ARTIFICIAL INTELLIGENCE IN AGRICULTURE

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ABSTRACT:
In this paper we are going to review about how ARTIFICIAL INTELLIGENCE is useful in AGRICULTURE. The world of Artificial Intelligence (AI) is shortly on the upward shove as it makes its way into many one of a kind industries. Agriculture is a foremost industry and a huge section of the basis of our economy. According to the Environmental Protection Agency (EPA), the agricultural enterprise contributes nearly $330 billion in annual revenue to our economy. As climates are altering and populations are increasing, AI is turning into a technological innovation that is enhancing and defending crop yield in the U.S. Here are some fundamental methods that AI is contributing to the agricultural industry.

Many farms are taking benefit of drone science to provide outstanding imaging that can assist display crops while scanning and inspecting fields to accumulate critical agricultural data. This imaging science can additionally aid in the identification of crops and their progress, which includes their health, and the determination of their readiness. For example, these snap shots can furnish farmers with the ability to determine how ripe their crops are, and if and when they will be prepared for harvest. Additionally, imaging science can help with ordinary area management, supplying estimates in real-time figuring out the place particular vegetation might also require more water, fertilizer, soil or pesticides.

Precision farming makes use of AI to generate accurate and controlled methods that assist grant instruction and perception about water and nutrient management, most useful harvesting and planting times as nicely as when the proper times for crop rotation would be.


INTRODUCTION

Agriculture is that the business that attended the evolution of humanity from pre-historic times to fashionable days and consummated dependably one in all its most simple needs: food provide. these days this still remains its core mission, however it’s integrated in a very a lot of advanced than ever mechanism driven by multiple social science, economic and environmental forces.

Data generated by sensors or agricultural drones collected at farms, on the field or during transportation offer a wealth of information about soil, seeds, livestock, crops, costs, farm equipment or the use of water and fertilizer. Artificial intelligence and advanced analytics help farmers analyse real time data like weather, temperature, moisture, prices or GPS signals and provide insights on how to optimize and increase yield, improve farm planning, make smarter decisions about the level of resources needed, when and where to distribute them in order to prevent waste.
Growing implementation of advanced technologies (such as laptop vision, machine learning and prognostic analysis) & applications in agricultural field that permits the farmers to research time period information of temperature, climatic conditions plant health, and soil wet. Rising adoption of advanced technologies for enhancing the crop productivity is predicted to drive the business growth. Rising adoption of preciseness agriculture & good sensors will influence the market completely. good sensors area unit placed across the farms to support preciseness agriculture procedure via information provided by the management systems and generate informed selections in fertilizing, harvesting, & planting. Moreover, the sensors live numerous climatical& soil aspects together with humidity and temperature that forwards info to the system.

Increasing application of pc vision technology like plant image recognition, and therefore the accumulative demand for healthier crop analyses square measure the many factors subsidizing the phase growth. Also, drone analytics application is projected to witness substantial growth as a result of the wide-ranging application for period choices beside mapping & diagnosis crop health. Pleasing government laws for drones' application in agricultural sector is predicted to fuel the expansion.

LITERATURE REVIEW

In general, crop management systems furnish an interface for ordinary management of crops covering every thing of farming. The thinking of using AI method in crop management was first proposed in 1985 via McKinion and Lemmon in their paper "Expert Systems for Agriculture" [1]. Another corn crop safety professional machine was proposed by Boulanger in his doctoral Thesis [2].

Apart from pests and illnesses monitoring, storage, drying, grading of harvested vegetation are additionally very important elements of agriculture. This part addresses more than a few food monitoring and great control mechanisms that appoint the notion of synthetic intelligence. Several fuzzy good judgment based totally structures had been designed, which includes Kavdir et al. [3], Gottschalk et al. [4], and Escobar et al. [5].

The crop yield prediction is very advisable for advertising strategies and crop price estimation. Moreover, in the age of precision agriculture analysis of relevant factors that at once results the yield can also be carried out through prediction models. Liu et al. [6], used an synthetic neural network model using back propagation mastering algorithm to predict yield from the soil parameters. The different important lookup works targeted on prediction of yield includes Khoshnevisan et al. [7].

