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Role of AI in Indian farming

Kartike Sachdeva
kartikesachdeva@gmail.com
Pathways School, Gurugram, Haryana

ABSTRACT

The implications of Artificial Intelligence in how Indian Farming has advanced and the repercussions that it brings.

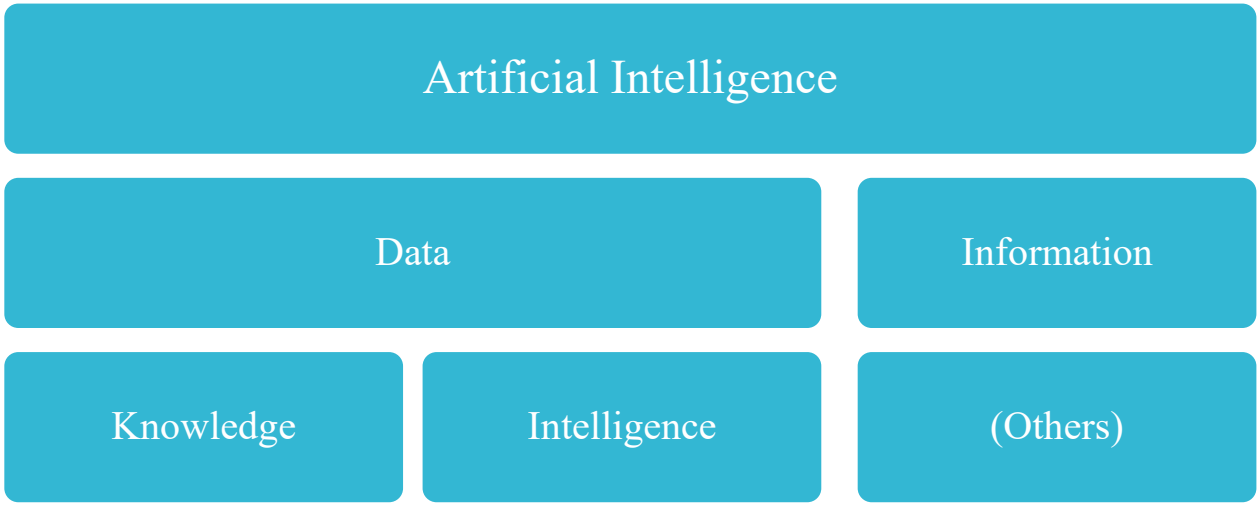
Keywords: *Artificial Intelligence, Farming, Advantages*

1. ROLE OF USING AI IN INDIAN FARMING

Highlights of the topic: Artificial Intelligence (AI) is a widely ranging subject that covers a variety of topics. Since, there are a host of topics that are being covered, it is difficult to find a concise way in which it can be described. However, holistically speaking, artificial intelligence is a theory that describes the creation of powerful computer systems that can do activities that would ordinarily need human intelligence.

There are several examples of artificial intelligence that have revolutionized technology, including software that assists both humans and the disabled. For instance, voice recognition and the commonly used 'speech to text to speech' software have aided many visually impaired individuals which in turn creates a society that holds everyone with equity.

There are four different applications under Artificial Intelligence



The applications of AI cannot be overlooked or explained briefly, it is found most in the things we take part in every day. One such example that has been seen to be revolutionary is how AI has transformed agriculture. Artificial Intelligence has transformed agricultural practices because of the efficiency that it brings to the table. With the current population increasing, and land being a constant, there is scarcity of land that is seen today. For such reasons and more, AI brings efficiency with less land usage and that helps in the agricultural society.

Products and technology that has been developed for agricultural usage has enabled a more competent farming technique which is time efficient and creates a safer place for farmers to stay. The technology developed through AI is helping in making farmers improve their wages. As the population increases, technology that has been developed helps in creating job opportunities as well. This is done because the technology has aided farmers who don't get wages and don't have crops that can be sold easily to find jobs in the city. This gives them another outsource of an opportunity that they can choose to take.

