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IoT Base Agriculture Field Monitoring Pump On/Off Using Manual/ Automatical

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ABSTRACT: Agriculture is the unquestionably the largest livelihood provider India**.** With rising population, there is a need increased for increasing agriculture production. In order to support greater production in farms, the requirement of the amount of fresh water used in irrigation also rises. Currently, agriculture accounts 83% of the total water consumption in India. Unplanned use of water inadvertently result in wastage of water. So making automatic plant Irrigation system using ARDUINO, which automatically provides water to plants and keep update by sending massage. In this plant watering system, the soil Moisture sensor checks the moisture level in the soil and if moisture level is low then ARDUINO switches on a water pump to provide water to the plant. Water pump gets automatically off when system finds enough of water pump and soil moisture. The water pump and the spray motor are added by using crane concept. This system is very used in Farms, gardens, home etc. this system is completely automated and there is no need for human intervention. Also, the sensor reading is transmitted

KEYWORDS: IOT, ARDUINO, Sensors, stepper motor, Thing Speak.

I. INTRODUCTION TO AGRICULTURAL MONITORING SYSTEM

Irrigation is a crucial alternative to predominantly monsoon fed Indian agriculture. Due to the possible health risks behind the use of pesticides, the cost of developing new pesticides has risen at an increasingly rapid rate over recent years .Government regulations have become more stringent, slowing the rate of development and in turn increasing the cost of new products. The biggest advantage of pesticides is they are readily available and very easy to use unlike alternative method and other similar methods which can take a long while to plan and often don't have an immediate effect on. The system was studied and developed to configure of the wireless sensor network to assess the temperature, humidity and water level adjustment, and of the sensor node necessary for the optimal farming environment, and of the monitoring management devices to collect and analyze such collected data from sensor node and to store them in the management server and to alert emergency. The collected data provide the information about the various Environmental factors. Monitoring the environmental factors is not the complete solution to increase the yield of crops. There are number of other factors that decrease the productivity to a greater extent. Hence automation must be implemented in agriculture overcome these problems. Though it is implemented in the research level it is not given to the farmers as a product to get benefitted from these sources. Hence this paper deals about developing smart agriculture.

II. PROPOSED SYSTEM

In the field section, various sensors are deployed in the field like temperature sensor, moisture sensor, ultrasonic sensor and humidity sensor. The data collected from these sensors are connected to the ARDUINO UNO. In control section, the received data is verified with the threshold values. If moisture level is low then ARDUINO switches on a water pump to provide water to the plant. Water pump gets automatically off when system finds enough moisture in the soil and a message is sent to the user via IOT module, updating the status of water pump and soil moisture. These factors include attack of pests which can be controlled by spraying the crop with proper pesticides. An irrigation system for efficient water management and spray the pesticides for crops has been proposed. Parameters like moisture, temperature, humidity are measured by using sensors. The water and pesticides are sprayed by using spray motor and motor pump. The ultrasonic sensor is used to monitor the growth of the plants, one can observe the plants from anytime, anywhere in the webpage via IOT. In present, Thing speak is added which is a platform with IOS to control

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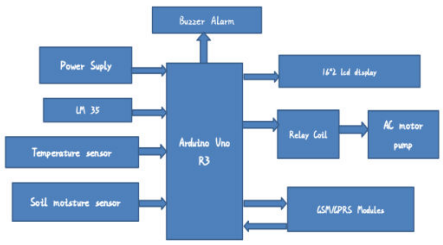
the ARDUINO that supports hardware platform. Monitoring the plant growth by using ultrasonic sensor and sending the status to the webpage via IOT module. Watering will be done automatically by predefined time delay.



1. ARDUINO UNO

The Microcontroller used here is an ARDUINO UNO. The UNO is a Microcontroller board based on ATMEGA 328P. The ATMEGA 328P has 32kB of flash memory for storing code. The board has 14 digital input and output pins, 6 analog inputs, 16 MHz quartz crystal, USB, an ICSP circuit and a reset button. The UNO can be programmed with the ARDUINO software.

