

Smart Agriculture Using IoT

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Abstract—Now a day's demand by agricultural product is harvesting, evaluation, technology, weather change. Diseases and insets, damages regarding agricultural are majorly analyze by different methods but some of them are unable to proceed properly with the same. To improve the analysis of all, this paper design IOT based monitoring system to analysis all the demanding issues. This paper developed by decision support, forecasting of all the demands and requirements as mentioned above using IOT sensor. This process include analysis by sensor right for saving to harvesting.

Keywords: *IoT, Raspberry Pi, Cloud Computing, Mobile Computing and Sensors*

I. INTRODUCTION

Some recent techniques such as Big Data analysis, sensor technology such as environmental sensor, cloud computing and mobile computing etc. are used in various fields. Use of all these in the field of agriculture is like a emerging one to improve the sector. IOT is the method which used to connect the different ideas, thoughts regarding various field to make them interlinked to get right information to right stack holder at right time. It is used to provide the simple and convenient network for all. It can used monitoring and tracking of different domain such as healthy environmental, utility, etc. It is also helpful to make automation to improve the quality and working of field.

Internet-of-Things and Big-Data analysis are recent technologies from last few years and applications are being developed in various domains using these as key technologies. Sensor technology has also been advanced and many types of sensors like environmental sensors, temperature and humidity sensor, nitrate sensor, potassium sensor, pH sensor, Environmental sensor are developed and used in applications as per the need. Cloud-Computing and Mobile-Computing are mature technologies and applications exists in almost every field using those technologies. Uses of these technologies in the field of agriculture are also introduced and are used for improvement in this sector.[1]

II. NEED OF IOT IN AGRICULTURE

Agriculture sector is the most important factor in Indian economy. 14.7% of India's growth depends on agricultural sector. Farmers of India have lack of knowledge. A major part of farming and agricultural activity is based on prediction. This prediction sometimes fails. It results into loss of farmers. Due to this, some farmers may commit suicide. Climatic change is the most important barrier that comes in traditional farming. There are many effects of climatic change such as heavy rainfall, most intense storm and heat waves, less rainfall. Climatic change also affect changes in life cycle of plants. IOT can minimize these barrier and increase productivity. As population is increasing day by day, farmers and agriculture companies are moving toward IOT for analytics and greater production capabilities. A forecast by UN Food and Agriculture Organization (FAO) denotes that food consumption will increase by 70% from 2050 as compare to 2006. This will lead to increase in food production. IOT could play important role in fulfilling these needs. It can do so by using proper amount of fertilizers and pesticides, predicting diseases, scanning storage capacities like water tanks and making sure that crops are fed and watered well.

Farmers depend on rains and bore wells for irrigation of their land. Recently they have been using irrigation technique through manual control in which they irrigate their lands at regular interval by turning water pump

on/off when required. In this situation IOT is needed to reduce human intervention,time and cost.

IV. SCOPE

A fully automated farm can increase the production of a crop than present technique without interaction of a farmer in zero loss business. Like you can implement a remote control robot with a various types of sensors and devices like camera, obstacle, sprayer etc. use of a non-conventional energy sources like solar panel, wind power. Also you can use a alarm system so that animals cannot be disturb the productivity of the plant.

V. DESIGN MODULE:

The sensor input module is the heart of this architecture, as it does half of the work of module. sensor input module is responsible for communications between sensor and internet as well as communication with the mobile app. sensor input module consist of three main entities those are Communication internet, mobile app, cloud computing. Sensor Kit module is portable IOT device with soil and environment sensors. Mobile App module provides interface to the users. Agro Cloud Module consists of storage, Big-Data mining, analysis and knowledge building engine and application module to communicate with the users.

