

SMART FARMING

TECHNICAL INNOVATION IN FARMING

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INTRODUCTION

Smart Farming is a concept of farming management using modern Information and Communication Technologies to increase the quantity and quality of products. The Third Green Revolution is taking over the agricultural world based upon the combined application of ICT solutions such as precision equipment, the Internet of Things (IoT), sensors and actuators, geo-positioning systems, Big Data, Unmanned Aerial Vehicles (UAVs, drones), robotics, etc. Farmers in the 21st century have access to GPS, soil scanning, data management and Internet of Things technologies. The world will need to produce 70% more food in 2050 than it did in 2020 in order to feed the growing population of the Earth, according to the UN Food and Agriculture Organization. To meet this demand, farmers and agricultural companies are turning to the Internet of Things for analytics and greater production capabilities.

- Among the technologies available for present day farmers there are sensing technologies, including soil scanning, water, light, humidity and temperature management
- Software applications — specialized software solutions that target specific farm types
- Communication technologies such as cellular communication
- Positioning technologies, including GPS
- Hardware and software systems that enable IoT based solutions, robotics and automation
- Data analytics, that underlies the decision making and prediction processes

APPLICATION OF IOT IN AGRICULTURE



PRECISION AGRICULTURE:

Popular definitions of Precision Agriculture (PA), Satellite Farming or Site Specific Crop Management (SSCM) describe the term as “a technology enabled approach to farming management that observes, measures, and analyzes the needs of individual fields and crops”. The development of precision agriculture is shaped by two trends: “Big Data and Advanced Analytics Capabilities and Robotics, aerial imagery, sensors, sophisticated local weather forecasts”. The biggest difference from the classical approach is that precision farming allows decisions to be made per square meter or even per plant/animal rather than for a field. In simple words farming that collects and uses data of plots for managing and optimizing the production of crops is known as Predictive farming. It is predicted that in the next ten years, nano-technology led application will play a critical in agriculture.

Agriculture drones:

Drones can be put to excellent use in the agricultural industry. Typically, there are two types of drones namely, ground-based and aerial drones. Since drones collect multispectral, thermal, and visual imagery during the flight, the collected data provide farmers with insights into plant health indices, plant counting and yield prediction, plant height measurement, canopy cover mapping, field water pond mapping, scouting reports, stockpile measuring, chlorophyll measurement, nitrogen content in wheat, drainage mapping, weed pressure mapping and so on.

Smart Greenhouses:

Smart greenhouse is a step ahead of the regular greenhouses. In these setups, the microclimate is controlled and monitored to ensure optimal plant growth. Greenhouse Monitoring Software that supports this capability includes Growlink, Farmapp and Green IQ.

Livestock Management:

There are specialized sensors for livestock management that can be attached to every livestock animal on the farm. These sensors collect data about animal health and maintain a log of the performance. Smart Farming techniques, enable farmers to better monitor the needs of individual animals and adjust their nutrition correspondingly, thereby preventing disease and enhancing herd health.

Crop Water Management:

In order to perform agriculture activities in efficient manner, adequate water is essential. Agriculture IoT is integrated with Web Map Service (WMS) and Sensor Observation Service (SOS) to ensure proper water management for irrigation and in turn reduces water wastage.

Integrated Pest Management or Control (IPM/C):

Agriculture IoT systems assures farmers with accurate environmental data via proper live data monitoring of temperature, moisture, plant growth and level of pests so that proper care can be taken during production.

Food Production & Safety:

Agriculture IoT system accurately monitors various parameters like warehouse temperature, shipping transportation management system and also integrates cloud based recording systems.

BENEFITS OF USING IOT IN AGRICULTURE:

- The effective use of inputs helps in reducing wastage and thus, decreases costs incurred.
- Losses due to diseases and infections can be reduced, by continuous and real-time crop monitoring.
- The use of water can be optimized, which in turn shall reduce water wastage.
- The use of IoT-based devices allows better management of farm activities.
- With IoT, various factors would also lead to the protection of environment.

CONCLUSION:

Smart Farming applications do not target only large, conventional farming exploitations but could also be new levers to boost other common or growing trends in agricultural exploitations, such as family farming (small or complex spaces, specific cultures and/or cattle, preservation of high quality or particular varieties, organic farming and enhance a very respected and transparent farming according to European consumer, society and market consciousness. Smart Farming can also provide great benefits in terms of environmental issues. For example: Through more efficient use of water or optimization of treatments and inputs.

