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Importance of Artificial intelligence in Agriculture

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Abstract:

The population is increasing tremendously and with this increase the demand of food and employment is also increasing. Artificial intelligence (AI)technology has strengthened agro-based businesses to run more efficiently. AI solutions have the potential to solve the challenges farmers face such as climate variation, an infestation of pests and weeds that reduces yields. AI is being used in applications such as automated machine adjustments for weather forecasting and disease or pest identification. AI implementation emphasis on checking defective crops and improving the potential for healthy crop production.

Keywords: Artificial intelligence, Herbicide, Pesticide, Automation Irrigation.

Introduction:

The population is increasing tremendously and with this increase the demand of food and employment is also increasing. AI 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. Artificial intelligence in agriculture such as for irrigation, weeding, spraying with the help of sensors and other means embedded in robots and drones. AI in agriculture not only helping farmers to automate their farming but also shifts to precise cultivation for higher crop yield and better quality while using fewer resources.

In agriculture AI help farmers to improve their efficiency, reduce environmental hostile impacts, control and manage any uninvited natural condition. Majority of agriculture start-ups are adapting AI enabled approach to increase the efficiency of agricultural production. Artificial intelligence empowered approaches could detect diseases or climate changes sooner and respond smartly. Use of AI in agriculture helps the farmers to understand the data insights such as temperature,

precipitation, wind speed, and solar radiation. The data analysis of historic values, offers a better comparison of the desired outcomes. The best part of implementing AI in agriculture that it won't eliminate the jobs of human farmers rather it will improve their processes. AI technology has strengthened agro-based businesses to run more efficiently. Use applications such as automated machine adjustments for weather forecasting and disease or pest identification. AI can improve crop management practice and have potential to solve the challenges farmers face such as climate variation, an infestation of pests and weeds that reduces yields.

Role of Artificial intelligence in Agriculture:

Weather Forecasted data: The forecasted/ predicted data help farmers increase yields and profits without risking the crop. The analysis of the data generated helps the farmer to take the precaution by understanding and learning with Artificial Intelligence. By implementing such practice helps to make a smart decision on time.

Monitoring Crop and Soil Health: AI is an efficient way to conduct or monitor identifies possible defects and nutrient deficiencies in the soil. Artificial Intelligence identifies possible defects through images captured by the camera and support to understanding soil defects, plant pests, and diseases.

Decrease pesticide usage: AI manage weeds by implementing computer vision, robotics, and machine learning which gathered data to keep a check on the weed which helps the farmers to spray chemicals only where the weeds are present and reduce the usage of the chemical spraying an entire field. Ultimately it reduces the weeds efficiently and also reduce use of herbicide in the field comparatively the volume of chemicals normally sprayed.

Various applications of AI in agriculture such as for irrigation, weeding, spraying with the help of sensors and other means embedded in robots and drones. Idea of efficient and automated irrigation system by developing remote sensors using the technology of Arduino which can increase the production up to 40%. Different sensors were built for different purposes like the soil moisture sensor to detect the moisture content in the soil, the temperature sensor to detect the temperature, the

pressure regulator sensor to maintain pressure and the molecular sensor for better crop growth. The installation of digital cameras. The output of all these devices is converted to digital signal.

Drones in agriculture: Unmanned aeronautical vehicles (UAVs) or unmanned ethereal frameworks (UAS), otherwise called automatons, in a mechanical setting are unmanned aircrafts that can be remotely controlled (Mogli and Deepak, 2018). They work in confluence with the GPS and others sensors mounted on them. Drones are being implemented in agriculture for crop health monitoring, irrigation equipment monitoring, weed identification and wildlife monitoring, and disaster management (Veroustraete, 2015; Ahirwar *et al*., 2019; Natu and Kulkarni, 2016). Remote Sensing with the use of UAVs for image capturing, processing, and analysis is making a huge impact on agriculture. (Abdullahi *et al*., 2015).

a) Drones implemented in agriculture crop

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b) Robot harvesting Tomato crop

Crop monitoring: New sensors mounted on UAV, with high-tech cameras being the eyes of the client on the ground and optimal procedures for survey, data acquisition and analysis are continuously developed and tested. A low-cost multispectral imaging system was designed and developed for application to crop monitoring (De Oca *et al*., 2018). It consists of a microcontroller along with two cameras embedded into the drone. One camera is sensitive to Infrared radiation while the other is a common RGB camera. This system provides images and information which are used by software to compute the NDVI and subsequently the health status of a crop.

