

A STUDY ON USE OF ARTIFICIAL INTELLIGENCE IN INDIAN FARMING

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Abstract

Agriculture in India's rural areas is a primary source of livelihoods for many people. Indian farming plays a critical role in the country's economy. To increase farmers' revenue by \$2 billion by 2022, the government has set a target of doubling farmers' revenue by 2022. As part of this strategy, the export policy has an even more ambitious goal: to increase agricultural exports to \$60 billion or more by 2022. Digital technology, by helping to modernise and organise India's agricultural activities, has the ability to have a major impact on rural India. A greater understanding of data analysis, artificial intelligence, the use of block chain technology, and the Internet of Things are all part of this latest technology. By improving crop productivity, farmers can cut risk while also increasing their earnings. The accurate and timely information that artificial intelligence provides on crops, weather, and insects is beneficial to farmers and agriculture industries.

Keywords: India, Farming, Agriculture, NITI Aayog

Introduction

Artificial intelligence (AI) is a technical term in the information technology industry that describes intelligent machines capable of carrying out tasks requiring human intelligence. American computer researcher John McCarthy introduced the term "AI" in the context of the 1956 Dartmouth Conference. Artificial intelligence includes words like "artificial," "created," or "manufactured," along with the concept of intelligence (the ability to acquire and apply knowledge and skills)(Alvarenga et al., 2015; Flohre et al., 2011; Szenci et al., 1998).

Artificial intelligence (AI) (Diskin & Sreenan, 2000; Young & Ross, 2001)empowers machines to acquire and apply knowledge from previous experiences, develop and adopt novel approaches, and collaborate with human intelligence, such as natural language processing, perception, and translation.

Super-intelligent artificial intelligence (ASI)

The ASI is much smarter than the aggregate intelligence of all humans. An advanced form of artificial intelligence is made up of massive data sets combined with lightning-fast processing and smart algorithms. With this enabled, the AI software can learn from the data sets' patterns without the user needing to provide anything(Deng et al., 2014; Rahman et al., 2008).

All three concepts are applied interchangeably to artificial intelligence, machine teaching, and depth education. While it is true that machine learning is an AI subset, and thus comprises more advanced techniques and models, computers use machine learning to gather data. While performance is the machine's subset of self-learning artificial neural networks, performing is a subset of that machine's learning process that utilises multi-layered artificial neural networks for highly accurate tasks.

AI and Indian Farming Sector

In India, agriculture is the sector that influences the economy the most. 18% of India's GDP is produced by Indian agriculture, and about 1.3 billion people have food security because of it. Dairy, meat, poultry, fishing, and food grain are the major segments of India's economy. There are various regions in India. Agricultural exports make up 10% of total exports in the country, and are fourth in terms of value. In India, the resource-intensive farming model is still being used. To start, many of the issues facing India's agricultural sector, such as soil degradation, increased use of artificial fertilisers, reduced soil fertility, and susceptibility to pests, are an outcome of unsustainable agricultural practises prevalent in the country. Dependence on unsustainable agricultural practises will only increase when it becomes more predictable and sensible for the climate to change. Similarly, the amount of water used in agriculture is still excessive and wasteful. Of the groundwater extracted, 89% is used in agriculture.

Efficiency of AI

Because there are no functioning end-to-end value chains, however, the price has not yet been realised. Artificial intelligence (AI) is capable of providing healthier cultivation practises and useful information on the weather, such as temperature, rain, wind, weed direction, pest controls, soil monitoring, and growing conditions. This data can also be organised by farmers, providing aid with workload, food supply, and the improvement of farming data management. By 2020, it is predicted that Indian smartphones will increase in number by three times and 315 million rural Indians will be online. 30 million Indian farmers own smartphones. About 70 million farmers are projected to be affected by AI and connected farm services by 2020, with the added benefit of generating nearly \$9 billion for farmers.

For the purposes of AI, it is necessary to focus on precision agriculture. Precision agriculture is a project designed to develop a Decision Support System (DSS) that will benefit farmers across an entire farm in order to maximise profit on inputs and resource conservation. This practise is now possible thanks to the introduction of GPS and GNSS. By increasingly introducing complex algorithms, robotics, sensors, and satellites, AI has facilitated an increased level of precision farming.

AI applications in Indian agriculture

For both good agricultural productivity and early detection of crop infestations, a proper assessment of crops is required. Early detection of stress conditions such as stress from climate change, nutrient deficiencies, weeds, insects, and fungal infestations is critical so that farmers can cope with their stress.