It is the belief of many renowned personalities that Artificial Intelligence is the future of farming. This belief has been concentrated to the world today because it has been seen to help farmers in huge numbers. Such technologies will help farmers to increase expenditure and cut down on costs such as raw materials, fertilizers, pesticides, and water amongst others. Artificial Intelligence and technology associated to it has shown how farmers are utilizing the resources and shows an effective way of using these resources by maximizing productivity and minimizing costs.

2. ARTIFICIAL INTELLIGENCE WITH RESPECT TO AGRICULTURE

Agriculture and artificial intelligence have been complementing one another for years now. Agriculture provides a living for more than 55% of India's population and AI has made it easier for farmers to be efficient by using less resources and maximizing productivity. AI applications in agriculture have progressed significantly, and smart farming has vastly improved over the years, allowing farmers to enhance the means of their work in order to create an independent working environment.

Some of these applications include but aren't limited to agricultural drones which are sprays that are used to keep pesticides away and the crops safe. This helps the farmers because human error in pesticides can be more lethal that can be harmful to the quality of the crops and humans can also be harmed by the over usage of pesticides because these chemicals can be detrimental for humans as well. Furthermore, the over usage of chemicals in crops can also be detrimental for the health of humans and this error has been significantly decreased by AI.

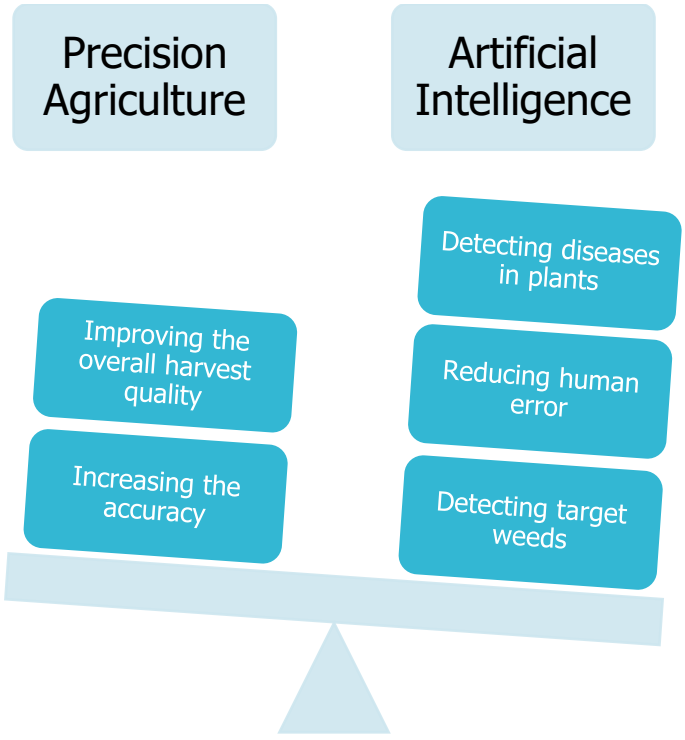
AI can transform the way we think about agriculture by bringing about several advantages. However, AI is not a self-contained technology. AI may be used to enhance the use technology as the next stage in the transition from conventional to innovative farming.

AI isn't a quick fix, and agribusinesses need to be aware of it. However, it may significantly improve modest, everyday tasks and greatly ease farmers' lives.

The use of drones that has been used in the Artificial Intelligence technology is primarily used in order to see what crops require water or pesticides and provides the same. Additionally, there is a machine that has been invented through AI that harvests and picks crops that do not cause damage to the fields or crops and this also ensures saving of time as well as working efficiently. Hence, this in turn increases farmers making more wages.

AI technology helps in detecting disease in plants, pests, and poor nutrition of farms with the help of scanners for pests and water needs. The advanced technology uses newfound algorithms to scan for diseases and pests. They also scan water needs and then uses what is needed for the plants that require it. Therefore, saving hundreds of dollars in crops and efficiently providing water and pesticides.