An agricultural robotic is a robot deployed for agricultural purposes. The fundamental region of application of robots in agriculture today is at the harvesting stage. Emerging applications of robots or drones in agriculture include weed control, cloud seeding, planting seeds, harvesting, environmental monitoring and soil analysis. According to Verified Market Research, the agricultural robots market is expected to reach $11.58 billion by 2025. "Self-driving Ibex robot
sprayer helps farmers safely handle hills - Farmers Weekly”. Farmers Weekly, explains about the usage of spray technology.

CONCEPTUAL FRAMEWORK

Fig 3.1. Types of AI

Fig 3.2. Category of AI in agriculture
RESEARCH DESIGN

Table 4.1 Types of artificial intelligence

<table>
<thead>
<tr>
<th>Artificial Intelligence</th>
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<td>Narrow AI</td>
<td>Sometimes referred to as &quot;Weak AI,&quot; this form of artificial intelligence operates within a limited context and is a simulation of human intelligence.</td>
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<td>Artificial Super Intelligence (ASI)</td>
<td>Most professionals would agree that societies have no longer yet reached the point of synthetic superintelligence. In fact, engineers and scientists are nonetheless attempting to attain a point that would be considered full artificial intelligence, the place a laptop may want to be stated to have the identical cognitive capacity as a human.</td>
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Table 4.2 AI in agriculture

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Agricultural robots are poised to emerge as a surprisingly valued software of AI in this sector. AI is turning into a technological innovation that is enhancing and defending crop yield in the U.S.
### Our Heritage

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<th>Agricultural Duties</th>
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<td>Examples: SEE AND SPRAY, HARVEST CROO ROBOTICS</td>
<td>Examples: PLANTIX, TRACE GEOMICS</td>
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### SAMPLING AND DATA COLLECTION

**ARTIFICIAL INTELLIGENCE:** Artificial (AI) is a wide-ranging branch regarding computer erudition concerned together with constructing clever machines successful about execution tasks they usually require ethnical intelligence. AI is an interdisciplinary science together with multiple approaches, however developments within computing device lesson then flagrant learning are creating a example alteration in certainly each area over the tech industry.

**Narrow AI:** Sometimes referred to as "Weak AI," this form of artificial intelligence operates within a limited context and is a simulation of human intelligence. Narrow AI is regularly focused on performing a single assignment extraordinarily properly and while these machines might also appear intelligent, they are running below a ways greater constraints and barriers than even the most primary human intelligence.

**EXAMPLES:** Google Assistant, Siri, Google translators etc.
Artificial General Intelligence (AGI): AGI, now and again referred to as "Strong AI," is the sort of synthetic Genius we see in the movies, like the robots from Westworld or Data from Star Trek: The Next Generation. AGI is a computing device with common intelligence and, an awful lot like a human being, it can apply that Genius to solve any problem.

Examples include visual perception, speech recognition, decision making, and translations between languages.

Artificial Super Intelligence (ASI):

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EXAMPLE: Humanoid robots etc.
ARTIFICIAL INTELLIGENCE IN AGRICULTURE: Agriculture is seeing rapid adoption of Artificial Intelligence (AI) and Machine Learning (ML) each in terms of agricultural products and in-field farming techniques. Cognitive computing in particular, is all set to become the most disruptive technology in agriculture services as it can understand, learn, and reply to special situations (based on learning) to amplify efficiency. Providing some of these options as a service like chatbot or different conversational platform to all the farmers will help them maintain pace with technological developments as nicely as observe the identical in their daily farming to reap the advantages of this service.

Based on our research the most popular functions of AI in agriculture appear to fall into three essential categories:

Agricultural Robots – Companies are developing and programming self-reliant robots to deal with fundamental agricultural duties such as harvesting plants at a greater volume and faster pace than human laborers.

Crop and Soil Monitoring – Companies are leveraging computer imaginative and prescient and deep-learning algorithms to technique facts captured via drones and/or software-based technology to monitor crop and soil health.

Predictive Analytics – Machine learning models are being developed to track and predict various environmental impacts on crop yield such as weather changes.

