

SMART FARMING USING IOT

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ABSTRACT:- The rapid growth in population has increased the demand of food. So there is a need to bring advancement in the field of agriculture. To keep up with the rapidly increasing population there is a need to double the crop yield. The crop yield mainly depends upon soil conditions. The parameters that has to be properly monitored to enhance the yield are soil moisture, weather conditions, water level etc. The soil should be maintained with good moisture and air in order to give good quality crop yield. Similarly use of proper amount of water for crop cultivation is necessary. The current situation is that there is not much crop development in agriculture sector. Food prices are continuously increasing because crop rate is declined. Thus, there is a need to bring advancement in the field of agriculture. Internet of Things (IOT) advances can be used in Smart Farming to enhance quality of agriculture. "Smart Farming Using IOT" is a proposed system which leads to remote monitoring of the farm and can achieve water conservation with increase in yield of crop. It contributes significantly toward revolutionary farming methods. Also, the sensor generated value enables the system to use an appropriate quantity of water which avoids over/under irrigation.

KEYWORDS: IOT, Automation, Irrigation, Moisture, Temperature, Humidity, Monitoring

INTRODUCTION:

Agriculture means production of foods and grains through farming. Farmers are the people who ensures that food is available for everyone. Production of crops mainly depends on soil condition therefore irrigation should be done with much care. Around 60% of water used for irrigation is wasted, poor irrigation systems are main cause of wastage of water. Alternate methods such as drip irrigation can be over-priced to be adapted. Agricultural operations have been highly enhanced after technology is combined with it. Smart Farming Using IoT enhances, automates and improves agricultural operations and processes. The system leads to increase in production with low cost and enables farmers with real time access to information. The objective of this system is to render a reliable, robust, efficient and intelligent farm controller device-based system which is smart enough to analyze distinct parameters of a field like moisture, temperature, humidity, etc. and provide a water delivering schedule in a targeted manner near the root zone of the crop to ensure all the crops get enough water for their healthy growth, thereby reducing manual intervention of farmer. The system analyses the soil quality to avoid soil erosion. The system gathers local

weather information and suitable factors to grow crops so that the crops always receive the appropriate amount of water. This system incorporates the concept of IoT (Internet of Things) via mobile App.

EXISTING SYSTEM:

[4] The proposed system introduced a GSM-SMS remote measurement and control system for greenhouse based on PC- based database system connected with base station. Base station is developed by using a microcontroller, GSM module, sensors and actuators. In practical operation, the central station receives and sends messages through GSM module. Criterion value of parameters to be measured in every base station is set by central station, and then in base stations parameters including the air temperature, the air humidity. [1] This proposed a system for detecting soil moisture by using soil moisture sensors and an ESP8266-12 microcontroller by using the losant platform. The results show that the data obtained from the sensor can be visualized in real time. Other research related to soil detection. [2] This paper describes greenhouse technology in agriculture represents the design and implementation based on ZigBee technology using CC2530 chip. It is mainly used for environment monitoring system. The wireless sensor and control nodes use CC2530F256 core for data acquisition, data processing, data transmission and reception. Here computer provides all the real time data for the concerned person using wireless communication like temperature control, fans condition. In this system uses intelligent monitoring and control of green house. It is helpful to farms for scientific and balanced planting crops. [5] proposed a wireless three-level controlled smart irrigation system to minimize the overall watering and crops production cost. The proposed system supplies the water when the soil humidity goes below the threshold value. [7] Proposed an automated irrigation system which monitors crop field using soil moisture, temperature, humidity, light sensors. The data from sensors are forwarded to webserver through wireless links. The data is encoded in JSON format in web-server database. The irrigation is automated if the moisture and temperature of the field fall below certain level. The farmers can monitor their field ubiquitously as the notifications are sent to their registered mobile numbers periodically