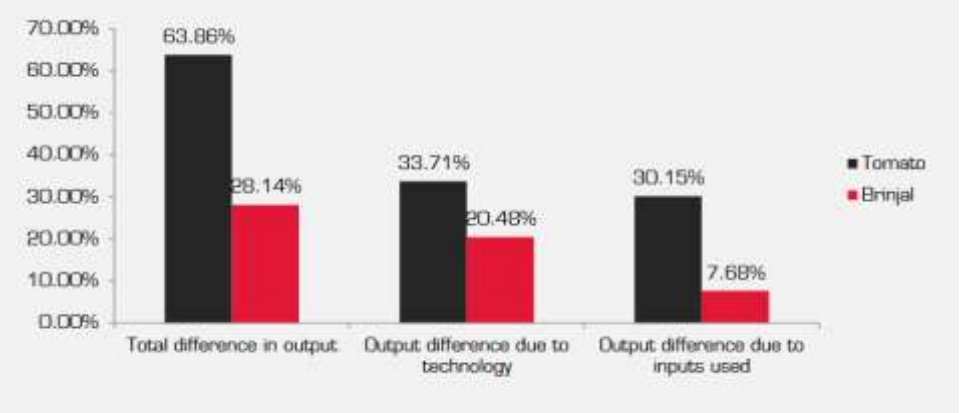
Each country's economic sector depends heavily on agriculture. The need for food is rising along with the global population daily. Currently, the farmers' conventional techniques are unable to meet the demand. To meet these needs and give individuals in this industry career prospects, there are various innovative automation approaches which have been devised. These devices in turn help in creating a working environment that is based on efficiency and leaves little scope for human error. Due to innovations of AI, modern agriculture has advanced to a new level. Crop production, real-time monitoring, harvesting, processing, and marketing have all been enhanced by artificial intelligence.



3. ADVANTAGES OF USING AI IN INDIAN FARMING

AI applications in agriculture have progressed significantly, and smart farming has vastly improved over the years, allowing farmers to enhance production while lowering expenses.

The advantages of using artificial intelligence in Indian farming are many. These innumerable advantages can be seen in how there are advancements in sprays that automate the times that each pesticide is sprayed into the crops to keep them safe and regulate the diseases that can be spread. This helps the farmers because pests affect crops by leaving bacteria's and viruses that can be harmful to the quality of the crops. Likewise, the usage of drones has had significant changes in the conventional method of farming. For instance, drones are used to understand which crop needs water or pesticide and provides them with it. This, in turn, saves water and protects the crops from pesticides. Secondly, there is another advancement of a machine that harvests, and picks crops accurately. This is done without damaging the field or crops which can help save time. It also makes the work more efficient while maintaining the quality of the work. This can be also seen through the increase in the artificial intelligence investments that various governments are making towards these projects.



Farming AI tech or Agri-tech helps farmers to work more efficiently and improve profit. This is possible because technology helps the farmers to replace work that is usually done by human intelligence and that in turn is left to AI technology which does the same input of the work faster and more efficiently, which brings an increase in wages.

4. PRECISION AGRICULTURE

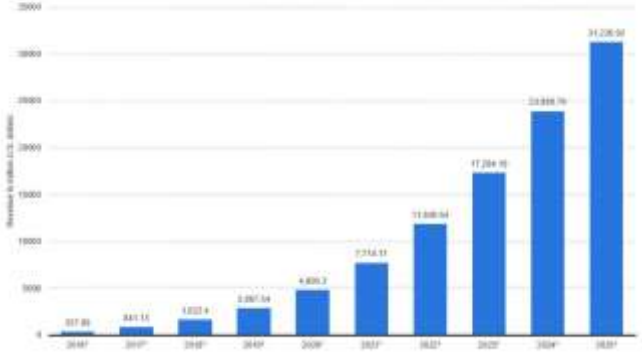
Precision agriculture is a term used to describe how AI systems are helping to enhance overall harvest quality and accuracy. Rural India is using AI and digital technology such as AI sensors and scanners in order to keep their crops safe and increase the production of crops. Additionally, rural places in India are using machines to harvest and pick crops which make the working process of picking crops faster than that used manually. This, can increase rate of production, resulting in a constant linear growth.
Gathering significant agricultural components for personal and commercial gain is the process of harvesting. Handpicking and physical work are included in traditional harvesting techniques. However, AI does this by using hardware and software's. Automated farming has been helping farmers in India and around the world revolutionizing farming. As the name suggests automated planting or harvesting plants itself makes the process faster and efficient.