Fig.2 Arduino UNO

2. SOIL MOISTURE SENSOR

Soil Moisture sensor is used to measure the moisture content present in the soil. When the soil moisture value read by the sensor is above the threshold value, low level (0V) will be the digital output and if it is below the Threshold level, high level (5V) will be the digital output. The digital pin is used to directly read current soil moisture value to see if it is above threshold or not.

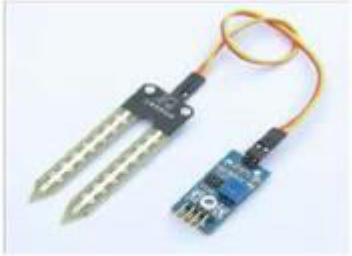


Fig.3 Soil moisture sensor

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3. GSM/GPRS MODULES

GSM/GPRS module is used to enable communication between a microcontroller (or a microcontroller) and the GSM / GPRS network with the help of this communication interface we can connect the GSM/ GPRS MODEM with an external computer (Or a microcontroller)

III. RESULT AND DISCUSSION

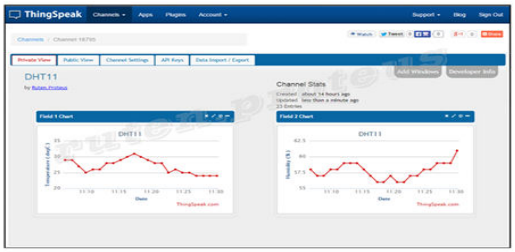

Fig.7 Shows Temperature and Humidity value relative to time

Thus after the signal conditioning process the value of humidity and the temperature of the soil is transmitted through the Wi-Fi module of the proposed irrigation system and then it is received to the used device through the open source IOT server.

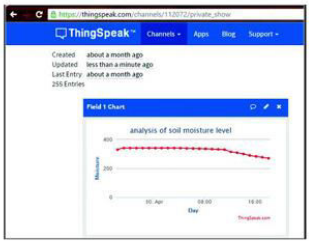

Fig.8 Shows soil moisture level analysed through Thing Speak

Then the real time data of the soil and crops such as temperature, humidity sensor is transmitted. Thus the humidity and the temperature signal is viewed by the user is in relative to the time. Whenever the signal is deviated from the span of reference value of the proposed irrigation system then the corresponding signal is transmitted to the field section by the user. Whenever the soil moisture is below the span of reference value then the signal is transmitted to the user through the Wi-Fi module and the IOT server that signal is received by the user device and the command is sent though the same path and the corrective action is takes place.

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Fig. 9 Shows the height of the plant (in cm) with respect to time

In this output the user can only view the height of the plant. The height value which is calibrated to the corresponding height of the plant in the proposed irrigation system. The Humidity, Temperature, Moisture sensors are displayed in the LCD module which is connected to the ARDUINO UNO. The Ultrasonic sensor which issued to monitor the growth of the plants. The IOT module is connected to the ARDUINO UNO. The pump at the pest sprayer are operated using motor. The stepper motor is used for forward and reverse operation.

V. CONCLUSION AND FUTURE ENHANCEMENT

Thus the system is useful to monitor the parameters for agriculture such as temperature, humidity, moisture, leaf growth, spray the water and pesticides through the motor pump via IOT module. The system reduces the manual work, man power. This set up was carried out using ARDUINO UNO, Temperature and Humidity sensor, soil moisture sensor, ultrasonic sensor and IOT module. The Thing Speak page can be developed to control the system through the mobile. Damage caused by predators is reduced and also be used to increase the productivity. The system is integrated with ultrasonic sensor to monitor the health of the plants; one can observe their plants anytime, anywhere in the web. In Future, new hardware, like the corn-tending robot, is making strides by pairing Data-collecting software with robotics to fertilize the corn, apply seed cover-crops, and collect information in order to maximize yields and minimize wastes. IOT sensors capable of providing farmers with information about crop yields, pest infestation and soil nutrition are invaluable to product and offer the precise data.

