

Automated System For Monitoring The Field of Temperature And Soil Moisture In An Irrigation

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Abstract- One of the important profession in India is farming so it is essential to look out for automation in field work to reduce man power. Manual watering of the plants in a garden requires more labour and time. Also, it is difficult for a man to identify when and how the soil needs water by observing with a naked eye. The purpose of the project is to build a multipurpose agricultural robot which can perform various operations on field. Here this project focuses on farming work features like automatic irrigation system, monitoring of the field using parameters as temperature, humidity and soil moisture these two parameters are monitored from field and transmitted through Bluetooth Connectivity.

Keywords- Bluetooth Connectivity, D C Motor and driver, Centrifugal Pump, Soil Moisture Sensor, Temperature and Humidity Sensor

I. INTRODUCTION

Agriculture uses 85% of available freshwater resources worldwide and this percentage will continue to be dominant in water consumption because of population growth and increased food demand. As there are very few water resources and due to scarcity of water we had upgraded our technology and invented many different techniques for sustainable use of water for agricultural crops. Automatic irrigation scheduling consistently has shown to be valuable in optimizing cotton yields and water use efficiency with respect to manual irrigation based on direct soil water measurements. Now a day's people are constantly super busy with their affairs and they don't have time to look after the plants, lawn or garden every time. When they go on vacation they can't able to water the garden or lawn which leads to death of the plant. Even if they ask neighbours to water the garden, too much water may end up with death of plants.

In the field of agriculture, use of proper method of irrigation is very important from yield point of view and scarcity of water. This system introducing automatic irrigation system by using

Arduino Uno controller, various sensors such as Temperature, humidity and Soil moisture Sensors were used to detect the temperature, humidity and moisture of the field. For wireless communication Bluetooth is used between farmer handset and robot which transmits status of sensors as well as receives commands from handset to turn on and off the motor pump. Soil moisture sensor gives information about moisture level of the soil which will then transmit to mobile unit through Bluetooth module. Farmer can give command by pressing the Number in Handset so that the water pump starts based on the reading taken from the field. This whole operation is wireless and mobile operated for automation in irrigation system. The system checks the moisture content in the soil, based on that pumping motor will automatically pumps the water into the field. Here we are using soil moisture sensor. By using this sensor, we find whether the soil is wet or dry. If it is dry, pumping motor will pump the water. In this system the main controlling device is microcontroller. Here soil sensor will give the status of the soil to the microcontroller based on that microcontroller will display the status of the soil.

II. IDENTIFY, RESEARCH AND COLLECT

IDEA

Sometime one experiment changes the whole world, so it's the duty of engineers to try something different for the future science. May be we don't know which one would click and verify the concept. In this project we show that how we use moisture sensor, Temperature and Humidity sensor to control the working of water pump. The proposed system is an embedded System which will closely monitor and control the microclimatic parameters of a field to control water provided to farm.

i. Sanjukumar, R V Krishnaiah (Volume-04, September 2013)

In the field of agriculture the most important part is: firstly, to get the information about the fertility of soil and secondly moisture content of soil. After measuring these two factors a farmer can starts sowing of seeds. Here a system is

developed based on GSM network. The sensors nodes can obtain the soil moisture, temperature, humidity information in real time, and then transferred to the remote monitoring centre by the gate way via the transmission network. This intelligent agriculture monitoring system has the useful characteristics of low power consumption, low cost, large network capacity, flexible deposition and monitor influence on natural environment.

ii. Prathyusha Shobila and Venkanna Mood (ISSN (Online): 2347-3878, Impact Factor (2014): 3.05)

This project includes two parts one part is irrigation part, second part is robot part. The irrigation part incorporates Temperature sensor, Conductive sensors, the microcontroller always monitors the temperature and the water content of the soil and it could send the data to the base station through wireless communication, here we are using Bluetooth radio set to establish the communication. The irrigation part works in two modes. One mode is automatic mode second mode is manual mode. If it is automatic mode the microcontroller automatically controls the irrigation motor based on the water content, if it is manual mode the motor will switch on/off based on the user command which can be sent through the Bluetooth communication. The second part is robot section, the robot section contains camera and wireless module by using wireless module we can controls the robot in the different directions. By using the camera we can monitor and observe the insects of the field.

