ARTIFICIAL INTELLIGENCE (AI) IN SUSTAINABLE RURAL DEVELOPMENT

[1]Mr. Dhiraj V. Mankar, [2]Mr. Sumit S. Jamkar, [3]Mr. P. R. Jakhotiya
Student, Mechanical Engineering Department, Sipna COET, Amravati, Maharashtra, India[1], Assistant Professor, Mechanical Engineering Department, Sipna COET, Amravati, Maharashtra, India[2], Assistant Professor, Mechanical Engineering Department, Sipna COET, Amravati, Maharashtra, India[3]

ABSTRACT

Sustainable rural development involves a holistic approach where daily basic needs of rural populations must be covered by reliable public utilities combined with technical, socioeconomic, and environmental conditions to support regional economies and urban-rural linkages. Sustainable rural development is vital to the economic, social and environmental viability of nations. It is essential for poverty eradication since global poverty is overwhelmingly rural. Today's era is considered as an age of science, technology, communication, intelligence, education and economy. The human being is tried to develop the society by implementing and adapting these concepts, especially in villages, city and town and turn them into Smart Village, Smart city and Smart Town. So, the objective of this report is to discuss role and the impact of artificial intelligence in rural areas for the development purposes, which is also known as villages. This paper puts light on how to develop the rural areas by implementing various technology related to AI and ML. In this paper we are going to consider some main areas which plays major role in sustainable rural development which are as education, agri-sector, healthcare system, e-commerce and connectivity. Artificial intelligence is considered the future of technology and digitalization. Its capacity to contribute to almost every sector of the industry offers many possibilities for governments and society to grow. That is why, many businesses around the globe have incorporated this technology into their procedures, products and services. The pursuit of this technological development has reached governments. Because of that, they are now trying to implement Artificial Intelligence in fields like healthcare, education, economy or agriculture. There is no doubt AI will be an essential foundation in the future of every country.

Keyword : - Artificial Intelligence (AI), Sustainable Development, Education, Healthcare, Agriculture, Development, etc.

1. INTRODUCTION

Artificial intelligence is not a strange term for everyone today. The idea of AI has existed for a long time. Alan Turing first conceptualized AI in his 1950 article ''Computing Machinery and Intelligence,'' in which he introduced the ideas of machine learning, genetic algorithms, reinforcement learning, and the Turing test. In 1956, John MacCarthy, an American computer scientist invented the word "Artificial Intelligence" when he organized the Dartmouth Conference. Artificial intelligence's practical applications nowadays appear everywhere in the office, the bank, the hospital, the factory, the internet and even in outer space. As everyone can see automated robots, voice recognition, self-driving car, satellite navigation systems are all the phenomena based on artificial intelligence techniques. Artificial intelligence seems like a wide area but nowadays people focus on using its applications in narrow areas such as in healthcare, biology, information technology as well as in business. Artificial intelligence (AI) is a rapidly developing field of computer science that uses computers to simulate human learning, memory, analysis, and even innovation, which usually require human intelligence. As considering the statistical view, in India there are 29 states and 7 Union Territories which consists of 725 districts that includes 649481 villages. Out of 133.92 cr. of population in India, 69% is from rural areas and remaining 31% from urban areas approximately as per Census. From this figure it is clear that rural areas are suffering more from livelihood and requires development by improving themselves in various fields like education, economy, science, technology, communication, networking etc. The government already recognized

these and deals with these issues by providing the concept of rural development called as Smart Villages. Rural development concept mainly focuses on basic amenities, infrastructure and livelihood. The world's population is assumed to be nearly 10 billion by 2050,boosting agricultural order-in a situation of humble financial development by somewhere in the range of 50% contrasted with 2013(FAO, 2017). At present, about 37.7% of total land surface is used for crop production. From employment generation to contribution to National Income, agriculture is important. It is contributing a significant portion in the economic prosperity of the developed nations and is playing an active part in the economy of the developing countries as well. The augmentation of agriculture has resulted in a significant increase in the per-capita income of the rural community. Thus, placing a greater emphasis on agricultural sector will be rational and apposite. For countries, like India, the agricultural sector accounts for18% of GDP and provides employment to 50% of the country's workforce. Development in the agricultural sector will boost the rural development, further leading toward rural transformation and eventually resulting in the structural transformation (Mogili and Deepak, 2018; Shah et al., 2019). Surprisingly, agriculture, though being the least digitized, has seen momentum for the development and commercialization of agricultural technologies. Artificial Intelligence (AI) has begun to play a major role in daily lives, extending our perceptions and ability to modify the environment around us (Kundalia et al., 2020; Gandhi et al., 2020; Ahir et al., 2020). With this emerging technologies the workforce which were restricted to only a minimal industrial sectors are now contributing to numerous sectors. In today's date, it has become very common to see machines and robot performing the daily simple and mundane tasks of humans to make their lives easier. Artificial Intelligence has become an indispensable part of people's life. It is AI which allows a business to investigate in real-time and bring more efficiency in their work and also helps in countries safety and security. It can be said that in today's date ecommerce is one such industry which is using Artificial Intelligence at its best by generating huge customer base, understanding customer needs, doing real-time research, coming with end solutions to problems and a lot more.

