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Artificial Intelligence in Agriculture-A Review

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Abstract: *India is the agriculture dominated country, everyone is directly and indirectly dependent on agriculture products for everyday needs. the world's population has reached 8 billion and is projected to reach 9.7 billion by 2050, increasing the demand for food production. the application of ai in agriculture has been widely considered as one of the most viable solutions to address food inadequacy and to adapt to the need of a growing population. our traditional method which was used by the farmer were not sufficient enough to fulfil the requirements. consequently, synthetic intelligence technique is added. this method supplied meals requirement and employment possibilities to many people. agricultural sectors included crop management and prediction and disease and pest management. finally, it presented challenges and trends that are promising when considering the future directions in ai for agriculture. this era includes crop yields caused by various factors such as climate change, population surge, employment issues, and food security issues. the main difficulty of the document is to verify the many artificial intelligence applications in agriculture, including irrigation, weeding and spraying integrated with sensors and other tools used in robots and drones.*

Keywords: Agriculture research, use of AI, crop, weed, and disease management

I. INTRODUCTION

Artificial intelligence (AI) is a growing technology that is attracting the interest of both academics and practitioners (Arora et al., 2022). Several definitions of AI have been given periodically, redefining the concept according to the latest advancements [1]. Digitalization provides precise information for the producers to use and optimise their production system. Moreover, digital technologies offer possibilities to develop new innovative production and consumption models by linking diverse agri-food system actors (Lajoie-O'Malley et al., 2020) [2] The introduction of AI to agriculture will be enabled by other technological advances, including big data analytics, robotics, the internet of things, the availability of cheap sensors and cameras, drone technology, and even wide-scale internet coverage on geographically dispersed fields. By analyzing soil management data sources such as temperature, weather, soil analysis, moisture, and historic crop performance[3] analysing By soil management data sources such as temperature, weather, soil analysis, moisture, and historic crop performance, AI systems will be able to provide predictive insights into which crop to plant in a given year and when the optimal dates to sow and harvest are in a specific area, thus improving crop yields and decrease the use of water, fertilizers, and pesticides. Via the application of AI technologies, the impact on natural ecosystems can be reduced, and worker safety may increase, which in turn will keep food prices down and ensure that the food production will keep pace with the increasing population. is a template.

II. METHODS AND MATERIAL

ROBOTICS: AI groups are growing robots that may without difficulty carry out a couple of obligations in farming fields. This form of robotic is skilled to manipulate weeds and harvest vegetation at a quicker tempo with better volumes as compared to humans. These forms of robots are skilled to test the exceptional of vegetation and come across weed with selecting and packing of vegetation on the identical time. These robots also are successful to combat with demanding situations confronted via way of means agricultural pressure labour.

Detection of pests and diseases: AI systems can examine digital. images taken by drones, agricultural robots, or farmers using a simple smart phone camera to detect pests and give concrete advice to agricultural workers on how to prevent their spread, treat affected plants or mitigate the damage caused. At the same time, AI can analyze data on the behaviour of livestock to detect abnormalities and identify potentially sick animals, thus allowing timely treatment.

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Protecting crops: AI can monitor the state of plants to spot and predict diseases, identify and remove weeds and recommend effective treatment of pests for ex. A precision agriculture startup called Taranis uses computer vision and machine learning to analyze high-resolution images of crops, providing plant insights to identify signs of stress or diseases.

soil monitoring: Integrating sensors, and AI system enables farmers to accurately monitor how much water and nutrients are available in the soil. Using sensors in soil monitoring could involve deploying devices that measure various parameter like soil moisture, temperature, PH levels and nutrient content. These sensors send information back to AI system which then analyze it and provide instruction to farmer on how best to manage their crops based on what they find out about the soil condition.

Breeding seeds:-By collecting data on plant growth, AI can help produce crop that are less pront to disease and better adapted to weather conditions. With the help of AI scientists can identify the best performing plant varieties and crossbreed them to create even better hybrids.

Intelligent spraying: weed or pest control can be automated, AI technologies, with the help of computer vision, weeding robotics is said to be remarkably precise, resulting in reduction in pesticide usage. Based on data analytics, these tools calculate how much pesticide is needed for each field based on the data about its history.

Future of AI in agriculture: The growth of the global population, which is projected to reach 10 billion by 2050, is placing significant pressure on the agricultural sector to increase crop production and maximize yields. To address looming food shortages, two potential approaches have emerged: expanding land use and adopting large-scale farming, or embracing innovative practices and leveraging technological advancements to enhance productivity on existing farmland.

pushed by many obstacles to achieving desired farming productivity — limited land holdings, labor shortages, climate change, environmental issues, and diminishing soil fertility, to name a few, — the modern agricultural landscape is evolving, branching out in various innovative directions. Farming has certainly come a long way since hand Plows or horse-drawn machinery

III. CONCLUSION

This review presents an overview of the methods of AI technology in agriculture, it is informative as possible with details of various AI technique employed in agriculture. It offers numerous opportunities to farmers, including improved crops health monitoring, precision farming, and breeding seeds etc.

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