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Monitoring and Controlling of Irrigation System through IOT

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ABSTRACT: This paper presents the project of a monitoring and controlling irrigation system. Smart farm irrigation system uses android phone for remote monitoring and controlling. Continuously monitoring the status of sensor and provide information in this smart irrigation project .we use different sensors like soil moisture sensor, humidity sensor, temperature sensor and LDR are used to measure the different parameters. All these real time data will be sent to the farmer .When the temperature increases it shows indication through a light and that is send as a notification to the farmer. Like that, when the moisture value crosses the threshold level then the motor will automatically on. The current field status will be intimated to the farmer through Android app. The farmer can access the server about the field condition anytime, anywhere thereby reducing the man power and time. Here, we use LDR to find the light intensity level.

KEYWORDS: smart irrigation system, LDR, Temperature, Humidity, Soil moisture Sensors, IOT.

I.INTRODUCTION

India is an agricultural country. Tons of new technologies are emerging in the field of agriculture to raise its productivity. But, still there are some ailments in the present agriculture scheme. Few of them are listed below .Agriculture is the strength of Indian Economy. Agriculture water consumption is more than rainfall every year. Improving farm yield is essential to meet the rapidly growing demand of food for population growth across the world. Developing IOT technologies can help to collect large amount of ecological and crop recital data.major source of income is from agriculture sector and 70% of farmers and general people depend on the agriculture. In India most of the irrigation systems are operated manually. Irrigation requirement depends on soil properties like moisture and temperature and the type of crop which is grown in the soil. Technologies have been developed for efficient use of water for irrigation purpose. Environment issue two main reasons for wastage of water and electricity in the field, When farmer forgets to switch off irrigation pump (field may get excess amount of water). When field is having rain and still pump is giving water to the field. Risk to farmers life Travelling to field through difficult tracts during night-time leads farmers life towards wild risks. The objective of this paper is to provide more efficient and cost hurdles.

II. LITERERATURE SURVEY

In the literature reviewed, the authors have used mobile and Internet for monitoring and controlling the flow of water Because of its energy autonomy and low cost, the system has the potential to be useful in an isolated area with limited water availability and controlling the irrigation process without human intervention. Acoustic based technique has been used to confirm the amount of moisture present in the soil[1] .In this technique, it has been observed that when soil moisture content is lowered, the speed of sound decreases. Wireless Sensor Networks have been used. for monitoring and controlling water flow from a remote end. Different processors like ARM and mobile technologies have also been

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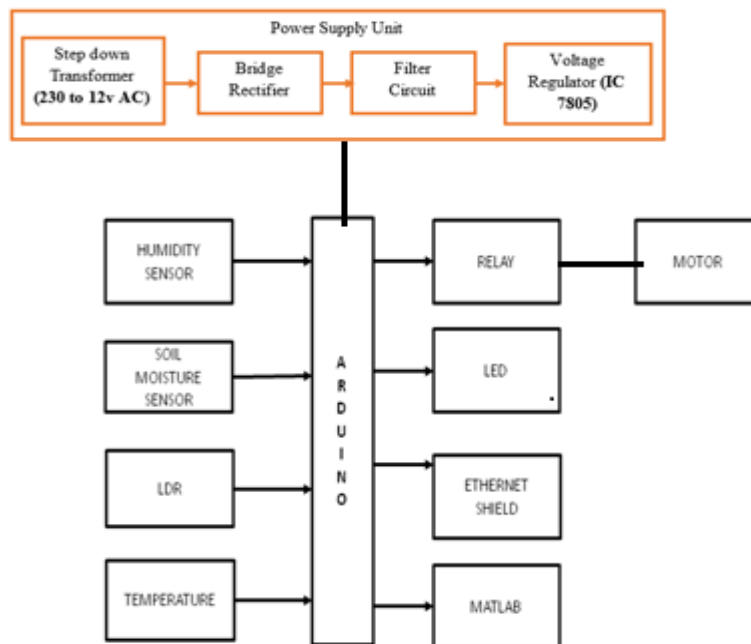
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used in real time. Green energy sources like solar-Photovoltaic have been utilized for reducing power consumption. The system supports water management decision, used for monitoring the whole system using GSM module. This system is smart irrigation techniques using internet of things (IOT) [2]. In this system sensors are placed in the agriculture field, measures the soil moisture value, water level in the tank and well-water through mobile data communication network. The web servers use intelligent software to analyze Mobile Integrated Smart Irrigation Management and Monitoring System Using IOT [3]. International Conference on Communication and Signal Processing the data and act according to the result obtained to perform desired action [4]. The system continuously monitors the water level in the tank and provide accurate amount of water required for plant or crop. The system checks the temperature and humidity of soil to retain the nutrient composition of the soil managed for growth of plant [5].