2. LITERATURE SURVEY

2.1 Artificial Intelligence in Agriculture

Agriculture plays a significant role in the economic sector. The automation in agriculture is the main concern and the emerging subject across the world. The population is increasing tremendously and with this increase the demand of food and employment is also increasing. The traditional methods which were used by the farmers, were not sufficient enough to fulfill these requirements. Thus, new automated methods were introduced. These new methods satisfied the food requirements and also provided employment opportunities to billions of people. Artificial Intelligence in agriculture has brought an agriculture revolution. This technology has protected the crop yield from various factors like the climate changes, population growth, employment issues and the food security problems. This main concern of this paper is to audit the various applications of Artificial intelligence in agriculture such as for irrigation, weeding, spraying with the help of sensors and other means embedded in robots and drones.

2.2 Emerging Roles of Artificial Intelligence in ecommerce

Artificial Intelligence also is known as AI is one of the widest and popular branches of computer science in today's date which involved creating and building smart machines. These smart machines are constructed with a purpose that they will be able to perform the actions which can be performed by human intelligence. It can be said with full confidence that artificial intelligence is a concept which is known to everyone. We can also say the concept of Artificial Intelligence is used in the home for purposes such as e-learning and e-commerce as well. There is hardly any domain which is left unaffected by artificial intelligence. We can say that artificial

intelligence is all around us starting from the department store you visit for grocery having self-checkout cash counters to huge shopping malls and airports having best and advance security systems. Apart from this, the use of AI has also been included in the education system, offices, etc.

2.3 Impact of AI on Rural Development

AI has the power to change the scenario of all problems with the effective and sustainable solutions in every sector which is majorly responsible for sustainable rural development. Artificial intelligence used to make our machines smart, intelligent and human like and it seems to be the future of technology. It can significantly contribute towards the development of a country, if efforts are taken in this direction. Our country's future greatly depends on AI. With the advent of this technology; there is a great focus on how it can impact the way people access their healthcare services. AI still finds its way in emerging markets, but certain applications have emerged and are now widely used. For instance, predictive models for disaster relief enable first responders to automatically analyze large-scale behavior and movement through multiple sources of data including social media platforms, web forums, news sources, etc.

3. ROLE OF AI IN MAIN SECTOR OF SUSTAINABLE RURAL DEVELOPMENT

3.1 Education

Artificial Intelligence is an emerging technology that started modifying educational tools and institutions. Education is a field where the presence of teachers is must which is the best educational practice the advent of Artificial Intelligence changes the teacher's job who are irreplaceable in the education system. The AI uses mainly advanced analytics, deep learning and machine learning for monitoring the speed of a particular individual among the others. As the solutions in AI continue to get to higher level it helps to identify the gaps in teaching and learning and increases the proficiency of education. AI can drive efficiency, personalization and streamline admin tasks to allow teachers the time and freedom to provide understanding and adaptability-uniquely human capabilities where machines would struggle. With the combination of machines and teachers it is possible to pull out the best results from students. Almost AI impacts every area of our life in the future and out of all those Education sector will be impacted hugely because teaching and learning is a major part of life and the current education system has a lot of changes to be desired. The schooling in olden days are not as flexible as what the future AI in education will present. The teachers that play the most important role in education system are not scalable and are expensive as well. In some of the countries teachers are given a heavy load of paper work and are undervalued. AI can help each individual separately by giving them separate curriculum based on their interest and skill assessments.