This technology is equipped with a camera which helps to scan and gather data on the crops. This data is then used to help gain more knowledge on the soil by scanning it for the types of crops the soil can grow. In the traditional method of farming, there would be a large scope for human error because they would not anticipate the crops that can be grown on certain soils, resulting in a complete loss of the harvest. The automated harvesting is a system powering the product. The program gives the camera the ability to identify the harvested goods. Thereafter, the machine instructs the AI to choose and gather the specified goods after assessing them.

Furthermore, AI also aids in the identification of plant and crop diseases, which is one of its major benefits. The invention of AI apps are widely available online and have increased more so in the last few decades.

These programmes aid in identifying issues with plant health. Additionally, these programmes also analyse the issues and then use the internet to locate answers to them. Overall, the pacific region inclusive of India has seen a wide range of hardware and software services that have exponentially increased in their production over the last few decades.

Revenues from the artificial intelligence for enterprise applications market worldwide, from 2016 to 2025 (in million U.S. dollars)



Plantix is one such prime example, this programme is a rapidly expanding application which features a database with details for more than 100,000 ailing plants. Additionally, it can also detect more than 60 different plant diseases and would give vivid and justified explanations for them. Likewise, it can provide details on any illness affecting tomatoes, peppers, or lettuce which not only work in the consideration of farmers but also of individuals who would want to know more about this.

The image above is an exemplar of how the Plantix app functions, although the database is not shown in this picture. It is programmed in a way that the database is the place where the solution to each plant disease is stored. The plantix application and other applications alike are following the same process of identifying the plant diseases with an image scanner, which scans the leaf and identifies the disease and pesticides, or medicine needed.

One of the other advantages of Artificial Intelligence in the agricultural world would be soil health monitoring and scanning. The fundamental base of any kind of farming remains in its soil. The growth of plants and crops is facilitated by the soil. Plants that can thrive in their natural habitat can be facilitated through this application that would detect any future diseases that can come in way of the plant to thrive in a healthy and nutrient rich soil. Therefore, identifying soil inadequacies is equally crucial if we want to avoid a net crop loss.

Traditional tests are not effective enough to get the desired outcomes. However, the AI software mitigate the shortcomings that are seen in the traditional testing methods. The amount of soil that is sampled for use in AI analytical equipment and after which in the lab, the material is examined using a variety of tools and techniques.

The soil scanning and monitoring can help in starting a business in farming as it can help decide if the land soil is meant for what the farmer wants to grow as soils are different for every type of product, hence getting to know beforehand can save a lot of money and crop loss.

As well as that the software monitors soil every second so the farmer does not consistently have to watch the soil. Also, as soon as a problem is detected like pests or lack of water the app gets notified.

5. DEMERITS OF USING ARTIFICIAL INTELLIGENCE IN INDIAN FARMING

Agriculture is a $4 billion industry that employs over 1.5 billion people, which is a whopping 20 percent of the world's population. There are predictions of there being millions of unemployed field workers in the next decades primarily due to the impact of AI in the agricultural sector. Even though artificial intelligence improves the agriculture industry in many amazing ways, there are many concerns regarding the forthcoming of AI on employment and the workforce of the agricultural sectors.

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Drones are expensive to purchase; thus, the main problem will be finding money internally from government initiatives and research institutes. The expense of technology has rendered it unavailable outside of the government and research groups.

