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Smart Faming in Agriculture

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Abstract

The working environment in agriculture has seen significant changes recently due to technological advancements including data transfer and the usage of electronic devices. In order to offer decision-making information for production as well as for the related strategic and managerial challenges, these changes necessitate updated information from production systems, markets, and agents involved in production. With the growing introduction of automation into the process, smart farming (SF), which is predicated on the integration of ICTs into agricultural production systems' machinery, equipment, and sensors, generates copious amounts of data and information. In order to combine and analyze diverse farm data for decision-making, smart farming depends on data transmission and data concentration in remote storage systems.

Introduction

The notion of "smart farming" emerged from software engineering and computer science and was brought about by the incorporation of computing technologies and the transfer of agricultural data in an environment where computers are almost always present. These computing components are integrated into things and linked to the internet and one another. The usage of sensors in agriculture has made the use of SF tools conceivable. An electrotechnical device called a sensor takes measurements of physical quantities in the surrounding environment and transforms them into a signal that an instrument can interpret. The following are some of the parameters that sensors read: mechanical stress levels, temperature, humidity, light, pressure, noise levels, presence or absence of specific sorts of objects, speed, direction, and item size. The management cycle and the idea of smart farming are summed up as a cyber-physical system that eventually leads to smart online gadgets that

can operate various farming systems. To begin building our management platform, we must first understand the system's variable inputs and how the rules must be followed to process them. In order to improve the activity's competitiveness and sustainability, business process management (BPM) and business rules are also incorporated into the system. Determining the platform architecture is also crucial. Of utmost significance is the server-based decision-making framework for choosing irrigation device settings, which analyses data inputs on edaphic and environmental variables, photos of crop development, and crop status.

Smart Farming:

The use of technology on your farm, such as sensors, robotics, artificial intelligence, positioning systems, and the Internet of Things, is referred to as smart agriculture. The ultimate objective is to maximize the amount and quality of crops produced while minimizing the amount of human work required. The main goal of smart farming is to manage agricultural operations by utilizing data from several sources, including historical, geographic, and instrumental data. Being technologically sophisticated does not automatically make a system intelligent. One way that smart systems set themselves apart is their capacity to capture data and interpret it. Hardware (IoT) and software (SaaS) are used in smart farming to collect data and provide useful insights for managing all agricultural activities, including pre- and post-harvest.

Examples of Technologies Used in Smart Agriculture are

1. Accurate plant nutrition and watering
2. Controlling and managing the climate in greenhouses
3. Sensors: for controlling temperature, light, moisture, soil, and water.
4. Platforms for software.
5. Positioning systems: satellite, GPS, etc.
6. Communication systems that rely on Lora Wan, mobile connections, etc.
7. Machines that work.
8. Platforms for analytics and optimization.

Innovative Technologies:

Indians lean towards being rather traditional. They contend that the most effective agricultural techniques are those that date back thousands of years. But such tactics should also evolve in light of the modern world and the expanding population. To improve smart farming,

Indian farmers must embrace cutting-edge technologies. Here are some examples of technologies that need to be improved.

1. **Product innovations:** Innovation in products is a prerequisite. It is necessary to refresh those items that have been in demand from earlier eras. In order to address this, new technologies have entered the market and are creating entirely new food varieties. Products that are not able to grow are examined in lab settings.

2. **Digital marketplaces:** For the benefit of Indian farmers, the Indian government launched an eNAM facility. The National Agriculture Market, or eNAM, is an online marketplace that links farmers throughout India by building networks amongst the country's current APMC mandis. Its major purpose is to promote equity in the agriculture market. This method facilitates smooth transactions between buyers and sellers and supports real-time pricing. Farmers may also connect with local clients, lease equipment, or pool their resources for better insurance.

3. **Operations software:** It will assist farmers in tracking resources or production, saving money, and making better operational decisions.

4. **Skills-building tools:** Building skills is necessary in Indian farming. Farmers cultivate what they have learned from their forefathers or parents. They are ignorant of how to operate these recently developed devices. To address this, farmers should have access to the newest farming practices and skill-building equipment available on the market. Videos, mobile apps, hotline voice services, and other things are included. Farmers may exchange experiences and pick up fresh, creative skills thanks to these technologies. Gujarat has an i-khedut portal that offers farmers in the state up-to-date information on farm inputs needed for farming, cutting-edge agricultural knowledge at their fingertips, and easy access to the benefits of numerous welfare programs for their agricultural produce in various markets.

Benefits of Smart Farming in India

1. **Increase Efficiency:** Through strategic farming, farmers may boost productivity. Modern technology allows farmers to produce more goods in a shorter amount of time. They conduct quick inspections, anticipate problems before they arise, and make critical choices to keep them out.

2. **Expansion:** agricultural is expanded by the application of smart agricultural technology. Every agricultural activity is of high quality and is completed on schedule.

With this technology, the short food chain is completed on schedule, and everyone in the nation has access to healthy food at a reasonable cost.

3. **Proper use of resources:** via the full and appropriate use of resources through smart agricultural technology. Resources that include energy, water, and land. Through the use of IoT farming data gathered from the sensors, which aids in providing the plants with the ideal number of resources.

4. **Cleaner process:** It's a greener method that can save water and energy while also enhancing frame quality. These devices assess pesticide and fertilizer usage. Compared to conventional agricultural practices, these technologies yield cleaner, organic goods.

5. **Agility:** Unpredictable weather variations, air quality, humidity, field soil, and crop health are all tracked by smart farming devices. That gives real time monitoring that can anticipate the state of the crop. This offers expert guidance during severe weather shifts that may help preserve the crops.

6. **Improved product quality:** Through the use of aerial drones, farm mapping, and agricultural sensors, these aid in the improvement of product quality. The ideal circumstances are created by smart farming technology to increase the value of nutritious goods.

Conclusion

Creative thinking will open doors and contribute to feeding the world's population. In addition, by raising their awareness of the whole agri-food chain, customers will be better equipped to choose specific product with knowledge. This may make it possible to fully disclose to customers the advantages of premium, organic, and cutting-edge sustainable production techniques. It may also create opportunities for farmers to manage fair trade more effectively, enabling them to make more informed decisions. At last, innovative and revolutionary business models that use the data-driven agri-food chain are approaching. In order to mobilize a critical mass of end users and confirm the associated advantages, however, the sustainability of IoT-based businesses—that is, the supply (providers of IOT technology) and demand stakeholders—must be carefully considered in the context of large-scale deployments.

References:

Ritaban et al. 2014. Development of an intelligent environmental knowledge system for sustainable agricultural decision support.Environ. Model. Softw., 52. pp. 264-272.

Tien JM.2013. Big Data: unleashing information.J. Syst. Sci. Syst. Eng. 22. pp. 127-151.

Wolfert et al. 2014. A Future Internet Collaboration Platform for Safe and Healthy Food from Farm to Fork, Global Conference (SRII), 2014 Annual SRII IEEE, San Jose, CA, USA.pp. 266-273.