SMART AGRICULTURE

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ABSTRACT-India is an agriculture based country, whose economy is directly depends on agriculture. In past decade there is not much development in agriculture sector. Because in India still continuing with the same orthodox and traditional methods in agriculture. Due to lack of knowledge about modernization in agriculture. In this project, the current problems related to farming are solved. Smart agriculture is an automated and directed information technology implemented with IOT (Internet of Things). IOT is developing rapidly and widely applied in all wireless environments. A combined approach with internet and wireless communications, Remote Monitoring System (RMS) is proposed. Major objective is to collect real time data of agriculture production environment that provides easy access for agricultural facilities such as alerts through Short Messaging Service (SMS) and advices on weather pattern, crops etc.

Keywords - Smart agriculture, IOT.

I.INTRODUCTION

Agriculture is the basic source of livelihood of people in India, which is backbone of human sustenance in India. About 14.7% of India's growth depends on agricultural sector. Now-a-days food prices are continuously increasing because crop rate is declined. It has pushed 40 million of people into poverty since 2010, so it's a huge cause of concern.

There are number of factors which are responsible for this, it may be due to water waste, low soil fertility, fertilizer abuse, climate change or diseases etc. Due to this recent era, climate-smart methods called smart agriculture is adopted by many Indian farmers. Smart agriculture is existed with the combination of networks and wireless communications. IOT gives platform to researches to maintain real time data and sends alerts immediately to farmers. IOT implementation gives easy access to information that comes from sensor nodes. Here we use sensors for sensing the climate changes, crop diseases and water management.

II.EXISTING METHODS

The biggest problem faced during production of crops, leading to wastage of water or inaccurate amount of water being poured in the field. Due to human tendency, either greater or lesser amount of water is allowed to enter the field in different times. This is the major cause of destroying the crops. For gaining good yield, the water is allowed to enter the field in morning or evening times by following this method we may able to reduce the electricity bill. The water management is a major role in farming. And allowing the water level to the field is varying by the type of soils like red soil, brown soil.

Precision farming is a farming management concept based on observing, measuring and responding to inter and intra-field crop variability. This requires the use of technologies such

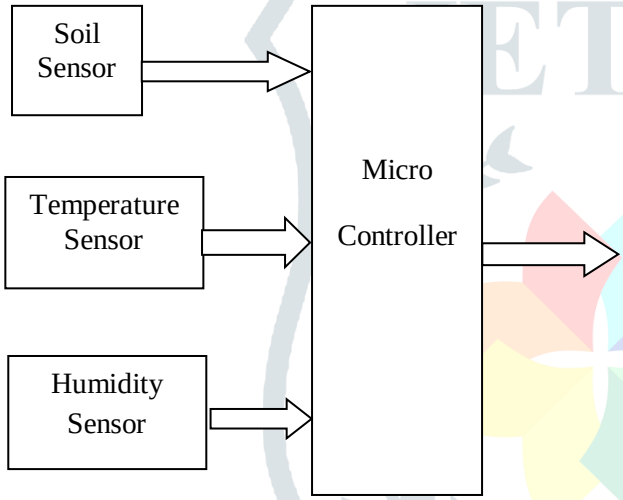
as Global Positioning Systems (GPS), crop sensors and Geographical Information System (GIS) computer software. The end goal of precision farming is to maximize the economic return by optimizing crop yield, and minimizing environmental impact.

III.PROPOSED METHOD

Proposed model for smart agriculture to develop real time monitoring system for soil properties like temperature, moisture, pH and to implement decision support advisory models for pest and diseases forewarning, crop diseases using image analysis and SMS based alarms. The intense use of technologies offers a means for providing the exact amount of water needed by plants.

It will also be possible to control various operations of the field remotely from anywhere, anytime by mobile as well as web applications (Using IOT).

IV.BLOCK DIAGRAM:

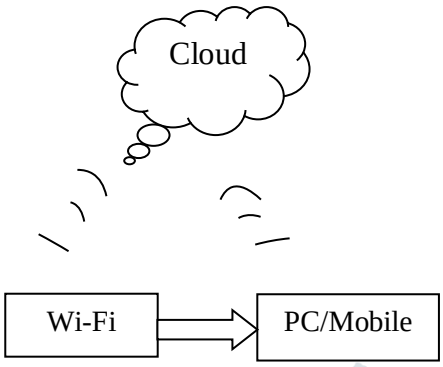


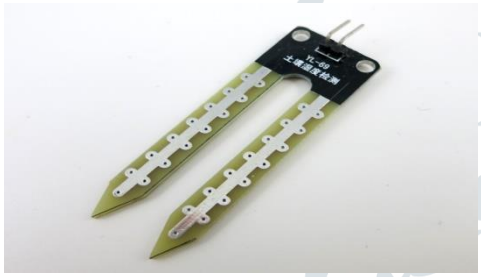
All the sensors are connected to microcontroller. A microcontroller takes input from the device it is controlling and controls the device by sending signals to different components in the device. Using Wi-Fi we are sending the information to cloud. Through short messaging service (SMS) we will get the real time information about climate changes.

