

# SMART FARMING SYSTEM USING IOT

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## Abstract

Agriculture is the primary occupation in our country for ages. But, now due to lack of interest, increasing weather problems and migration of people from rural to urban areas and almost universal lack of good extension services, agriculture sector faces lots of problem. To overcome this problems, we go for smart farming techniques using IOT. This system is created mainly for the Greenhouse Farming but it can be used in any type of farming. This project includes various features like moisture and humidity sensing of soil and air, temperature and light sensing. Network of several wireless sensors are used to note down the soil properties and environmental factors continuously. This project is three-tier system in which first the sensors are used to note the parameters, followed by displaying the value of each factors remotely and comparing with optimized values of each. This prototype system is subjected to several tests. The experimental results express the systems reliability and accuracy which confirms the feasibility in real-world application.

**Keywords** — Soil Moisture Sensor, Humidity Sensor, Temperature Sensor, IOT.

## I. INTRODUCTION

At the present, India hold second ranked in agriculture sector in the world. As per 2019, agriculture employed more than 50% of the India work force and contributed around 17% - 18% to countries GDP. More than 70% household depend on agriculture as their principal means of livelihood. A greenhouse is a framed structure covered with a transparent material and large enough to grow crops under partial or fully controlled environmental conditions to get optimum growth and productivity. Every crop has its own comfortable environment for growth and it is very necessary to monitor it because the environment around the crop plays an important role in its quality, yield and also in the spread of diseases. To counter these complexities, this prototype is designed and developed, however it is not an integrated system to provide automation in agriculture but to monitor the essential environmental factors.

## II. EXISTING SYSTEM

Agriculture is the foundation of our Country. In Ancient times agriculturists used to figure the ripeness of soil and influenced presumptions to develop which to kind of product. They didn't think about moisture, humidity, level of water and also climate condition which dangerous an agriculturist more. They utilize pesticides in view of a few suspicions which made lead a genuine impact to the yield if the supposition isn't right .The profitability relies upon the last phase of the harvest on which agriculturist depends.

## III. PROPOSED SYSTEM

One way to address the Agriculture issues and increase the quality and quantity of agricultural production is using sensing technology to make farms more "intelligent" and more connected through smart application to known smart agriculture. We are develop module which senses Humidity, Temperature, and Moisture of soil and light Intensity. Through an interface, it guide to the farmer which is the suitable seed for the farm. The farming system consists of sensors like humidity, moisture and temperature sensor, a Wi-Fi module. The software consists of an IOT platform which includes set up of the profile for irrigation based on the seasons. The software sends notification Main Module to switch On/Off the system. Sensors sense all the physical parameters and

convert the analogue value to digital value. Humidity and Temperature sensors are used to estimate the humidity and temperature respectively on field. Soil Moisture Sensor is used to estimate the moisture content of the soil. For obtaining data in real time from the sensors, a module is combined. This data is then transmitted to the IOT gateway. The IOT gateway then transmits the data to the IOT platform (Cloud) using the Wi-Fi module. The cloud in the system will include a database. The database will maintain the data received from the IOT gateway. The Data collected are analyzed using Decision trees. Fig. 1 is the Diagram of Proposed system which consists of six modules i.e. Acquiring Data from the environment, Microcontroller Assembly, Network, Cloud storage, IOT based Interface and Hand held Device and are described as follows:

#### A. Data from Environment

The moisture from the soil is determined by the FC-28 soil moisture sensor which collect all data of the soil measured in percentage. The humidity and temperature are determined by DHT11. Humidity and Temperature Sensor are measured in percentage and Celsius respectively. The light intensity is measured by BH1750 light sensor in candela.

#### B. Micro-controller assembly

Fig. 2 is the messenger of Microcontroller assembly in the proposed system. This Microcontroller assembly is the hardware part of the system and governs the data get via the sensors present in it. The microcontroller job is to communicate with cloud storage and has Embedded Wi-Fi module which has the Wi-Fi range up to 300 meters which helps to propagate information through the network.

#### D. IOT based interface

IOT integration is concerned with APIs, the applications communicates with each IOT devices using logical connectors. APIs exhibit data that enables those devices to transmit data to the application, acting as a data interface. They also allow your application to take control of the device and act as a function interface.

#### E. Hand held Device

The monitoring of the data can be done in mobile application. The data received from the sensor are displayed in these applications which act as user interface. These application are operated in portable device like mobile phones which has LCD to display the data.