Agricultural Robotics:

Companies are the usage of automation and robotics to assist farmers locate greater efficient ways to shield their crops from weeds. Blue River Technology has developed a robot called See &
Spray which reportedly leverages laptop imaginative and prescient to monitor and precisely spray weeds on cotton plants. Precision spraying can help prevent herbicide resistance.

Harvest CROO Robotics has developed a robotic to help strawberry farmers choose and pack their crops. Lack of workers has reportedly led to millions of greenbacks of revenue losses in key farming regions such as California and Arizona. Harvest CROO Robotics claims that its robotic can harvest 8 acres in a single day and exchange 30 human laborers.

Crop and Soil Health Monitoring:

Deforestation and degradation of soil fantastic continue to be widespread threats to food safety and have a terrible affect on the the economy. Berlin-based agricultural tech startup PEAT, has developed a deep studying software called Plantix that reportedly identifies doable defects and nutrient deficiencies in soil. Analysis is performed through software algorithms which correlate precise foliage patterns with certain soil defects, plant pests and diseases. The photo consciousness app identifies feasible defects through pictures captured through the user’s smartphone camera. Users are then furnished with soil restoration techniques, hints and different feasible solutions.

Similar to the Plantix app, California-based Trace Genomics, offers soil analysis services to farmers. Lead investor Illumina helped increase the device which makes use of computing device mastering to grant purchasers with a experience of their soil’s strengths and weaknesses. The emphasis is on stopping faulty plants and optimizing the conceivable for healthy crop production. After submitting a sample of their soil to Trace Genomics, customers reportedly get hold of an in-depth summary of their soils Contents.
awhere, a Colorado primarily based employer makes use of computer learning algorithms in connection with satellites to predict weather, analyze crop sustainability and evaluate farms for the presence of illnesses and pests. For example, every day weather predictions, are personalized based totally on the wishes of every customer and and vary from hyperlocal to global.

Types of clients referred to on the company’s internet site consist of farmers, crop consultants and researchers. We’ve covered AI for weather prediction earlier this year, however the video below gives a properly thought of some of the fundamental technologies at play.

Based in Raleigh, North Carolina, FarmShots is every other startup targeted on analyzing agricultural records derived from pix captured by way of satellites and drones. Specifically, the agency pursues to “detect diseases, pests, and negative plant vitamin on farms. For example, the agency claims that its software can inform users precisely where fertilizer is wanted and can decrease the amount of fertilizer used through almost 40 percent. The software is marketed for use throughout cellular devices.

CONCLUSION
The farmers are outfitted with education and it is important updated their education, to ensure the technologies are used and proceed to improve harvesting. Water deficiency is one in every of the key downside faced by framers, though water deficiency can’t be eradicated it can be controlled. Different soil has different wetness levels and different seed desires different level of water. Sometimes the water remains constant for many types of crops, where additional water is getting used. The surplus water usage can be managed through AI. The soil is tested against the crop that's aiming to be harvested, we would get a transparent view water needed for the harvesting. Only the specified quantity of water is provided in Associate in Nursing uniform manner throughout the field. This may additionally promote systematic farming. This will help to prove the price of these equipment over the lengthy haul. Additionally, substantial testing and validation of rising AI applications in this area will be essential as agriculture is impacted by environmental factors that can't be managed not like different industries where risk is easier to model and predict. We count on that the agricultural enterprise will proceed to see constant adoption of AI and will continue to screen this trend.

LIMITATION
It will be a minor nuisance if your laptop crashes or get hacked, it becomes all the more essential that an IA device does what you desire it to do if it controls your vehicle, your aircraft, your pacemaker, your automatic buying and selling system. It will be a minor nuisance if your laptop crashes or get hacked, it becomes all the more essential that an IA device does what you desire it to do if it controls your vehicle, your aircraft, your pacemaker, your automatic buying and selling system.

It prices heaps of cash to form or get the robots, they have the upkeep to stay them running. The farmers will lose their jobs, The robots will modification the culture / the emotional attractiveness
of the agriculture and also the energy problems are expensive. The robots is also a lot of acceptable to the non-farm community, the roles within the agriculture need intelligence and fast, and also the robots may be substituted with the human operator.

REFERENCE