III. ARCHISTRUCTURE DIAGRAM

We use camera for the real time monitoring of plants. In the first few days/month the colour of the fruit/vegetable will be green. Then it changes to its real colour. All this changes are captured by the camera and all of this will be stored in the data base. In the data base we have diseased leaf image and the normal leaf images. If the plant is affected by any insects then will be analysed with the help of MATLAB and it is compared with the data stored in the database. If any disease is detected then it sends that information and will indicate to use fertilizers. The filter is a device that allows passing the dc component of the load and blocks the ac component of the rectifier output. Thus the output of the filter circuit will be a steady dc voltage. The filter circuit can be constructed by the combination of components like capacitors, resistors, and inductors. Inductor is used for its property that it allows only dc components to pass and blocks ac signals. Capacitor is used so as to block the dc and allows ac to pass. Filter Capacitor Circuit To Block DC and Pass AC. Being that capacitors have offer very high resistance to low .



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3.1 architecture diagram

The block diagram it contains power supply unit, arduino microcontroller, sensors, light dependent resistor (LDR), relay, Light emitting diode (LED), relay, ethernet shield, and dc motor. humidity sensor which is used to measure the presence of water in air, temperature sensor senses the temperature and provides the level of temperature. soil moisture sensor can be used to detect the water content in the soil. The Arduino Ethernet Shield allows an Arduino board to connect to the internet. It is based on the Wiznet W5100 ethernet chip (datasheet). The Arduino Uno is a microcontroller board based on the ATmega328. The functions are performed by using microcontroller.

IV. SENSORS

A. 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. The threshold voltage can be regulated with help of potentiometer.

B. TEMPERATURE SENSOR

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical accuracies of $\pm 1/4^{\circ}\text{C}$ at room temperature and $\pm 3/4^{\circ}\text{C}$ over a full -55°C to 150°C temperature range. Lower cost is assured by trimming and calibration at the wafer level. The low-output impedance, linear output, and precise inherent calibration of the LM35 device makes interfacing to readout or control circuitry especially easy. The device is used with single power supplies, or with plus and minus supplies. The LM35-series devices are available packaged in hermetic TO transistor packages, while the LM35C, LM35CA, and LM35D devices are available in the plastic TO-92 transistor package. The LM35D device is available in an 8-lead surface-mount small-outline package and a plastic TO-220 package.

C. HUMIDITY SENSOR

Humidity Sensor is one of the most important devices that has been widely in consumer, industrial, biomedical, and environmental etc. applications for measuring and monitoring Humidity.

Humidity is defined as the amount of water present in the surrounding air. This water content in the air is a key factor in the wellness of mankind. For example, we will feel comfortable even if the temperature is 00°C with less humidity i.e. the air is dry. But if the temperature is 100°C and the humidity is high i.e. the water content of air is high, then we will feel quite uncomfortable. Humidity is also a major factor for operating sensitive equipment like electronics, industrial equipment, electrostatic sensitive devices and high voltage devices etc. Such sensitive equipment must be operated in a humidity environment that is suitable for the device.

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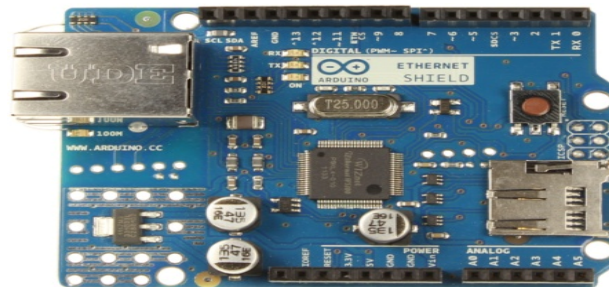
SENSOR RANGE

S.NO	SENSOR	SENSOR RANGE
1	Soil moisture	0 O to1024
2	Temperature	-55 ⁰ c to 150 ⁰ c
3	Humidity	0 to 100%