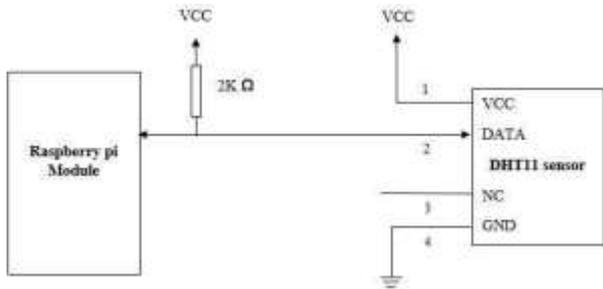
WORKING:

The Smart Farm using IOT comprises three major sections which are as follows:

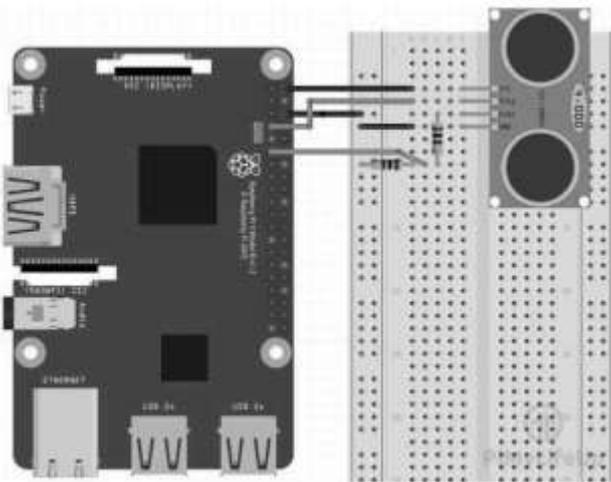
Sensor section: In this system we are using three sensors

i.e. DHT11 sensor, moisture sensor and ultrasonic sensor. This sensor determines the temperature, humidity and moisture in the soil as well as the water level in the tank. The water level in the water reserve is kept in check by the system and the farmer is informed accordingly.

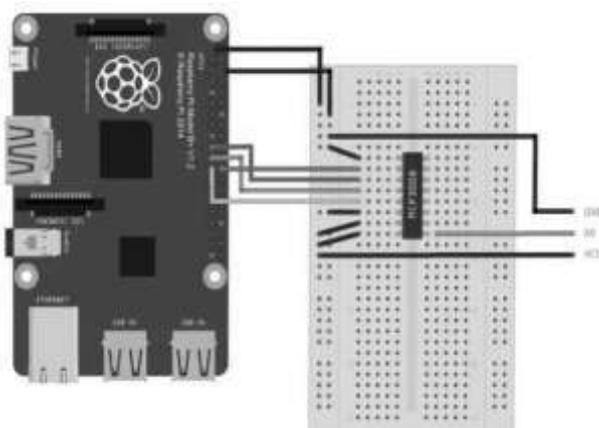
DHT11 sensor: -



Ultrasonic sensor: -



Moisture sensor: -



Control section:

Control Unit Consist of Raspberry pi, Relay Module and water pump.

2 Channel Relay Module

2Channel Relay Module is electrically operated switch which is used to Turn ON/OFF the motor.

Raspberry Pi 3 B

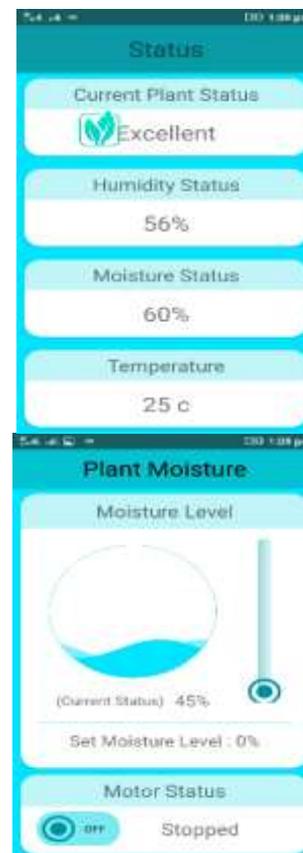
Raspberry pi monitors the system based on the values generated by various sensors. It defines the threshold value based on which it takes decisions whether to irrigate or not irrigate the field.