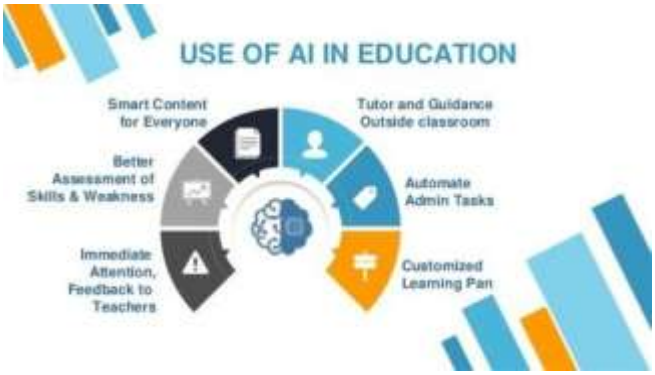

Fig -1: Use of AI in Education

3.2 Agri-Sector

The technologies which are AI-based help to improve efficiency in all the fields and also manage the challenges faced by various industries including the various fields in the agricultural sector like the crop yield, irrigation, soil content sensing, crop- monitoring, weeding, crop establishment (Kim et al., 2008). Agricultural robots are built in order to deliver high valued application of AI in the mentioned sector. With the global population soaring, the agricultural sector is facing a crisis, T. Talaviya et al. / Artificial Intelligence in Agriculture 4 (2020) 58–73 59 but AI has the potential to deliver much-needed solution. AI- based technological solutions has enabled the farmers to produce more output with less input and even improved the quality of output, also ensuring faster go-to- market for the yielded crops. By 2020, farmers will be using 75 million connected devices. By 2050, the average farm is expected to generate an average of 4.1 million data points every day.

The various ways in which AI has contributed in the agricultural sector are as follows:

3.2.1 Image recognition and perception

Lee et al. (2017) said that in recent years, an increasing interest has been seen in autonomous UAVs and their applications including recognition and surveillance, human body detection and geo-localization, search and rescue, forest fire detection (Bhaskaranand and Gibson, 2011; Doherty and Rudol, 2007; Tomic et al., 2012; Merino et al., 2006). Because of their versatility as well as amazing imaging technology which covers from delivery to photography, the ability to be piloted with a remote controller and the devices being dexterous in air which enables us to do a lot with these devices, drones or UAVs are becoming increasingly popular to reach great heights and distances and carrying out several applications

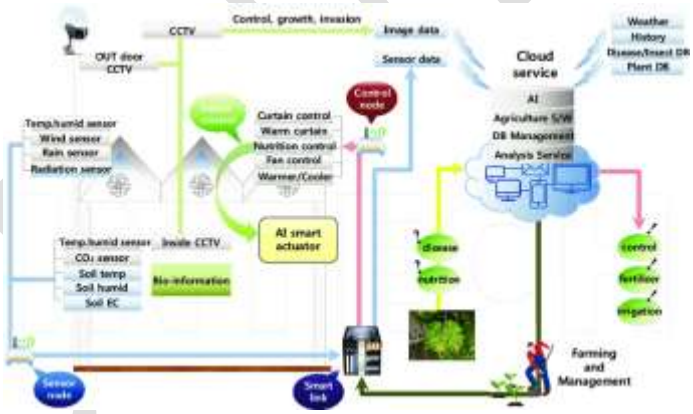

Fig -1: Application of AI in Agriculture

3.2.2 Skills and workforce

Introduction related your research work Panpatte (2018) said that artificial intelligence makes it possible for farmers to assemble large amount of data from government as well as public websites, analyze all of it and provide farmers with solutions to many ambiguous issues as well as it provides us with a smarter way of irrigation which results in higher yield to the farmers. Due to artificial intelligence, farming will be found to be a mix of technological as well as biological skills in the near future which will not only serve as a better outcome in the matter of quality for all the farmers but also minimize their losses and workloads. UN states that, by 2050, 2/3rd of world's population will be living in urban areas which arises a need to lessen the burden on the farmers. AI in agriculture can be applied which would automate several processes, reduce risks and provide farmers with a comparatively easy and efficient farming.

3.2.3 Maximize the output

Ferguson et al. (1991) said in his wok that Variety selection and seed quality set the maximum performance level for all plants. The emerging technologies have helped the best selection of the crops and even have improved the selection of hybrid seed choices which are best suited for farmer's needs. It has implemented by understanding how the seeds react to various weather conditions, different soil types. By collecting this information, the chances of plant diseases are reduced. Now we are able to meet the market trends, yearly outcomes, consumer needs, thus farmers are efficiently able to maximize the return on crops.