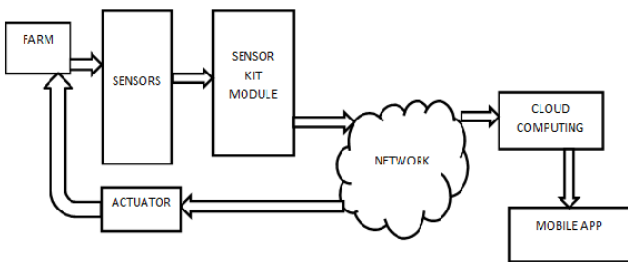


Figure1: Multidimensional module for smart IOT

A. Working Process

- **Cloud Computing:**

All the user of agricultural sector need to be registered ToAgroCloud through mobile app. AgroCloud storage consisting of Big-Data storage will store all the details of farmer, agro marketing detail, and service provider.

Cloud computing provides sharing of resources with cheap cost. Cloud computing service provide offers services like infrastructure as a services (IaaS), Platform as a services (PaaS), like and software as service (SaaS) with cheap cost. Cloud computing has been used for storage of agriculture data [4, 5]. It has been use in agriculture sector along with IoT. [2, 3]

- **Mobile app:**

Mobile app application need to be installed on end user mobile phone. Internet of Things, commonly known as IoT, is making news every single day, for one reason or another. Since sometime though apps are making the news with IoT as well. The fact is getting established slowly but steadily that mobile apps are leveraging the IoT.

- **Actuator:**

It perform important role in a multidimensional smart IOT agricultural. An actuator is a mechanism for turning energy into motion. Actuators can be categorized by the energy source they require to generate motion.

- **Sensor Kit Module:**

This module is an important part of this agricultural and is responsible for soil sampling for period interval to get soil property values.

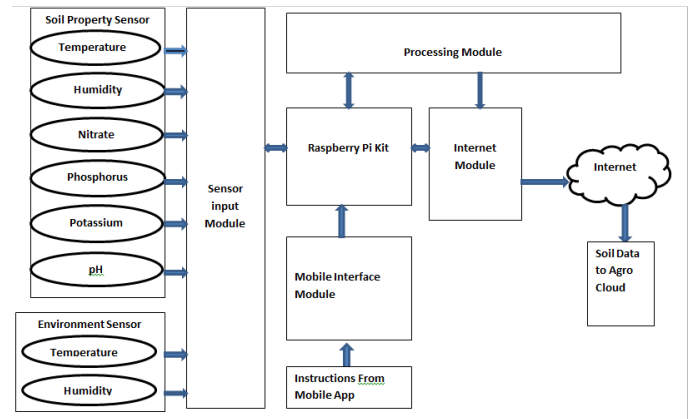


Figure 2: Sensor Kit Module

Figure 2 show the sensor kit module. Sensor kit is cost effective and portable kit in which we have considered the used of raspberry-pi kit which is IOT enabled device with memory and processing capability. The major compound of this kit is like temperature sensor, humidity sensor, nitrate sensor, potassium sensor, pH sensor and environment sensor.

B. Significance in Agriculture

Due to IOT we can decide how much amount of water supply is needed for agriculture. Shortage or excess of water damages the crops. By using IOT we can analyze water requirements. Weather forecasting with accuracy can be done. It lead to high productivity. We can also decide how much amount of fertilizer and pesticides are required. By using IOT we can maintain record of pH levels,temperature and soil moister. With the use of this record farmer can make decisions about agriculture.

VI. OBJECTIVE\

The main purpose of this system is to increase the production of crop using automation. Increase the production of a crop with minimum interaction of a human being using IoT technology, in IoT use a different types of a sensors such as humidity sensor, temperature sensor, rain sensor using this sensor collect the data that shoes the exact condition of a plant and atmosphere and all the information is send to the farmer using cloud computing. This system introduce the smart solution for agriculture and efficiently solve the problem related to the farm.

VII. CONCLUSION

As an important constituent part of the IoT, sensor networks enables us to interact with the real world objects. In this

project we are dealing with the sensor network design that enables connecting agriculture to the IoT. The connection sets up the links among agronomists, farms, and thus improves the production of agricultural products. It is a comprehensive system designed to achieve precision in agriculture.

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