Sowing warnings, control of pesticides and inputs can all help improve the farming community's income and stability. It is advantageous to have access to all relevant weather data, remote sensing data, AI technologies, and AI platforms, so as to provide farmers with accurate monitoring of crops and insights when necessary. Microsoft and ICRISAT are developing an application for farmers that teaches them how to sow using artificial intelligence. Microsoft India developed a sowing application in collaboration with the International Crops Research Institute, which had a personalised village consultation dashboard for Andhra Pradesh (Icrisat). Farmers are given the best opportunity to seed their crops when the weather, soil, and other variables all agree. The seeding app is built to help farmers make well-informed decisions to reduce crop failure and maximise crop yield.

Monitoring of soil health

Soil is the farmer's pulse. It is useful for them to know when, when, and what to sow, since it enables them to choose when, when, and what they plant. Distributed soil health surveillance that requires no infrastructure for laboratory testing has been possible using image recognition and deep learning models. Combining remote satellite data signals and local farm image capturing, artificial intelligence helps farmers implement corrective measures in the wake of unfavourable weather patterns.

Soil Surveillance System

An intelligent soil surveillance system for farms with a low price tag is known as a soilsens technology. This technology was developed with support from the DST and Electronics and Informatics (IITB) of Mumbai, as well as a startup incubated at the Bombay (IITB) Institute of Technology called Proximal Soilsens Technologies Pvt. Ltd. An embedded sensor measures the moisture in the soil, the temperature of the soil, and the humidity in the air. Farmers should use smartphone applications in order to get proper watering. You can also find this data on the cloud. Improved water efficiency in agriculture could be achieved with the use of the technology. A reference guide may be helpful when seeking the best ways to efficiently use water for different plant and soil requirements. In addition, this system can help to prevent irrigation, thus preventing disease, saving water, electricity, and keeping nutrients in the soil, among other things.

The growth in popularity of agricultural robotics is attributable to a lack of available human labour and the need to produce food for the global population. Farming can be made easier and less labor-intensive with robots. Harvesting, picking, seeding, spraying, pruning, sorting, and packing are some of the other tasks the application can be used for.

Multiple-spectral and camera-equipped sensors on drones can detect stress in plants, the amount of growth, and the amount of yield. Visual checking on a crop is a labor- and time-saving technology. Drones with advanced capabilities are capable of carrying and delivering herbicide, fertiliser, and water.

Farmers will be able to understand what customers want, which will allow them to respond to market demand. In addition, using AI, farmers would be able to recognise seasonal shifts in customers' habits and tastes, thus facilitating a more personal and tailored customer experience. By growing more crops, farmers will see a boost in profits, which will in turn encourage them to continue farming. Supporters of AI-powered supply chains argue in contrast, however, that this method saves money due to the lack of middlemen and more streamlined logistics operations. This efficient routing also benefits farmers of all sizes because it enables larger farmers to plan their routes to market in a more effective manner. The final reason why these products could lower waste and losses is because they would be able to move faster, with no middlemen to get in the way.

eNAM

The eNAM online trading platform is used by agricultural commodity traders in India. Farmers, traders, and buyers have been able to conduct business using the internet thanks to commodities being traded on the market. Price discovery does, to some degree, benefit the market. Also, they have numerous avenues for marketing their produce in the market. Tradable goods of over 90 varieties, including grains, vegetables, and fruits, are offered on the site. While the main goal is to create transparent transactions and price discovery in regulated markets, we're also working on it for the U.S. market. The state agricultural marketing board and agricultural produce market committee oversee electronic trading promotion (APMC). The trade licencing offered is made available to traders and commission agents with a single licence issued by individual states which does not have a physical presence requirement, and requires a licence for all traders in the state regardless of the type of market.

Conclusion

The National Institute for Transforming India, which is part of the Indian government, has formed a partnership with other AI pioneers to apply AI to Indian agriculture. India's agricultural industry is vital to the Indian economy, which is why the government must be responsible for designing an implementation plan for AI in agriculture. A significant focus has been made to raising farmer income by doubling it since the Modi administration came to office. As well, measures have been taken to enhance the supply of agricultural inputs while simultaneously building a thriving market.

NITI Ayog, a think tank inside the Indian government, is working with IBM to develop a new crop yield prediction model using artificial intelligence (AI) for the 10 most aspirational districts in India's several states. In an effort to advance agriculture, the alliance has established a goal to utilise information technology to provide knowledge on how to increase crop production, soil output, and management of agricultural inputs in order to help farmers predict outbreaks of pests and diseases. Data collected from ISRO, soil health cards, IMD's weather forecast, and soil moisture/temperature, crop phenology, and fertiliser levels, together with local crop observations, fertiliser amounts, and meteorological data from ISIC, are all used in this information system to assist farmers increase their net income .

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