AGRICULTURAL FIELD MONITORING AND CONTROL USING IOT

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Abstract— This project explains about the field monitoring of agricultural and farming land using the techniques of IoT system, our project is to give cheap, reliable, cost efficient and easy to use technology which would help in conservation of resources such as water and also in automating farms. We proposed use of temperature and moisture sensor at suitable locations for monitoring of crops. The sensing system is based on a feedback control mechanism with a centralized control unit which regulates the flow of water on to the field in the real time based on the instantaneous temperature and moisture values. The sensor data would be collected in internet of things which would take further action.

Keywords— Arduino Uno; Temp Sensor; PIR Sensor; IoT; Water Level Sensor

1. INTRODUCTION
Crop farming in India is labor intensive and obsolete. Farming is still dependent on techniques which were evolved hundreds of years ago and doesn't take care of conservation of resources. The newer scenario of decreasing water tables, drying up of rivers and tanks, unpredictable environment present an urgent need of proper utilization of water. We have the technology to bridge the gap between water usage and water wastage. Technology used in some developed countries is too expensive and complicated for a common farmer to understand.

Thus by providing right amount of water we would increase the efficiency of the farm. The farmer can also look at the sensory data and decide course of action himself. We have made the interface of our project keeping in view the educational and financial background of average Indian farmer. In this paper we are proposed a low cost and efficient wireless sensor network technique to acquire the soil moisture and temperature from various locations of farm and as per the need of crop controller take the decision to make irrigation ON or OFF.

Improvement of agriculture field has become biggest challenging for the countries like India, so new technologies have to be adopted. We have implemented a novel methodology of physical parameter monitoring, data display, data integration to the cloud, alert generation and predicting the future values with the help of Embedded C analysis. We have used temperature sensor, rainfall sensor, light sensor and the moisture sensor. These sensors have been installed in the agriculture field to collect the data, and thus data is mitigated into the cloud with the help of IoT hub(Things peak).

So user can have a real time data visualization, with the help of MATLAB analysis user can predict the future parameter values. By predicting the moisture value user can have control over the agriculture field by using a MQTT, by sending commands. MQTT is a machine to machine communication protocol which is based on pub-sub service.

In this we have subscribed to the servers by creating channels, server could be “iot.eclipse.org” and “test.mosquitto.org”. The remote monitoring solution that we offer can be monitored in real time through any remote devices including mobiles or tablets. This provides the flexible for the data visualization, data understanding, and the predictive analysis also given the scope for the farmers to prepare for the advanced data which might appear in the future.

2. RELATED WORK
In this method, the farmers have been using irrigation technique in India through the manual control in which the farmers irrigate the land at the regular intervals. This process sometimes consumes more water or sometimes the water reaches late due to which the crops get dried. Water deficiency can be detrimental to plants before visible wilting occurs. Slowed growth rate, lighter weight fruit follows slight water deficiency.

The proposed agricultural environment monitoring server system is applied to an agricultural environment, environmental and soil information could be monitored even at a remote site, and it is expected that this would contribute to increased crop yields and the improvement of quality in the agricultural field by supporting producers’ decision making about crop production through the analysis on the collected information. The agricultural environment monitoring server system proposed in this paper collects environmental information such as luminance, temperature, humidity, wind direction, wind speed, EC, pH, CO2 etc. which affect growth of crops and soil information through the WSN environmental sensors and soil sensors installed outdoors, collects image information on the outdoors and location information on the position where the server system is installed through CCTV and GPS modules, and the information is converted into a database through the agricultural environment monitoring server to provide suitable information to producers through to a variety of services. In addition, the server system is set up to use power supplied through solar cells so that it could be used in agricultural environments with insufficient power infrastructure.
3. PROPOSED WORK

The system is particularly useful for agriculture applications in sparsely populated semi-arid areas since human involvement and intervention is not needed for irrigation purposes. This method is to increase the efficiency of the moisture sensors so as to minimize the effects of fertilizers on the value of soil moisture. The system helps for increasing irrigation efficiency by reducing the labor cost and saving water and electricity. The system also consists of an IOT module through which the farmer can easily be notified about the critical conditions occurring during irrigation process.

The system is developed for smart irrigation is on two ways

- **PIR SENSORS**
  PIR sensor is used to detect the motion of any animals from the field. In the PIR sensor it has three inputs and one output. Its range can vary by adjusting the sensor. The PIR sensor itself has two slots in it, each slot is made of a special material that is sensitive to IR. The lens used here is not really doing much and so we see that the two slots can 'see' out past some distance (basically the sensitivity of the sensor).

- **PH SENSOR**
  PH sensor is used to detect the acid or base or neutral of the soil condition. If the PH value is less than 7 it is called basic nature. If the PH value is greater than 7 than it is called acidic nature.

- **TEMPERATURE SENSORS**
  Temperature sensor is used to detect the temperature of the soil. It ranges from -55 degree Celsius to -150 degree Celsius.

- **WATER LEVEL DETECTORS**
  Water level detector is used to detect the level of water of the field. Perhaps, water level increases it gives output to the Arduino.

- **LDR**
  Light Dependent Resistor which is used to detects the amount of light falling in the soil. The operating range -20 degree C 75 degree

4. WORKING

Program is already made to supply the flow of water into field using the pump motor1 to outlet into the field according to the kind of crops. Suppose if there is any excess amount of
the rainfall pump motor2 activate which is drain off excess amount of water from the field. Temperature, water level, light and PH of the soil is monitored and sent data to user by using IOT.

![Application for mobile used for controlling motor](image)

**5. FUTURE SCOPE**

In future, according to this project there will be chances to reduce the man power. So the farmers need not go to the agricultural field every day. It can be automatically controlled by the farmers anywhere without visiting the field.

**6. CONCLUSION**

From the data we conclude that irrigation process is done better than before to yield the proper production done before and usage of water level is limited how much that system needed only. Due to the regular updates to the server we can get proper knowledge to the system can work perfectly for indefinite time period, even in certain abnormal circumstances and increase the production rate.

**REFERENCES**