6. PROCESS OF FARMING WITH THE USE OF TECHNOLOGY

There are several factors in agriculture that must be considered, including crop type, soil characteristics, climate, etc. Farmers choose which crop should be grown where and when based on these criteria. Furthermore, having the right soil, climate, and season alone will not guarantee a high-quality product. It needs a certain set of steps that must be taken. Agricultural techniques are the procedures used to cultivate crops.

Soil preparation: The soil where a crop will be planted must first be prepared by ploughing, levelling, and manuring. The act of ploughing involves excavating and loosening dirt using a plough. This aids in adequate soil aeration. Levelling is the process of distributing and levelling the soil after ploughing. The soil is then fertilised.

AI Technology such as machines to prepare soil like shown above are used to help prepare the soil and it helps to make the process extremely fast and efficient.

Sowing: The very first step in planting is choosing seeds from high-quality crop strains. This process of dispersing the seeds over the field after soil preparation is known as sowing. You can sow manually, by hand, or using seed drilling equipment. Some crops, like paddy, are seedling-grown in a small area before being moved to the main field.

Sowing seeds could be efficiently done by using industry machines as they can be faster than manmade progress and they can be more precise and faster compared to a person. Furthermore, industry AI machinery in agriculture could help tremendously with profits as they can help with more planted crops hence more produce, thus better gross profit margins for farmer businesses.

Manuring: Nutrients are necessary for crop growth and productivity. Therefore, a consistent supply of nutrients is required. Nutritional supplements are given throughout the manuring process, and they can be either natural or synthetic substances or fertilizers. Plant and animal wastes decompose into manure as a by-product. Commercially manufactured fertilisers are chemical mixtures that include plant nutrients. In addition to giving crops nutrition, manure restores soil fertility. Vermicomposting, crop rotation, and planting of leguminous plants are further techniques for replenishing the soil.

AI technology is used in this method as too many crops is hard for a person to manage all he vast amounts of crops, hence industrial AI tech that helps to manure vast amounts by seconds helps to progress faster through the field hence resulting in productivity.

Irrigation: although this is a small step compared to the rest, it is the most crucial. Water is supplied through irrigation. Water sources include things like wells, ponds, lakes, canals, and dams. Water build-up from excessive irrigation might harm the crop. Controlling this frequency and the time between subsequent irrigations is necessary.

Smart farming has greatly improved over the years, and AI applications in agriculture have advanced dramatically. This has allowed farmers to increase productivity while reducing costs. An agricultural drone that sprays pesticides to protect the crops is one of the applications that may be observed. This benefits the farmers since pests can destroy crops by leaving behind germs and viruses that can lower their quality. Additionally, the drone utilises artificial intelligence (AI) to determine which crops need water or pesticides and then delivers them, saving water and pesticides. Because of the time saved, increased productivity, and improved quality, farmers get paid more.

Harvesting: Harvesting is the act of cutting and gathering a crop once it has reached maturity. After harvesting, grains are separated from the chaff either by threshing or, in small-scale operations, manually.

In the image above we can see that there is an auto harvesting tractor, which is again an industrial machine technology, which helps the farmers to harvest the crops such as wheat, with argri-tech which helps to speed up the process of harvesting.

Storage: harvested grains are kept in granaries or bins for subsequent use or marketing. Therefore, crop protection techniques need to be improved. Prior to storage, grains are cleaned, dried, fumigated, and other insect and rodent protection measures are taken. Although AI tech is not used in this phase of agriculture the process look likes like this.

7. CONCLUDING STATEMENT

Through this journey, I have learnt a lot of about empathy and how to empathize towards others as I wrote a research paper on how AI helps in farming, this helps me empathise as I learn about the environment as well. Also, through this journey I have learnt new skills like how to operate a cad model software in depth and more. I enjoyed it a lot as I did it in favour of society.
Ending this research paper, I would like to say that this is a small step in the journey towards creating a solution that provided equal access of opportunities to the target audience leading to enhancing creativity and productivity. This has helped me in looking at the world from a different perspective which has made me a global citizen who is concerned about the global issues of the world and has made me aware of things I wasn't aware of before.

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