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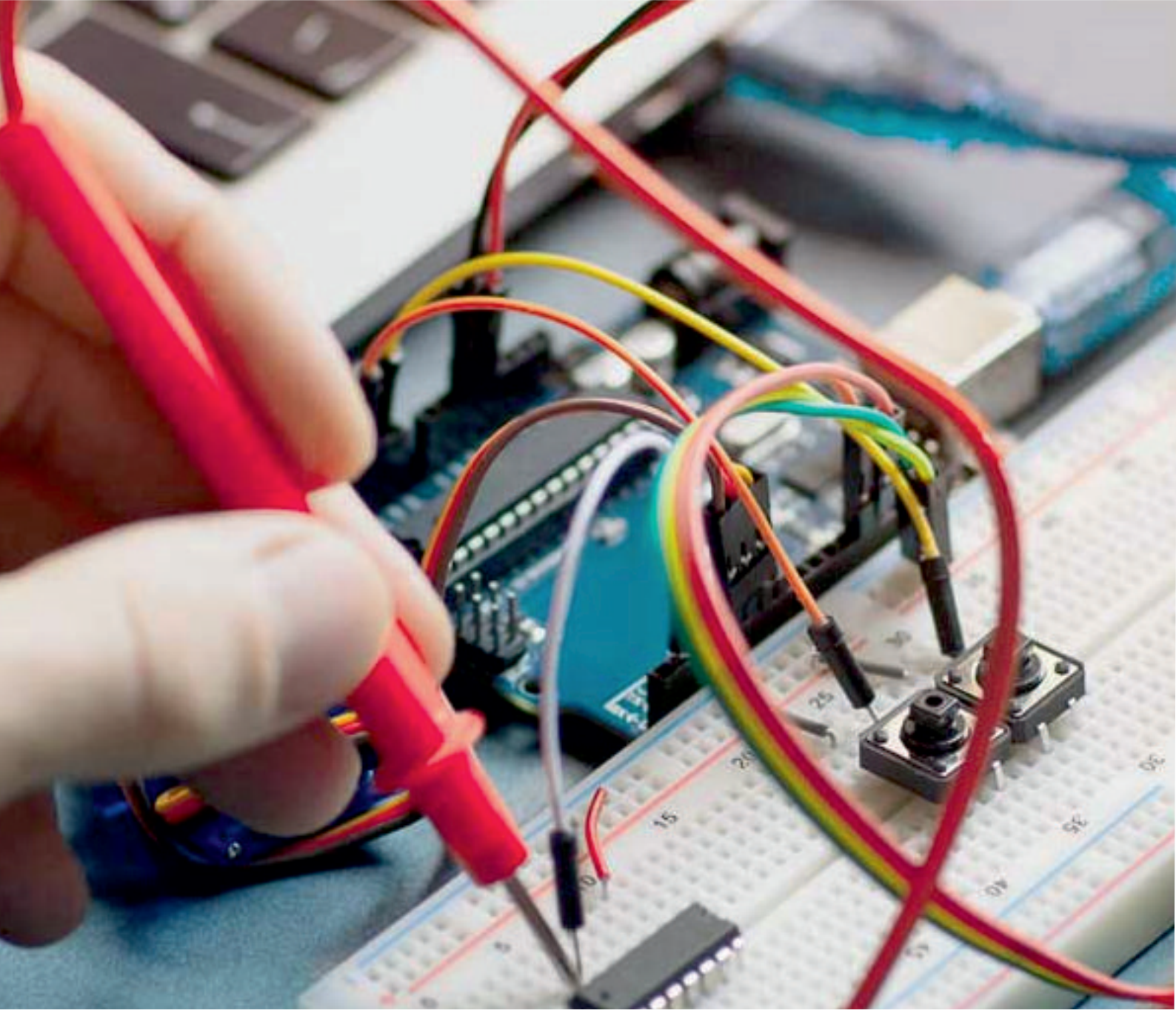

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