Components

a. Soil sensor

Soil Moisture Sensor works similar to soil pH sensor. The collected data is sent to server.

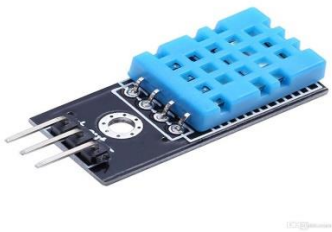




The server will perform required action like if the moisture is less than needed then supply water will be used to moisturize the soil.

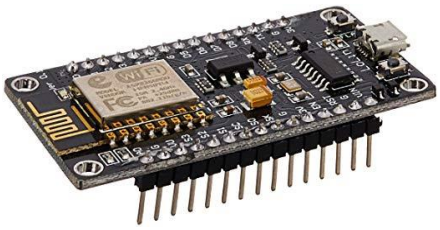
b. Temperature sensor

Temperature sensor is an electronic device that senses the temperature and sends the information to the main server by using micro controller. The average temperature required throughout the life period of the crop ranges from 21 to 37^0C.If the temperature range is exceeds, water supply is required.



c. NODEMCU

NODEMCU is an open source IOT platform. It includes firmware which runs on the ESP8266 Wi-Fi SOC from Expressive systems, and hardware which is based on the ESP-12 module.



The programming code is being written for ESP8266 Wi-Fi chip using Arduino IDE, for which installation of ESP8266 library is required. We designed to make working with this chip very easy.

V. IMPLEMENTATION

IOT based smart agriculture system is used to generate decisions regarding irrigation using real time data. It is implemented in three phases.

- Sensing
- Processing
- Information distribution

The sensing phase involves the sensing of physical parameters which includes temperature, moisture and humidity. All these sensors are connected to micro controller. Micro controller acts as the IOT gateway in the developed system as it has the capacity to transmit the data to the cloud. This transmission is done by using Wi-Fi ESP8266 module.

The processing takes place in the cloud. The cloud consists of a Web server, a database where the sensed data is maintained and decision logic which takes decisions based on the sensed data. In the information distribution phase, the output of the decision logic will be sent to the android application and then to the IOT gateway.

RESULTS

This is our prototype project which is used to senses the temperature, humidity and moisture content in soil.

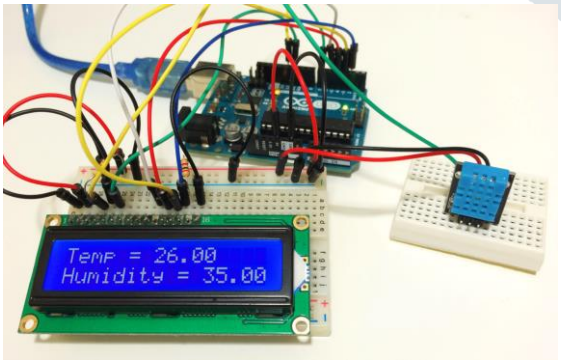


Fig.DHT 11 sensor interface with Arduino

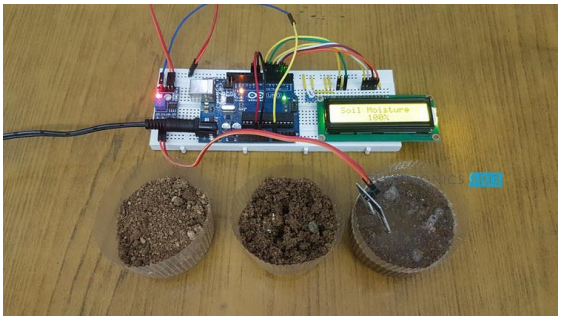


Fig. Soil sensor interface with Arduino

CONCLUSION

IOT technology offers real time monitoring and analytics for smart farming. It will help farmers in decision making and take immediate decisions for events happening. It increased the productivity and profit as well as better food production.

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