

Different Approaches for Smart Agriculture using IOT

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1 Introduction

Most of the countries still rely on traditional ways for farming but in the recent years change in climatic conditions, global warming and deforestation has made these conventional methods fail as they require lot of manual work where farmers invest more time monitoring the fields and rely on estimations and guesswork. Using Smart Agriculture with IOT Sensors help farmers to monitor their crops and make better decisions on when to harvest the crop. This results in less wastage and more production. The primary goal of the essay is to elucidate different approaches for smart agriculture using IOT by covering temperature data, content of soil moisture and density of sunlight etc.

The varying climatic conditions of different regions reduced the overall productivity. To minimize this issue and fulfill the food demands we need a smart approach for enhancing the food productivity.

With the previous approaches using IOT there was no Live data from the sensors regarding the crop conditions. But with the current approach sensors are connected to cloud which helps in getting the real time weather data, hourly report of soil moisture, humidity etc.

Sensors are utilized to monitor numerous characteristics by connecting a WiFi module to the appropriate sensors and sending information to an IOT gateway for analysis and storage.

The key components of this paper include how IOT using smart agriculture and issues faced from the previous approaches and the feasibility of integrating technology in agriculture.

2 Related Work

The Department of Electronics and Communication, University of Allahabad, published a paper on Smart Agriculture using IOT using various methodologies like PCB Layout, Humidity and Temperature Sensor, Arduino IDE but most of the sensors have limitations they do not provide real time data about weather and climatic conditions.

So in this paper we try to focus on integrating all the required sensors for getting real time temperate variations, rainfall patterns, humidity and soil moisture data.

Samir Dawaliby R and D Paris, France, published a paper on IOT Platform for Autonomous Drone Operations Management how to handle their activities across a variety of IOT devices, like monitoring and tracking, weather forecasting, farming. The latter contains a huge number of sensors that occasionally send incorrect signals owing to a insufficient power or a computer failure and must be remotely monitored in remote regions with drones.

Devesh Mishra of the Department of Electronics and Communication offers a smart agriculture approach for a small area that makes use of sensor devices such as the temperature and moisture sensors. This technology is designed to keep costs low while also providing a simpler platform for monitoring the factors for crop development via the IOT devices.

3 Smart Agriculture

Smart Agriculture is a new concept which refers to farm management that uses technology such as IOT, drones, robots, and Artificial Intelligence to raise the volume and standard of goods while reducing the efforts of manual work needed for the production.

Farmers who are equipped with such instruments may observe field conditions without visiting to the ground and make important decisions for the entire farm.

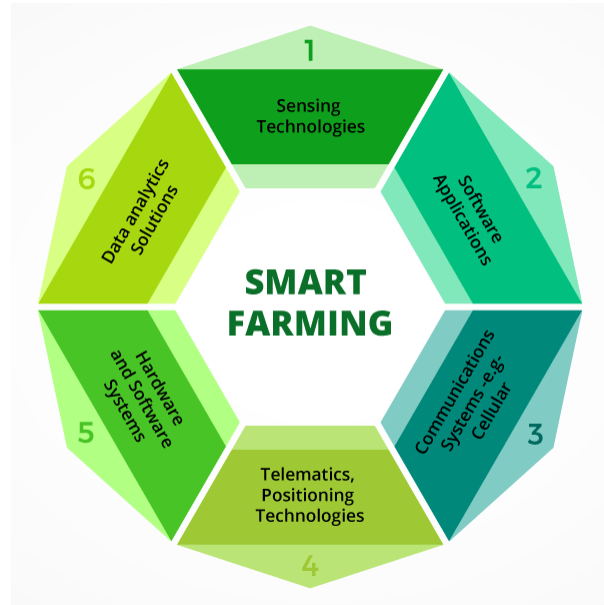


Fig. 1. Lifecycle of Smart Agriculture using IOT

3.1 IOT in Agriculture

IOT technology is behind the proposed system's operation. IOT allows us to automate and control everyday devices through the internet from anywhere on the world.

Smart farming that enable farmers to do more with less through digital technology. Large amounts of critical data are collected in real time by sensors and IoT devices. UAVs and robots that evaluate crop productivity and growth, as well as video devices for livestock surveillance.