V. ETHERNET SHIELD

The Arduino Ethernet Shield connects your Arduino to the internet in mere minutes. Just plug this module onto your Arduino board, connect it to your network with an RJ45 cable (not included) and follow a few simple instructions to start controlling your world through the internet. As always with Arduino, every element of the platform – hardware, software and documentation – is freely available and open-source. This means you can learn exactly how it's made and use its design as the starting point for your own circuits. Hundreds of thousands of Arduino boards are already fueling people's creativity all over the world, everyday. Requires an Arduino board (not included)

- Operating voltage 5V (supplied from the Arduino Board)
- Ethernet Controller: W5100 with internal 16K buffer
- Connection speed: 10/100Mb
- Connection with Arduino on SPI port



5.1 ETHERNET SHIELD

VI.RESULT

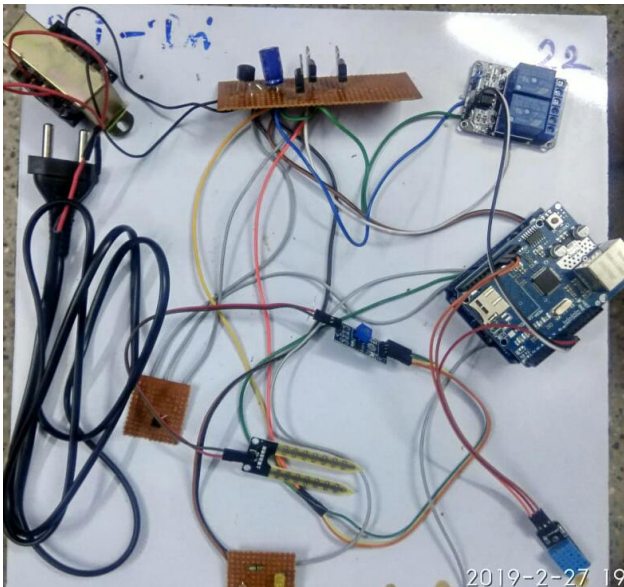
The outcomes of this project is monitored by using android application.The functions are performed an arduino microcontroller atmega328 and sensed values displayed on user android application.The displayed values are 31.00c,61.00%,5 temperature,humidity and soil moisture sensors respectively.

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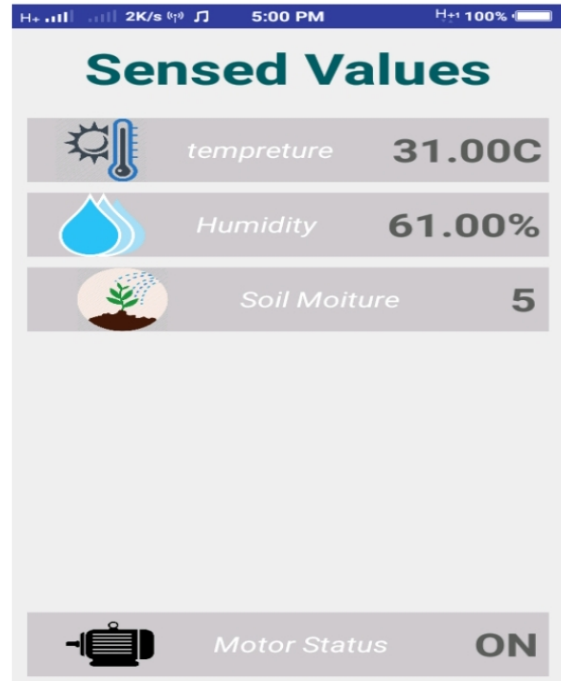
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6.1 hardware prototype



