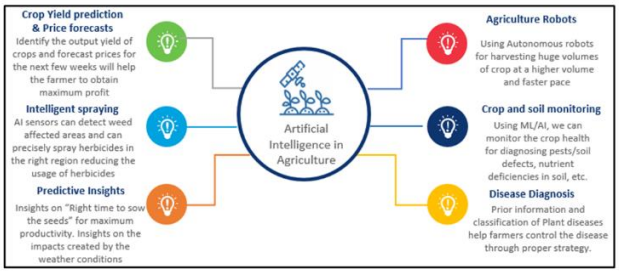
Today, artificial intelligence has become a valuable part of human life. Products ranging from Voice Assistants such as 'SIRI', 'CORTANA' to Self Driving Cars and Facial Recognition technologies to Language Translation tools, human life has been surrounded by AI driven products.

AI being more closely related to the field of Information Technology has transformed IT business operations and their daily activities and operations by replacing traditional methods of computing and has proved to be a boon to this industry [3]. IT systems have improved with Enhanced quality assurance, Improved Server Optimization, Better Application Deployment, More Secure Systems and intensified Automation specially in the field of Robotics.[3]

As more and more industries are turning towards AI, let us have a look at how AI will play it's role to change technologies in future.

AI in Farming Indutry

Agriculture is one of the mainstay occupation of people in many countries in the world and with the current trend in the increment of population, there will be a huge gap in demand supply of crop production. As per UN projections there will be only an extra 4% of land, which will come under cultivation by 2050 [4], thus AI has been amalgamated with traditional methods to innovate the various steps of lifecycle of agriculture such as crop yield, irrigation, soil content sensing, crop- monitoring, weeding, crop establishment [5].



[IMG 1]

Agro tech companies are investing heavily in research and development of AI powered products to address the challenges faced by farmers in various steps like crop yield, irrigation, soil content sensing, crop- monitoring, weeding, crop establishment. Products such as Unmanned aeronautical vehicles (UAVs), Chat bots, AI integrated Applications, Smart spraying devices has proved to be fruitful. As more and more awareness is created people are showing the positive response to AI powered devices. It has been predicted that by 2050, the average farm is expected to generate an average of 4.1 million data points everyday. [5]

'Plantix', an application developed by a German based startup PEAT which identify the nutrient deficiencies in soil including plant pests and diseases using Image Recognition based technology. [6]

Although composition of AI in agriculture has proved to be a boon for this industry but this has resulted in the loss of employment for labour workers, especially in rural areas where majority of the population depends on labour based activities.

AI in Fashion Industry

The fashion industry is one of the biggest in the world with a market size of $ 3 trillion as of 2022, with increasing competition and to keep up with latest trends, companies are investing heavily to amalgamate AI with their existing infrastructure.[7]

AI is playing a crucial in various from design to manufacturing, logistic supply chain and marketing, AI in fashion is playing a big role in transforming this industry.[7]

The popular clothing brand H&M combing both analytics and AI with human intelligence to use what is known as "Amplified Intelligence." Stitch Fix company is using the data from customers and clients to create more accurate results for the user.

Techniques of Machine Learning and computer vision are being for apparel manufacturing, design and distribution, fabric production and various other subdivisions and departments.

[IMG 2] Smart Mirror

AI-powered smart mirror is used by the retailer store simplifying the shopping experience of the customers with virtual visualization of clothes and how they look on you even without putting the clothes actually on your body. iLUK is an AI based personal stylist which is usually placed outside retail stores, it uses the Computer Vision-based and 3D Reconstruction technology at its heart to make personal styling.[8]