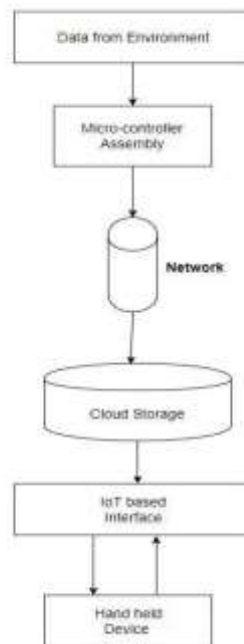
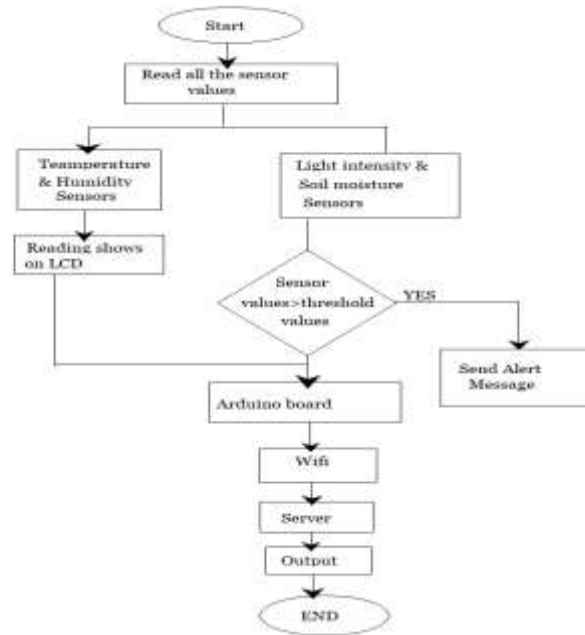


Fig 1. Diagram of proposed system



Hardware part  
Fig. 2 Microcontroller Assembly

## AGRICULTURAL ISSUE THAT IOT CAN ADDRESS

In this section several issue faced by farmers have been addressed-

### Climate Change:

It is the biggest issue of agriculture now days. In a conference in Gujrat on “Climate smart Agriculture” experts from agriculture sectors found out that agriculture production will decrease 10-20% by 2050 because of climate change. Climate change affects directly to agriculture and also impacts on quality and productivity of crops. Therefore a quick solution is required to address this issue .A recent report by Ericsson, in fact, claims that information and communication technologies (ICT) could help cut up to 63.5 Gt of GHG emissions by 2030.The Internet of Things can help decarbonizes our energy system, provide modern energy system to every human being, manage our infrastructure, and allow us to adapt to and address climate change.

### Soil Study:

Soil is major component in farming which has a great impact on the success of agriculture. Farmers check moisture and soil data receive an advantage in farming, including in precision agriculture.

### Water Study and Crop water estimation:

Water quality affects farming and crops output. Farmers need to make decisions on the amount of water their crops need. Crop water requirements depend on various conditions like crop types, season, climate, and growth stages of crops. Crops lose water through transpiration, and canopy loses water through evaporation. A project in Scotland, Dee, developed a Smartphone application which encourage users to submit information of water conditions, i.e. water level, water clarity, obstruction in river, algae cover, temperature, nonnative plants in water, and accompanying photographs of the River Dee.

### **Crop Produce Readiness Analysis:**

If farmers are supplied with the information of crop price, they can sell their crops in specific time to earn well. An innovative use of smart phone-based sensors is to determine ripeness of crops. IOT based application, smart phone camera is utilized to capture pictures of crops and UV-A light sources to determine ripeness levels for green crops. Farmers could integrate the system into their farms by separate crops of different ripeness levels into piles before sending them to markets.

## **HOW SMARTPHONE CAN HELP IN SMART AGRICULTURE**

Agriculture is the main source of farmers' incomes. Lack of access to relevant information leads yield, farmers & low income. People still believe in agriculture they do not want coming in smart farming. Data on soil could be used by biotech giants. Access to real time information about harvesting helps corporation predict property value of farmers to get idea about crops market. However IOT should be brought closer to primary sector by integrating with complementary tools to generate quantity and quality of crops and save the time of farmers. Farmers can check easily soil moisture, humidity sensor and light intensity through farming application and after getting all data then save the water consumption. The information from one farm can be shared with other farm in order to get aggregated output.

## **CHALLENGES IN IMPLEMENTING IOT IN RURAL AREA**

In India, There are many challenges to implement IOT in rural areas. Almost Indian farmers, lack of awareness about new technology provided by government, this is a major problem in rural areas. This created a barrier when government launch new technologies and implement some project like IOT based and many more. Another issue is Indian farmers are still believe in old generation agriculture system. In order media any such advance technology first step to aware among farmer. Mostly farmers are lack of essential infrastructure like proper irrigation system. To overcome this problem government use three step: -

- Provide education on new technology.
- Digital and IOT awareness.
- Connect skill-intervention to market.

## **CONCLUSION**

Agriculture is an integral part of India. It provides employment to approximately 52% of labor. Its contribution to GDP is between 14 to 15%. If government provides with proper training about technologies for farmer, with a smart mobile in hand farmer can perform many of their agricultural tasks without even reaching there. Basically it helps farmers to stay connected with their farms from anyplace anytime. It also helps in reducing human effort with increased productivity and it boosts economy of farmers as well as country. Therefore with fully equipped software and Internet of Things, agriculture industry can provide a better vision for next generation and make India better in coming days.

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