Real Time Monitoring of Agricultural activities using PIC Microcontroller.

[1]Rutuja Dhimdhime, [2]Dipali Jagadale, [3]Gauri kabare, [4]Prof.Ms.M.M.Deshpande
[1]Student, [2]Student, [3]Student, [4]Assistant Professor
[1,2,3,4] P.E.S. Modern College Of Engineering, Pune, Maharashtra, India

Abstract: This project describes a real-time soil monitoring for the agriculture farmlands to provide optimal and integrated data collections. Real- time monitoring provides reliable, timely information of crop and soil status plays an important role in the decision making in the crop production improvement. Agriculture depends on many parameters as inter and intra variability's of plants to give better yields such as soil parameters, climatic parameters so on. Here the system is designed to collect the data set for major parameters such as temperature, humidity, soil pH, soil moisture, light intensity and carbon-dioxide of the fields. The system consists of an PICmicrocontroller, DHT11 Sensor, soil moisture sensor, ultrasonic sensor, DC motor and motor driver. Data sets collected were used for the analysis of selection of crops and their vulnerabilities for regulating the irrigation parameters which will be of help in the agricultural practices, it will make easy way for farmers to take decision on planting a crops, watering and fertilizing them by avoiding the interference of hydro geologists and soil scientists by giving precaution.

Index Terms− PIC Microcontroller, GSM Module, DHT11 Sensor, Soil Moisture Sensor, Ultra sonic sensor, Motor Driver IC, DC Motor

I. INTRODUCTION

Agriculture is the backbone of the Indian economy and around 70% of the population depends on this field to run their livelihood. From time immemorial agriculture has been a part of the human civilization. It has transformed the way humans survive. The economy of a particular area was indirectly dependent on agriculture, and was a major thrust behind the industrial revolution. Advancements in the field of science and technology led to increased yield. Applying electronic monitoring systems is one of the technologies for analyzing important conditions required for optimum growth of plants. The conditions can be listed as temperature, humidity, carbon dioxide, and soil moisture and soil pH. There are valuable data that could decide the plant life cycle. Efficient use of these parameters increases the output per plant and minimizes crop loss .The quantum of steps taken to monitor never ends here, more data collection in turn increases the accuracy and by leaving no stones unturned efficiency of harvest and output increases. Agricultural stations have developed novel methods for monitoring the data, and programs to help the farmer generate more output. Integrating various sensors that are rugged and capable of generating the hard data in real time can augment further analysis. Currently geographical land use patterns, soil parameters are determined using satellites, and non invasive techniques that are sophisticated and generate precise data in real time.

II. LITERATURE SURVEY

In[1] ,This paper tell us about desing and development of an real time monitoring of agricultural activities usig wireless sensor network,With the advancement in technology, the world around us in every part of our life getting automated. The manual procedures are being replaced by these automated systems, since they are with energy efficient and consume less labor work. This paper proposes the Here, multiple environmental data such as Humidity, Soil moisture, Soil pH etc. are collected by a set of wireless sensor nodes and applied as input to the Peripheral Interface Controller (PIC).

In[2] ,This paper tell us about desing and development of an automatic plant growth monitoring system using pic microcontroller in which the entire system is controlled using PIC microcontroller which is programmed as giving the interrupt signal to the sprinkler. In proposed system, when a plant will continue to be predominant in water consumptionbecause of population growth and increased food demand. The main objective of our project is to work we are going to check temperature, humidity, soil moisture and plant growth monitoring. The project here is all about automated control features with latest electronic technology using microcontroller and GSM phone line.

In[3] ,This paper tell us about desing and development of automatic irrigation system using wireless sensor network & zigbee module.The automatic Irrigation System (AIS) is the recent requirement in every part of agriculture in India. It is used to assist in the growing of agricultural crops, maintenance of landscapes and revegetation of disturbed soils in dry areas and during periods of inadequate rainfall. The automatic Irrigation System is a machine based system, which automates the irrigation of land by combining microcontroller, sensors, various software, hardware and latest wireless communication technology approaches together for field irrigation.

In[4] ,This paper tell us about desing and development of agricultural field monitoring and automation using pic16f877a microcontroller and gsm. Agriculture is an important activity which directly and indirectly engages 70% of the population in India. Water feeding to the agricultural field has to be done regularly with continuous monitoring. Days and Nights continuously monitoring the water feeding and switching ON and OFF the motor becomes a burdensome task to the farmer.

III. SYSTEM SPECIFICATIONS

1) Supply Power: 9V Battery
2) Communication method: GSM Module
3) Features: Real time alerts on Phone via SMS.