IoT section:

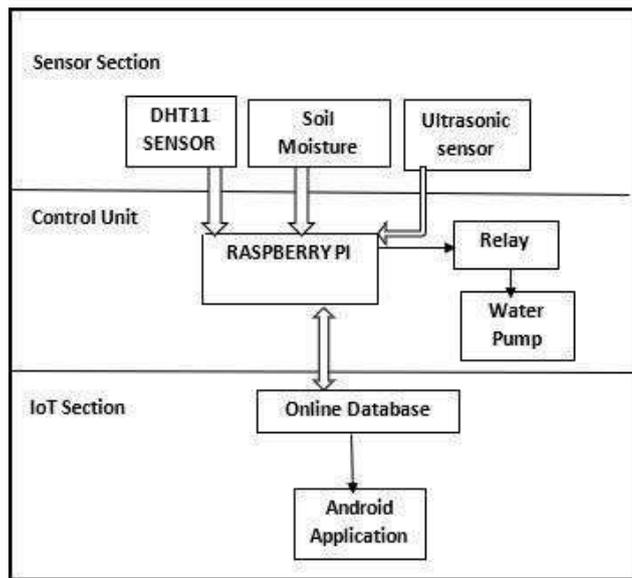
- Monitor different parameters of the crop, water reserve, weather patterns and supervises the irrigation.
- Maintain records of different crop parameters and corresponding weather conditions.

E-Plant: (Mobile app)

- Motor can be turned on/off automatically as well as manually.
- Set the desired crop moisture level if necessary.
- Monitoring different parameters of the crop, water reserve, and weather patterns.
- Day-wise graphical analysis of crop data.



BLOCK DIAGRAM:



CONCLUSION:

A system to monitor temperature, humidity, moisture levels in the soil was designed and the project provides an opportunity to study the existing systems, along with their features and drawbacks. Agriculture is one of the most water-consuming activities. The proposed system can be used to switch the motor (on/off) depending on the favorable condition of plants i.e. sensor values, thereby automating the process of irrigation, which is one of the most time efficient activities in farming, which helps to prevent over-irrigation or under irrigation of soil thereby avoiding crop damage.

The farm owner can monitor the process online through an Android App. Though this project can be concluded that there can be considerable development in farming with the use of IOT and automation.

REFERENCE:

1.] R. K. Kodali and A. Sahu, "An IoT based soil moisture monitoring on Losant platform," Proc. 2016 2nd Int. Conf. Contemp. Comput. Informatics, IC3I 2016, pp. 764-768, 2017.

2] Mohamed Rawidean Mohd Kassim, Ibrahim Mat, Ahmad Nizar Harun, "Wireless Sensor Network in Precision agriculture application" International conference on computer, Information and telecommunication systems (CITS), July 2014 published in IEEE Xplore.

3] Nagothu, S. K. (2016, February). Weather based Smart watering system using soil sensor and GSM. In Futuristic Trends in Research and Innovation for Social Welfare (Startup Conclave), World Conference on IEEE pp. 1-3.

4] Jin Shen, Song Jingling, Han Qiuyan and Yang Yan, "A Remote Measurement and Control System for Greenhouse Based on GSM-SMS", Electronic Measurement and Instruments, 2007. ICEMI '07. 8th International Conference 5] Hussain, M., Gawate, S. P., Prasad, P. S., and Kamble, P.

A. (2015, April). Smart irrigation system with three level access mechanisms. In Computation of Power, Energy Information and Communication (ICCPEIC), 2015 International Conference on, IEEE, pp. 269-275.

6] Firebase, "Firebase documentation," [Online]. Available: <https://www.firebase.com/docs/>. [Accessed 15.02.2017].

7] Rajalakshmi, P., and Mahalakshmi, S. D. (2016, January). IoT based crop-field monitoring and irrigation automation. In Intelligent Systems and Control (ISCO), 2016 10th International Conference, pp. 1-6.