6.2 mobile output display

SIMULATION OUTPUT

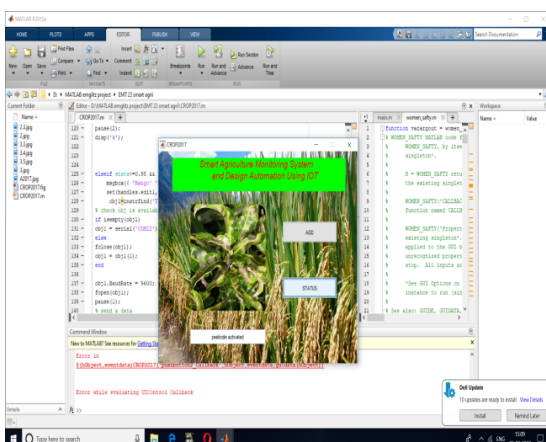


Figure 6.3 Output message for leaf diseases

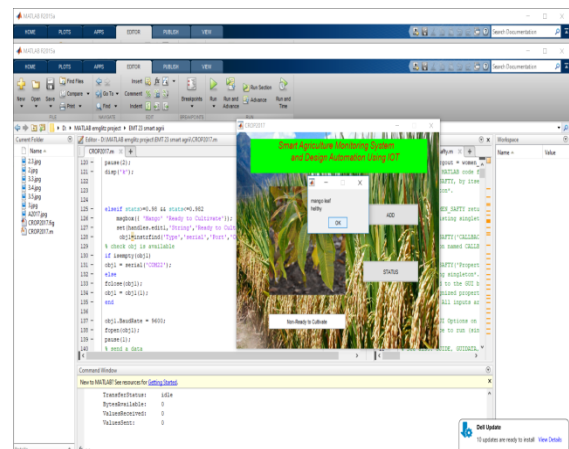


figure 6.4 Output message for healthy leaf

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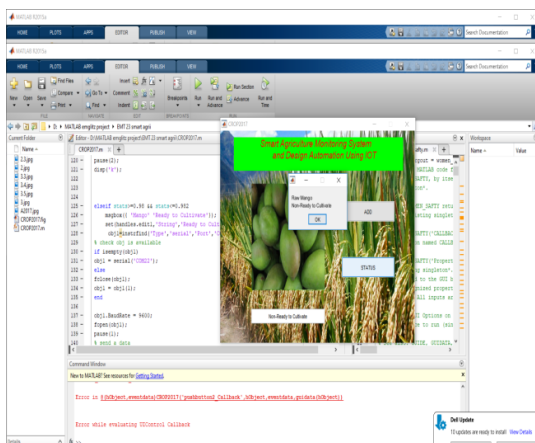


Figure 6.4 Output message for non ready to cultivate

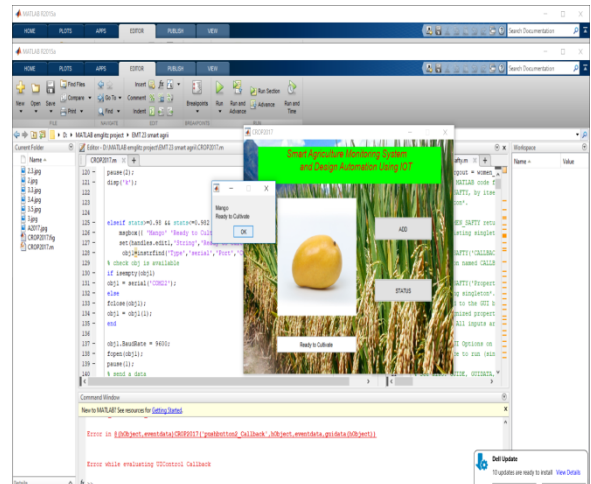


figure 6.5 Output message for ready to cultivate

VIII.CONCLUSION

In this work, we successfully develop a system that can help in an automated irrigation system by analyzing the moisture level of the ground. The smart irrigation system proves to be a useful system as it automates and regulates the watering without any manual intervention. The primary applications for this project are for farmers and gardeners who do not have enough time to water crops/plants. The farmers are facing major problems in watering their agriculture fields. It is because they have no proper idea about when the current available so that they can pump water. The moisture sensors and temperature sensor measure the moisture level (water content) and temperature of the plants. If the moisture level is found to be below the desired level, the moisture sensor sends the signal to the arduino UNO board and sends an alert message which alerts the Water Pump to turn ON and supply the water to respective plant. Also without visiting will get the status of the motor and temperature on mobile. The system features a custom sensor design for power efficiency, cost effectiveness, cheap components, as well as scalability and ease of use. In future there are some tasks that should be done and would develop the system to a more mature state. The system may be further extended for outdoor utilization. smart irrigation system is to make it more innovative, user friendly, time saving and more efficient than the existing system. Measuring four parameters such as soil moisture, temperature, humidity and the system also includes intruder detecting system. Due to server updates farmer can know about crop field nature at anytime, anywhere.

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