3.2.4 Chatbots for farmers

Chatbots are nothing but the conversational virtual assistants who automate interactions with end users. Artificial intelligence powered chatbots, along with machine learning techniques has enabled us to understand natural language and interact with users in away more personalized way. They are mainly equipped for retail, travel, media, and agriculture has used this facility by assisting the farmers to receive answers to their unanswered questions, for giving advice to them and providing various recommendations also.

3.3 Healthcare System

AI in clinical decisions with the rapid development of medical technology, new research information has been produced faster and faster. The amount of information within the medical literature doubles every 3 years. It is estimated that if a physician wanted to stay completely up-to-date, he/she should read 29 h per workday. As such, it is not possible to rely solely on humans to keep up with it. In addition, big data, including EHRs, ''omic'' data (e.g., genomics, metabolomics, and proteomics), and socio-demographic and lifestyle-related information would be of no use without comprehensive analysis. We would like to say that AI technology is the only solution. IBM Watson is one of the leading AI healthcare support systems that can assist doctors in making efficient decisions. With its machine learning and natural language processing capabilities, this system helps doctors review patients' EHRs and further search related medical research publications and guidelines. A double-blind study compared the decisions made by a tumor board with the one made by the Watson Oncology system. The results showed that 90% of the recommendations made by the system were concordant with the ones made by the tumor board, but the system only took 40 sec to complete the process. AI in EHRs In 2009, the United States Department of Health and Human Services started to encourage the adoption of EHRs. However, the implementation process has been challenging. The major barriers include low satisfaction with the system, interoperability problems, and lagging adoption in solo practices and non-primary care practices. Now EHR documentation has become one of the most time-consuming tasks in healthcare facilities. Deliberato et al. suggested that AI technology could help healthcare providers collect, store, reformat, and trace clinical data, as well as develop personalized assessments and plans. AI in diagnosis Diagnostic errors are a serious threat to healthcare quality and safety. It is estimated that the rate of outpatient diagnostic errors is 5.08% in the United States, which is *12 million adults every year. About half of these errors could potentially be harmful. Over prescription of antibiotics is also a very common problem, especially in developing countries, caused by insufficient training of health workers. Introduction of medical AI technology into healthcare management systems might help to identify unnecessary diagnoses and treatments. As per the information and the revolution done by AI in healthcare system we must adopt the technology in all areas which directly and indirectly help for sustainable rural development.