Crop monitoring by using artificial intelligence application

Yield mapping and monitoring: Grain yield mapping system include: Grain flow sensor - determines grain volume harvested; Grain moisture sensor (remunerates for grain moisture variability), GPS antenna (receives satellite sign), Yield screen show with a GPS receiver (geo-reference and records information), header position sensor (distinguishes estimations logged during turns), travel speed sensor.

Disease forecasting is essential part of disease controlling system. It is in fact a support system for decision making and provides an indication when the disease is likely to appear and when it goes critic. The prediction of disease outbreak, combined with knowledge of disease epidemiology, allows control measures to be applied in time when they are most effective, reducing cost of production and the impact of fungicides/pesticides on environment.

Challenges:

It is true that many experts are doing research in the field of Artificial intelligence and in future machines will become more and more powerful. But anything which has advantages there exist disadvantages also so there can be ethical issues related to machines. For example, if any machine is made for very sensitive work and did any mistake than who will be responsible. (Mudit Verma, 2018). AI is deep learning models predict the output. It needs specific set of inputs to devise a solution for different kinds of problems is difficult to understand for a layman. Many people in the world don't even know the use or existence of Artificial Intelligence. Mostly people are unaware of, which makes it difficult for them to trust it.

Future scope:

AI solutions have to become more viable to assure that this technology reaches the farming community. AI cognitive solutions are offered in an open-source platform that would make the solutions more affordable, which eventually will result in faster adoption and greater insight among the farmers. Techniques along with hyper spectral imaging and 3D laser scanning are crucial to construct crop metrics over thousands of acres of cultivable land. It has the potential to introduce a revolutionary shift in farmlands are monitored by farmers from the perspectives of both time and effort. AI can be appropriate and efficacious in agriculture sector as it optimises the resource use and efficiency. It solves the scarcity of resources and labour to a large extent. Adoption of AI is quite

useful in agriculture. Artificial intelligence can be technological revolution and boom in agriculture to feed the increasing human population of world.

Conclusion:

Artificial Intelligence driven techniques like remote sensors for soil moisture content detection and automated irrigation with the help of GPS. The problem faced by farmers was that precision weeding techniques overcome the large number of crops being lost during the weeding process. Not only do these autonomous robots improve efficiency, they also reduce the need for unnecessary pesticides and herbicides. Besides this, farmers can spray pesticides and herbicides effectively in their farms with the aid of drones, and plant monitoring is also no longer a burden. For starters, shortages of resources and jobs can be understood with the aid of man-made brain power in agribusiness issues.

References:

Abdullahi F., Mahieddine R E., Sheriff. 2015. Technology Impact on Agricultural Productivity: A Review of Precision Agriculture Using Unmanned Aerial Vehicles. Institute for Computer Sciences, Social Informatics and Telecommunications Engineering. pp. 388-400.

Ahirwar S., Swarnkar R., Bhukya S., Namwade G. 2019. Application of drone in agriculture. Internationl Journal Current Microbiology Applies Science. 8 (1), pp. 2500-2505.

De Oca AM., Arreola L., Flores A., Sanchez J., Flores G. 2018. Low-cost multispectral imaging system for crop monitoring. International Conference on Unmanned Aircraft Systems (ICUAS).

Mogili U M R., Deepak B B V L. 2018. Review on application of drone systems in precision agriculture. International Conference on Robotics and Smart Manufacturing. Procedia Computer Science. pp. 502-509.

Mudit Verma .2018. Artificial intelligence and its scope in different areas with special reference to the field of education. International Journal of Advanced Educational. 3 (1)5-10.

Natu A S., Kulkarni S C. 2016. Adoption and utilization of drones for advanced precision farming: a review. International Journal on Recent and Innovation Trends in Computing and Communication., 4 (5), pp. 563-565.

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Veroustraete F. 2015. The rise of the drones in agriculture. Ecronicon, 2 (2), pp. 1-3.