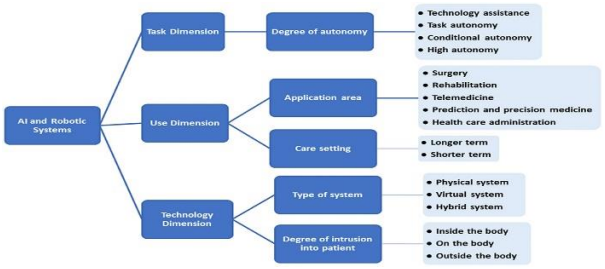
AI in Healthcare

Medical Science has improved rapidly in the 21st century, increasing life expectancy of a person around the world. AI has also played pivotal role in development of this field, with recent development of AI in healthcare made us wonder whether AI tools will replace human doctors. It would be possible with Strong AI but with current weak AI, such tools can assist human physicians to achieve better results and accuracy in medical field. [9]

Machine Learning, a subdomain of AI is most widely used in healthcare to make predictions by learning from huge chunk of data. ML is specially used in 'precision medicine' in which is predicting what treatment protocols will success on a given patient, and this is determined based on past data of patients. [10]

AI is proving to be helpful in mining medical record of a patient, designing treatment plans, forecasting health events, predicting epidemics and pandemics. During the time of covid-19 pandemic, AI was used for preliminary screening of COVID-19 cases, containment of coronavirus, drug development. [11]

Image 3 below demonstrates the practical use of AI in healthcare.



[IMG 3]

Prediction of coronavirus just from using chest x-ray images proved to be helpful for healthcare workers, eliminating the physical contact with patient. The model prepared using Deep transfer learning demonstrated the specificity rate of around 90% which was highly encouraging. [12]

Several AI powered applications have been developed and doing in the market, one such application is the app 'Ada Health Companion' which uses AI to operate a chat-bot, which combines information about symptoms from the user with other information to offer possible diagnoses.[13]

Despite the positive development of AI in the field of AI the path for adoption of AI driven healthcare is filled with a lot of challenges. The unstructured data sets, interoperability issues, lack of open sets of medical data, inadequate analytics solutions which could work with big data, limited funds, inadequate infrastructure, lack of manpower skilled in AI, regulatory weaknesses, inadequate framework and issues related to data protection are some of the key challenges for AI-driven healthcare.[11]

AI in Renewable Energy Sector

As the market is growing on rapid rate and so is the competition, with new innovations and technologies coming up companies are finding it difficult to cope up with traditional methods. During the energy crisis in 1970s, people started to look towards renewable sources of energy as the risk of running out of conventional fuel summed up. [15]

As the world is turning towards renewable energy systems Traditional model-based methods will be difficult to address the analysis, scheduling and control problems of future renewable energy systems [14]. With the development of smart grids, energy operators has gathered more and more data which is used by AI devices to deal with complex problems.

Some of the application of AI in RE sector are 'Smart Match of Supply with Demand' by forecasting the energy demand for a better adjustment to peaks enabling continuous energy exchange between consumers and providers [15], 'Intelligent Storage' to RE project maximize the return on investment and increase flexibility for fluctuant demand and changing renewable inputs due to climate conditions. It also solves the problems of volatility of renewable and of cyclical evolution of demand [16]. One of the important application of AI is the development of 'Smart Microgrids', increasing the efficiency, cost effective, performing predictive analysis and real time storage dispatch [16].

Conclusion

This essay discussed the role of Artificial Intelligence in some less mainstream technologies where AI is proving to be a boon by creating a positive impact on those industries by improving revenue, profits, security, labour involvement. While developments in use of AI is still in nascent stage in these industries, on the other hand, in certain mainstream industries like Finance sector [17], Real estate [18], Cybersecurity [19], Education [20], Transportation [21], even in Art & Music [22] in which artistic images and music is developed using artificial intelligence algorithms and devices. It is evident that AI has given a lot of advantages to the world enabling the population to multi task in less time with much greater efficiency but that has been achieved at the cost of loss of employement specially in low level labour workers who has been displaced by AI and AI powered tools.

Following the current trend and effort in research, possibilities are there that Strong AI which is 'intelligent machines that are indistinguishable from the human mind' would be developed by the of this century.

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