iii. Bhagyalaxmi k, Jagtap Komal K, Nikam Nakusa S, Nikam Karuna K, Sutar Snehal S (Vol. 4, Issue 3, March 2016)

In this project we can covered the four topics this are automatic irrigation system, weeding, remote monitoring system, disease detection. As irrigation is the main part of agriculture. Labour-saving and water-saving technology is a key issue in irrigation. Microcontroller based automatic plant irrigation system allows a simple and low cost method for irrigating the crops automatically. In the proposed system we use GSM technology. Here we have four sensors are soil moisture and rain drop sensor for irrigation purpose and temperature, motion to monitor and also control the agriculture Parameters. When any of these sensors generates a low signal, the controller enables the GSM modem to send the message of the particular parameter and display the status of sensors on LCD. Farmer can give command through GSM to ON/OFF the pump motor as per the input data from sensor. GSM is used to inform the user about the exact field condition. The information is given on user request in form of SMS. GSM modem can be controlled by standard set of AT

(Attention) commands. These commands can be used to control majority of the functions of GSM modem and the Sensing data will be displayed on the LCD.

iv. K Srinivasa Rao and N Nagendra (Volume 6, Issue 11 November 2017)

The soil moisture sensor checks the moisture content in the soil with the help of probe inserted in the soil at the plant. The value is generated by short circuiting of two probes in the soil. The values are seen in the serial monitor in the Arduino software. These values are processed by the microcontroller and send the signal to relay and LED matrix. If the moisture content is high in the soil then the value is low and the moisture content is low then the values are high in the serial monitor. We can preset the values of HIGH and LOW in the program. In this project, the boundaries of the soil moisture values is $250 < M < 650$ i.e., when the soil moisture value is above 650 then the relay turns ON the motor.

III. STUDIES AND FINDINGS

The automated system which has been designed and fabricated is working with the help of the Micro Controller used and the programming has been done. The system is controlled by the use of any smart phone which has the Bluetooth connectivity and has the required application.

The system is turned ON with the help of the battery (12 V) which is connected to the micro controller board which supply the required amount of current to all the system and it will receive the data from humidity and temperature sensor as well as from the soil moisture sensor.

When the moisture level which is sensed through the sensor is less than the prescribed amount and the dryness of the soil is high, there will be a signal from the micro controller to switch ON the Submersible Centrifugal type Pump which gives the amount of water necessary to decrease the temperature of the soil thereby increasing the soil moisture, helping to keep the soil under the required conditions for the different crops.

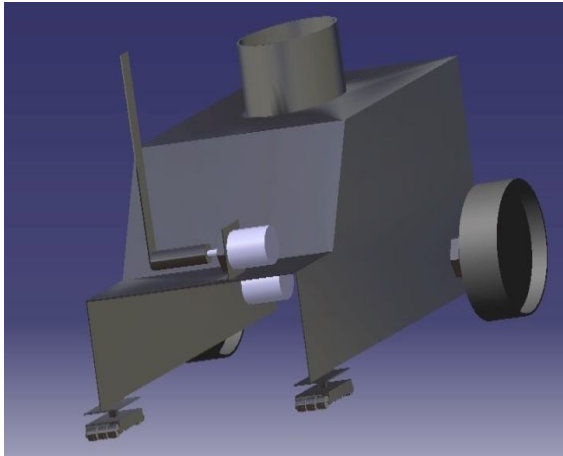


Fig.1: Designed 3-D Model



Fig4: Tested result of Humidity and Temperature



Fig.2: Experimental model



Fig5: Dry Soil Test Result



Fig3: Dry Soil Test Result

IV. CONCLUSION

1. The proposed system has Bluetooth controlled pump operation which reduces the man efforts, wastage of water, as well as the time consumption.
2. Bluetooth controlled is beneficial over the GSM module system as the breakage of network and connections are highly reduced.
3. To cover the large area of and the Wi-Fi Hotspot is suitable.

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