

Applications of IoT in Agriculture

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Article by

Ms. Meghna R. Dave

Assistant Professor, Computer Engineering Department,
C. U. Shah College of Engineering & Technology
C. U. Shah University



Application of IoT in agriculture can be considered as a life-changer for humanity and the whole planet. Currently, the world is witnessing extreme weather conditions, deteriorating soil, drying lands, collapsing ecosystems which makes food production more complicated and expensive.

Apart from this, the population across the world is increasing day by day. As per some predictions, there will be more than 9 billion people in 2050 which means that demand for food will also be increased leading to acute shortages. With rapidly developing agriculture technology and IoT applications for smart farming, we can overcome the above mentioned situation.

In general terms smart agriculture means collecting information about agriculture and food production practices with the help of IoT, big data and advanced analytics technology. IoT generally refers to adding sensing, automation and analytics technology to modern agricultural processes. Implementation of IoT in agriculture will not only boost productivity and cut costs but will also act as primary measures to reduce the carbon footprint associated with farming and preserve energy and water resources. Same amount of tasks can be performed in a lesser amount of time and also increase the crop yields with the help of accurate data obtained through IoT. The IoT-based smart farming not only helps in modernizing the conventional farming methods but also targets other agricultural methods like organic farming, family farming (complex or small spaces,

particular cattle and/or cultures, preservation of particular or high-quality varieties, etc.), and enhances highly transparent farming.

Below mentioned are some common applications of IoT in smart agriculture:

- 1) Agricultural drones
- 2) Computer Imaging and Remote Sensing
- 3) Data Analytics
- 4) Monitoring climate conditions
- 5) Precision farming
- 6) Smart greenhouse
- 7) Smart sprinklers, lights, coolers, heaters

- **Agricultural Drones**



It is used to enhance agricultural practices. Drones in agriculture are used for crop health assessment, crop monitoring, spraying pesticides, irrigation, planting, and analysing the field. These drones capture multispectral, thermal, and visual imagery during their flight. With proper strategy and planning based on real time data collection, farmers can get various information such as plant counting, yield production, measurement of plant height, drainage mapping, weed pressure mapping, etc.

- **Computer Imaging and Remote Sensing**



- Computer Imaging can be done by placing sensor cameras across various corners of the farm in order to generate images through digital image processing. Images captured can be used to conclude size, shape, colour and growth of crop resulting in quality control.



- In IoT based remote sensing, sensors are placed across the farm to keep track of any alterations in the shape, size, light, humidity and temperature. By doing so, crop diseases can be prevented and one can keep track of the advancement of crops.

- **Data Analytics**



It helps to provide insights about farm productivity, when to irrigate, sow, harvest, and the patch of land that can be used by farmers. Moreover, analytics is enabling farmers to make data-based decisions like which crops to plant for their next harvest. In order to increase yield and profit, farmers and growers should make use of data and innovation as much as possible.

- **Monitoring Climate Conditions**



IoT solutions enable farmers to know real time weather conditions. The sensors placed in farms help to recognise any change in weather conditions that can affect crop production.

- **Precision Farming**



Precision farming is an approach where inputs are utilized in precise amounts to get increased average yields, compared to traditional cultivation techniques. precision agriculture (PA) technologies system approach to reorganize the total system of agriculture towards low-input, high-efficiency and sustainable agriculture.

Precision farming helps to increase agriculture productivity, prevents soil degradation, reduction of chemical application in crop production, efficient use of water resources, dissemination of modern farm practices to improve quality, quantity and reduced cost of production, developing favorable attitudes. Precision farming has changed the socio-economic status of farmers.

- **Smart Greenhouse**



A smart greenhouse can be created with the help of IoT. These smart greenhouses intelligently monitor and control the climate without requiring any sort of manual intervention.

The IoT sensors installed inside the greenhouse provide crucial information on temperature, humidity, pressure, and light levels. These sensors control everything from turning on the lights and opening a window to controlling temperature and cooling off, all through a Wi-Fi signal. Remote access is created by connecting the system to a cloud with the help of IoT. This eliminates the need for constant manual monitoring. The cloud server controls the data processing and applies a control action inside the greenhouse.

- **Smart sprinklers, lights, coolers, heaters**



Water consumption can be reduced with the help of smart sprinklers which makes agriculture more sustainable. Connected coolers and heaters in storage and transportation facilities create better preserving conditions for the product and help reduce waste. Intelligent LED lighting automatically adjusts to the changing conditions and ensures every part of a greenhouse or storage space gets the right amount of light.

Thus there are several applications of IoT in agriculture. And, the use of IoT enhances produce quality, reduces wastage of resources and increases yield of farms a three fold benefit to the farming community.