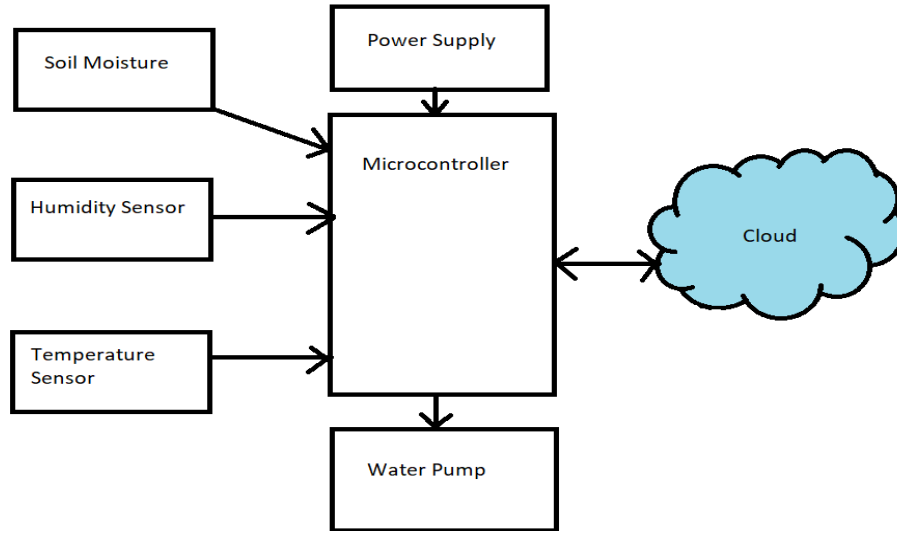


Fig. 2. Block Diagram of Smart Agriculture using IOT

Drones for agriculture are an excellent technique to obtain aerial footage of crops. UAV's can be used for crop monitoring, nutrient deficiency detection, and scouting. Farmers might utilize this data to optimize their agricultural management decisions by the use of GPS coordinates.

Crop Monitoring: Crop monitoring devices collect information about crop growth, moisture, humidity, rainfall, other features in addition to weather conditions like weed monitoring, volume of water, insect detection, animal penetration into the field, crop production, IOT allows farmers to connect to their farms from everywhere at any time. Micro controllers are utilized to control and automate agricultural procedures, while wireless sensor nodes are employed to check farm conditions. Wireless cameras have been utilized to view the circumstances virtually in the form of videos and images. A mobile phone allows a farmer to stay up to date on the current state of his farmlands utilizing IOT anywhere

and any location across the world. IOT technology has the potential to cut costs while increasing productivity.

Grain Monitoring: It takes a lot of effort and money to keep track of grain storage. Even when employing temperature-controlled storage, grain workers must manually verify each grain storage site to ensure that everything is in working order, which might take all day if they are spread out over a site. By incorporating IOT monitoring capabilities that send out mobile notifications whenever symptoms of spoiling are detected. It may also add IOT capability to existing monitoring systems, such as temperature cables.

Monitoring Climate Conditions: Weather reports with smart sensors may collect data and communicate it to a farmer. Furthermore, the data is first examined using special software, and the farmer receives a prepared analysis that allows him to make a thorough prediction and avert crop losses.

Livestock Management Data on various parameters of animal health is provided via IOT-enabled livestock management systems. Animals' position, temperature, heart rate are monitored using a wearable collar or label with sensors, which wirelessly communicate the data to farmers' devices real-time.

This enables farmers to monitor the wellness and position of each animal in their farm from anywhere, as well as get notifications if anything is out of the ordinary. Instead of personally checking each animal to determine if a disease has spread, they can tell which livestock is sick and aren't. So this helps to collect and evaluate previous data to determine pattern in animal wellness or to track disease transmission.

3.2 Drones in agriculture

It is becoming increasingly common for farmers and agronomists to employ drones to help streamline their activities and acquire important insights about crops via extensive data analytics which is an effective technique for farming systems.

Drone data can be used to identify and develop continual adjustments, like garbage management and recommended fertilizer modifications in crop monitoring. Products accountable for farmers' to consumers' may be accurately tracked using GPS locations for each stage of their journey.

In order to find the optimum planting instructions, Drones can be used to closely examine large parts of farms, considering factors like height, slope. The technique has also proven useful in obtaining a full view of plants growth and density, which may benefit in planting choices, slimming, pruning actions, and agricultural model refining.

4 Conclusion

We have discussed different approaches of smart agriculture using IOT and with the current approach sensors are connected to cloud which helps in getting the real time weather data, hourly report of soil moisture, humidity etc. After analysing the issues faced from the previous approaches and the feasibility of integrating technology in agriculture using drones, wireless sensor devices. We can integrate the techniques of the ever increasing development in the field of Machine Learning with IoT and make the process of collecting and monitoring much effectively.

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