Airo International Research Journal
ISSN: 2320-3714
June 2020, Volume: 22 , Issue 1

A Review on usefulness of Artificial Intelligence(AI) in Agriculture

MISS GURBINDER KAUR

ASSISTANT PROFESSOR IN COMPUTER APPLICATIONS

GURU NANAK COLLEGE, KILLIANWALI

Abstract: Agricultural growth is main concern for every country. Growth of population at fast rate makes it even more important. Traditional methods used in agriculture are not sufficient enough, as with increasing population, demand of agricultural products also increases. Moreover, traditional methods can also affect soil and quality of agricultural products as insecticides and pesticides are used recklessly. So AI and Machine Learning can be seen as starting of another revolution in Agriculture.

Introduction: AI is used in different sectors to improve productivity and efficiency. Challenges in traditional methods are overcome by it. Nowadays, AI is also helping farmers to improve their efficiency and reduce negative impacts on environment. There is quick adaption to AI in its various farming techniques. Many startups in agriculture are adapting AI enabled approach to increase efficiency and productivity in agriculture.

The most popular applications of AI in agriculture fall into three major categories:-

1. Agricultural Robotics
2. Crop and Soil Monitoring
3. Predictive Analysis

Agricultural Robotics:-

Robots are being developed for different sectors. Today companies are developing robots for agriculture to handle various tasks such as harvesting, irrigation etc. Robots can be used in following tasks to increase efficiency and speed of work:-

- **Harvesting**: This is one of the most important task in agriculture. Though with industrial revolution agriculture work was mechanized and turned easy, but now it is automated. As a result, now it is quite efficient and speedy.
- **Irrigation**: It is one of the most labour intensive processes in farming. AI trained machines aware of soil quality, kind of crop and historical weather pattern can automate

Airo International Research Journal
ISSN: 2320-3714
June 2020, Volume: 22 , Issue 1

irrigation and increase overall yield. Such automation benefits farmers in managing irrigation facilities.

Crop and Soil Monitoring:-

AI can provide information to farmer about quality of soil, detection of disease in crop. AI-driven technologies are emerging to help in improving the efficiency in crop and soil monitoring in following ways:-

- **To identify crop readiness**: Farmers can identify crop readiness with help of AI. Images of different crops are captured under white/ultra-violet-A light to determine how ripe the crop is. Farmers can create different level of readiness for different crop category.
- **Disease detection**: Images of crops are capturedand segmented into three areas like background, diseased and non-diseased. The diseased part is sent to remote labs for further diagnosis. It can also identify nutrient deficiency in crop.
- **Field management**: High definition(HD) images are capturedby drone and real-time estimates can be made during cultivation period. Farmers can also identify areas where crop requires fertilizer or pesticides. This leads to resource optimization.
- **Health monitoring of crops**: Crops health is monitored using remote sensing technology. It saves the farmer's time and effort as it detects any disease in crop. This technique may be employed in monitoring crops throughout their lifecycle.

Predictive Analysis:-

AI and Machine Learning techniques are being developed to track and predict various environmental impacts on crop yield such as weather changes. Following techniques comes under this category:-

- Identification of optimal mix for crops: AI solutions recommend the farmers on the best choice of crops and seeds which is based on parameters like soil condition, weather forecast, type of seeds and pest infestations in a specific area. Recommendations are also based on some external factors like crop prices, consumer requirements and market place. Thus by using these recommended solutions, farmers can get better productivity with lesser efforts than before.

Challenges in AI application in agriculture

Though AI offers vast opportunities for application in agriculture, still there are some challenges to implement the same:-

Airo International Research Journal
ISSN: 2320-3714
June 2020, Volume: 22 , Issue 1

- Cost of technology: AI-trained machines have high cost. Small and marginal farmers cannot afford these machines.
- Increase in unemployment: Millions of labourers can be unemployed due to AI-trained machines. For example: sowing and irrigation are labour intensive tasks. But due to usage of machines, it will affect labour employment in negative way.
- Lack of knowledge: There exists a lack of familiarity with High Tech technology in most regions of the world. In spite of development of such advanced technology, usage of this technology can emerge as a challenge.

Conclusion:-

Agriculture will for sure immensely benefit from AI applications. It can be used to create intelligent systems that can be embedded in machines that can work with higher accuracy and speed than humans. Research in this regard is still in progress. Some applications are available that are really fascinating. Still to face aforementioned challenges faced by farmers, there is need of much more research in this area. Only then it will be able to handle frequent changes in external conditions and will facilitate real time decision making.

References:

1. Dharmaraj, V. and Vijayanand, C. 2018. Artificial Intelligence (AI) in Agriculture. Int.J.Curr.Microbiol.App.Sci. 7(12): 2122-2128.
2. RajkumarMurugesan, Dr. S. K. Sudarsanam, Dr. VijayakumarVaradarajan, Dr. G. Malathi, VenkataramanNeelanarayanan, Mr. VenugopalRajaraman, Dr. D. Rekha, “Artificial Intelligence and Agriculture 5. 0”, International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-8 Issue-2, July 2019
3. Lal Mohan Bhar*, Ramasubramanian V., Alka Arora, SudeepMarwaha and RajenderParsad, “Era of Artificial Intelligence: Prospects for Indian Agriculture”, ICAR-Indian Agricultural Statistics Research Institute, New Delhi
4. ArkaBagchi, “Artificial Intelligence in Agriculture”, “To eradicate extreme poverty and hunger” Millennium Development Goal, UN Summit 2000
5. BadiaMelis. R et al., 2016. "Artificial neural networks and thermal image for temperature prediction in apples," Food and Bioprocess Technology, vol. 9 no.7, pp. 1089-1099.
6. Balleda, K et al., 2014. "Agpest: An efficient rule-based expert system to prevent pest diseases of rice & wheat crops," in Proc. Intelligent Systems and Control (ISCO)-2014, IEEE.

7. Capizzi. G et al., 2016. "A Novel Neural Networks-Based Texture Image Processing Algorithm for Orange Defects Classification," International Journal of Computer Science & Applications, vol. 13 no. 2, pp. 45-60.
8. Clark.F.2003. Striking Hypothesis, Human Sci. & Tech. Press, Changsha.
9. Hanson A. M. G. J., Joy. A, Francis. J. Plant Leaf Disease Detection using Deep Learning and Convolutional Neural Network, International Journal of Engineering Science, vol. 7 no. 3, pp. 5324-5328, 2017.
10. Hopfield. J. J. 1982. Neural Networks and Physical Systems with Emergent Collective Computational Abilities, In: Proceedings of the National Academy of Science of the United