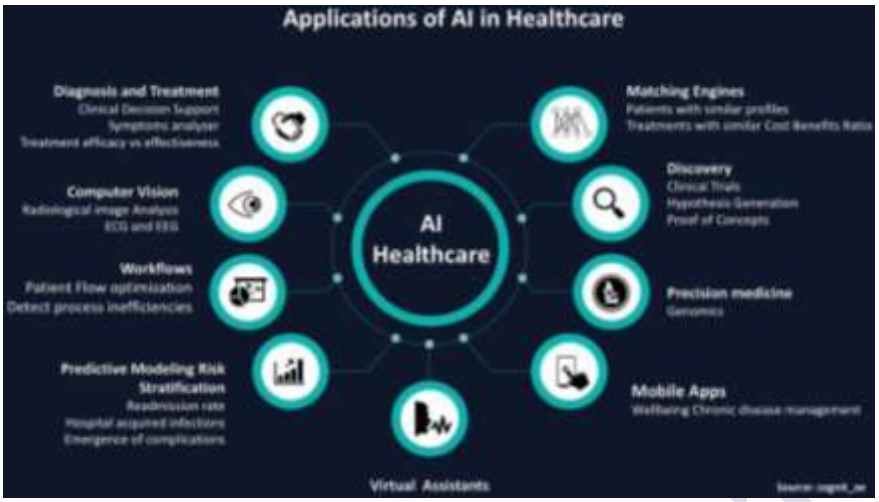

Fig -1: Application of AI in Healthcare

3.4 E-commerce and Connectivity

work One can see AI in the ecommerce industry as chat bots, CRM, ERP, Product Content Management (PCM) and so much more. CRM is a very important part in the ecommerce industry because it is possible through the CRM platform only that one can study the customer's buying trends, etc. In detail to form best and profiting predictions for better accuracy and better results. In today's date It has only become possible with the help of AI that one can easily transfer, use and share huge volumes of data which is used for observing the customer buying trends, choices, factors which affect their buying decision, etc. So that proper and secure engagement can be ensured. Artificial Intelligence helps to achieve the sales goals. There is no hiding to the fact that if the sales are on the right path it is just because of technology like AI, ecommerce is a field which is all dependent on sales. This is the reason why Artificial Intelligence is used here as it can help the ecommerce companies to find a clear perspective which can ensure higher sales and a whole customer journey process. With Artificial Intelligence one can know about the satisfaction of the customers and how to address the needs and requirements of the customers irrespective of the time and situation. AI helps in automation. Most people think that by the word automation we mean to say that the robots are going to take over all the things which are performed by humans. However, the actual meaning of automation is that it helps the businesses by allowing them to understand what their customers want despite the time gap/constraint. With the help of Artificial Intelligence, sales representatives from across the globe can connect easily and work together and connect with customers as much as possible to ensure the best customer experience and high sales. AI is everywhere, considering the development and involvement of Artificial Intelligence in the ecommerce industry, it can be said that by the end of 2021, about 90% of the customer interactions will be dealt and handled without the humans. Acknowledging the innovation and development which AI has bought in the field of ecommerce, it can be said that business will see a drastic positive change like never before. Ecommerce portals such as eBay, Flipkart, Amazon, etc. is making use of the Artificial Intelligence effective to grow their business.

Fig -1: Application of AI in E-Commerce

CONCLUSIONS

On the basis of above information we can say that Smart Villages are the need of the hour as development is needed for both rural and urban areas for better livelihood and Information technology will offer effective solution. There are successful technologies available, which have been implemented in urban areas. As per the information in paper there is no one sector or part in industry which is not get affected by Artificial Intelligence and the technology is future for sustainable rural development for sure. From the education, agriculture, healthcare, to e-commerce all the sector are in good control of artificial intelligence and we need to adopt the technology as the government also taking initiative to introduce today's youth to all new technology for being part of sustainable development. As the new technology are playing vital role in sustainable development in rural as well as in urban areas, an educated rural youth will be an asset rather than a burden as is happening now. India needs educated population and not literate but uneducated otherwise all the smartness and development of villages or cities will result in failure.

REFERENCES

1. Smruti Smaraki Sarangi1* , Gyanendra Singha A Survey on Impact of AI and Social Media for Rural Development Vol.-7, Special Issue-11, May 2019 International Journal of Computer Sciences and Engineering
2. Vishal Dineshkumar Soni Emerging Roles of Artificial Intelligence in ecommerce International Journal of Trend in Scientific Research and Development (IJTSRD) Volume 4 Issue 5, August 2020 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470.
3. A.S. Noor Nawaz1*, Hasansab A. Nadaf2 , Abdul Kareem M.3 and Nagaraja H. Application of Artificial Intelligence in Agriculture-Pros and Cons Vol-1 Issue-8 Nawaz et. al. (2020)
4. B. V. A. N. S. S. Prabhakar Rao, Kadupukotla Satish Kumar, P. Sundeep B. V. A. N. S. S. Prabhakar Rao, Kadupukotla Satish Kumar, P. Sundeep International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-9 Issue-3, January 2020.
5. Abdullahi, H.S., Mahieddine, F., Sheriff, R.E., 2015. Technology Impact on Agricultural Productivity: A Review of Precision Agriculture Using Unmanned Aerial Vehicles. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, pp. 388–400.
6. Anthony, D., Elbaum, S., Lorenz, A., Detweiler, C., 2014. On crop height estimation with UAVs. 2014 IEEE/RSJ International Conference on Intelligent Robots and Systems. https://doi.org/10.1109/iros.2014.6943245.

7. Grace, Katja, John Salvatier, Allan Dafoe, Baobao Zhang and Owain Evans. 2018. Viewpoint: When Will AI Exceed Human Performance? Evidence from AI Experts. Journal of Artificial Intelligence Research 62: 729–54.Hobdaya, A. J., Smitha, A.D.M., Stobutzki, I. C., Bulman, C., Daleya, C. R., et al. 2011. Ecological risk assessment for the effects of fishing. Fisheries Research 108 (2011) 372–384.
8. Rao, Diet Expert Advisory System, International Journal Of Computer Applications In Engineering, Technology And Sciences (IJ-CA-ETS), April '11 – Sept '11, Vol 3: Issue 2) Pp. 282-287.