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Multidisciplinary Model for Smart Agriculture using IoT

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***Abstract*: The proposed system is multidisciplinary model for smart agriculture based on the key technologies. Although precision agriculture has been adopted in few countries; the agriculture industry in India still needs to be modernized with the involvement of technologies for better production, Internet-of-Things (IoT), Sensors, Mobile Computing, and Farmers need to be registered to the Cloud module through Mobile App module.**

***Keywords*: Sensors, IoT, Cloud**

1. Introduction

Internet of Things is a technology which tends to connects all the objects in the world to the proposed system is multidisciplinary model for smart agriculture based on the key technologies. Although precision agriculture has been adopted in few countries; the agriculture industry in India still needs to be modernized with the involvement of technologies for better production.

Proposed model is beneficial for increase in agricultural production of Agro-products. Soil Monitoring for Precision Farming: Monitoring soil conditions is a simple use case—but it can lead to a fantastic return on investment for farmers. We've seen several great uses for agriculture IoT in this space: Sensing for soil moisture and temperature, Controlling water usage for optimal crop growth. Determining custom fertilizer profiles based on soil chemistry. Determining the optimal time to plant and harvest, Reporting weather conditions.

2. Objective

Our main objective is to study how does Internet of Things work for agriculture. We are about to design a model for farmers that uses the given app for their own agricultural benefit. To help the farmers to know the exact status of the farm by designing an interface.

3. Literature survey

Use of IoT has been proposed in agriculture domain. It is described as the architecture which utilizes Future Internet characteristics. The farmers will get Easy access to information and advice through this architecture. IoT has been used for product supply chain business process. In IoT and Cloud have been used for agriculture sector. In authors have explained this in the context of service providers and supply chain for cost effective services for farmers. In authors have described controlled architecture of smart agriculture based on IoT and Cloud Computing. Use of cloud computing for agriculture sector for storing details of agriculture information has been explained in [1].

In [2] authors have described controlled architecture of smart agriculture based on IoT and Cloud Computing. Cloud storage stores work history information, fertilizers distribution, soil temperature, moisture, humidity through sensors and environment information collected through sensors, collection and recording information. Smart mobile phones are available now days to many users including in the rural areas. IoT device which can be interfaced to soil and environmental sensors to collect soil properties and current environmental conditions. Authors have analyses the collected data for correlation between environment, work and yield for standard work model construction. Monitoring for adverse signs and fault detection. [2]

In [3] authors have designed and implemented a soil temperature, humidity monitoring system for agriculture using and sensor technologies for the operation. In this author have proposed development of rice cropping monitoring system for real time monitoring to increase rice production. This system makes use motes with external sensors for leaf wetness, soil moisture, soil pH, atmospheric pressure sensors attached to it. PH values are sent to the farmer from base station via GSM modem in the SMS form. Using the pH values farmer can decide the amount of fertilizers to be used. IoT with data mining is discussed. [3].

The approach is based on to predict crop yield by sensing soil properties and atmospheric parameters. Sensors are used in agriculture domain and how it will affect the cost reduction and benefits. Challenges in agriculture sector and remote sensing applications are discussed in which include crop estimation and cropland mapping, based on soil temperature, humidity monitoring system for agriculture using and Sensor technologies for the operation. Development of crop monitoring system for real time monitoring to increase crop production. This system makes use motes with external sensors for leaf wetness, soil moisture, soil pH, atmospheric pressure sensors attached to it. PH values are sent to the farmer from base

station via cloud or in the SMS form. Using the pH values farmer can decide the amount of fertilizers to be used. IoT [4].

In [5] Application of agricultural information cloud Cloud computing in planting management by using cloud computing database, information management of specific processes of plant production becomes possible and this allows cloud computing management of relevant records and storing of data related to production performance shown by individual plant and plant groups, analyze and compute, make production plans, etc. This include automatic analysis of key problems occur in specific process of production, like analysis of potential management defects, measurement and analysis of productivity and property based on productivity curve.

In [6] Cloud computing in estimation of productivity effect and management measures Smart Agriculture Based on Cloud Computing and IOT Fan TongKe Cloud computing estimates productivity effect of plants with production function constructed by using computer simulation and mathematic modeling. For example, scientists use random model and computer simulation technologies to estimate the benefit of various management strategies adopted in different growing processes of key plants. Cloud computing in tracing and control of farm produce security by using information technology of computer network, cloud computing is able to build a tracing system for regional farm produce, thus enhances security monitoring of farm produce "from farm to dining table" and realize certification of pollution-free farm produce and place of origin.

4. Proposed system

Monitor various soil properties from agriculture and environmental conditions periodically through portable cost effective IoT device and usable by farmers. Sensor give information about crop production details to the farmers after crop harvesting and stores these details at the central place as in the cloud storage. This in result producing in good crop an over the time and will be analyzed for current crop, mapping of crop production to soil properties at that time, next crop to be cultivated etc. This will be helpful for increase in production.

This will facilitate distribution of products from farmers to buyers and from agro vendors to farmers. Through the Ministry of agriculture farmers will be able to get notifications about new schemes announced by the government for agriculture sector. Sensor Kit module is portable IoT device with soil and environment sensors. Mobile App module provides interface to the users.

5. Implementation

Here we proposed an IOT based project Multidisplinary Model for smart Agriculture. In this system we monitor the properties of soil. The proposed system consists of various sensors which predict the various properties of soil and environment such as soil moisture, temperature and humidity. The various sensors used are DHT11, PH probe sensor and soil moisture sensor. The sensor detects the properties of soil, as the environment condition changes the sensor will send the message to farmer and on mobile Application. Blynk Application is a platform where we store contious data of soil properties which has been detected from the sensors in agriculture field. The output values given by the sensors are stored in Application.

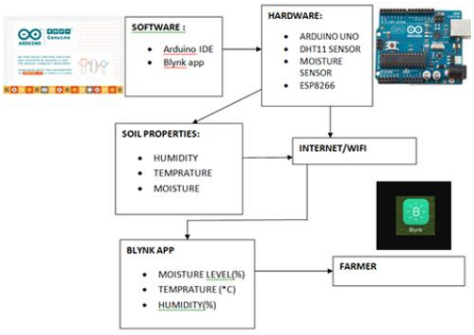
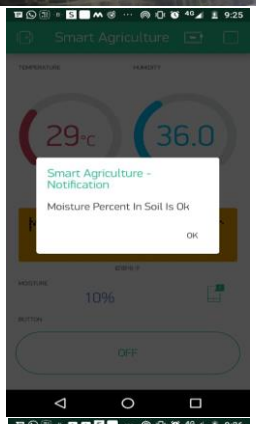


Fig. 1. System design



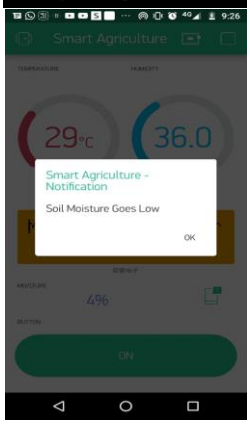


Fig. 2. Hardware setup and implementation

6. Conclusion

We have proposed a multidisciplinary approach for smart agriculture using key technologies: Internet of Things, Sensors. Through real time sampling of soil farmer will be able to get current fertilizer requirements for the crop the proposed system is Less complex, more efficient than the rural style of farming, reliable and helps farmers to produce good production of crops. It encourages the use of modern technology in agriculture.

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