IV. BLOCK DIAGRAM

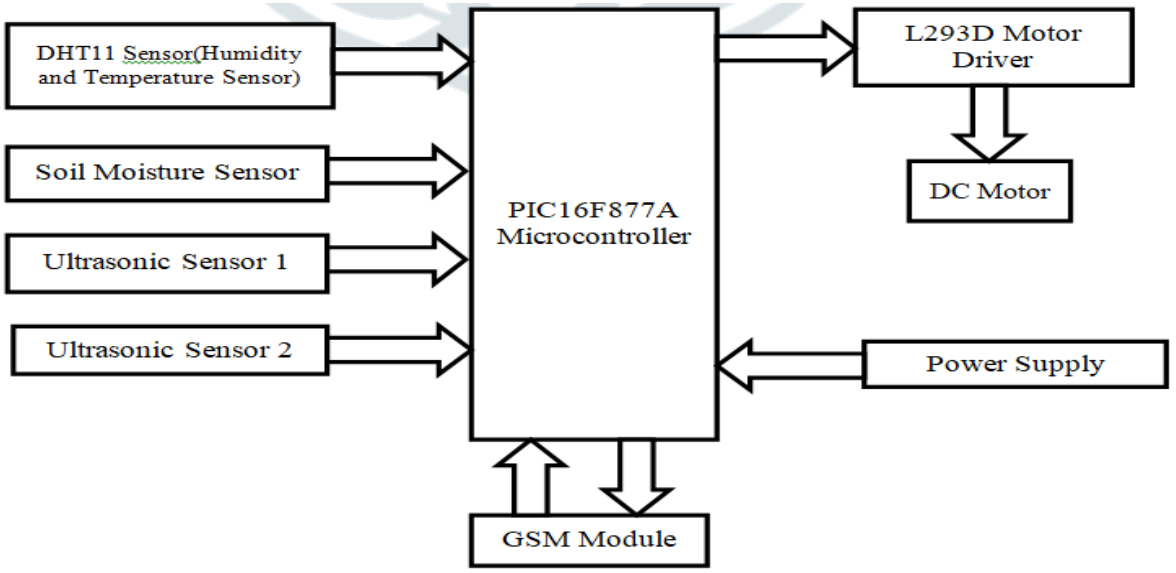

Figure 1: Real time monitoring System

V. COMPONENT USED

a. [1,]PIC Microcontroller 16F877A : PIC Controller: Peripheral Interface Controller (PIC) is microcontroller grown by Microchip, PIC microcontroller is quick and simple to execute program
b. Temperature and Humidity Sensor (DTH11): Humidity is known as the amount of water vapor in the air. Water vapor is in the gaseous state and is not visible to naked eyes. The indication of humidity is precipitation, dew, or fog.
c. L293D Motor Driver: The L293D is designed to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V. Both devices are designed to drive inductive loads such as relays, solenoids, DC and bipolar stepping motors, as well as other high-current/high-voltage loads in positive-supply applications.
d. Soil Moisture Sensor: A small charge is placed on the electrodes and electrical resistance through the sensor is measured. As water is used by plants or as the soil moisture decreases, water is drawn from the sensor and resistance increases. Conversely, as soil moisture increases, resistance decreases.
e. [2],Ultrasonic Sensor: Supply voltage 5 v Global Current Consumption 15 mA Ultrasonic Frequency 40k Hz Maximal Range 400 cm
Minimal Range 3 cm Resolution 1 cm Trigger Pulse Width 10 µs Outline Dimension 43x20x15 mm Speed ultrasonic sensor is non contact distance measurement module, which is also compatible with electronic brick.
f. DC Motor: RPM is one of the most important specifications of a DC motor. RPM, which stands for revolutions per minute, is the amount of times the shaft of a DC motor completes a full spin cycle per minute. A full spin cycle is when the shaft turns a full 360°.
g. [1],GSM MODULE:GSM Modem: It is a global system for mobile communication uses microwaves to communicate with other GSM modem or Mobile phone. GSM (Global System for Mobile) / GPRS (General Packet Radio Service) TTL it is a modem with SIM900 quad-band GSM / GPRS device, works on frequencies of 850 MHZ, 900 HZ, 800 MHZ and 1900 HZ. This device is very compact in size and easy to use as plug in GSM Modem. The Modem is designed with 5V DC TTL interfacing circuitry

V. METHODOLOGY

[4],This system consist of different types of sensors like temperature sensor, Ultrasonic sensor, humidity sensor, soil moisture sensor, GSM, LCD display and motor etc. [3],All sensors are connected to the pic microcontroller; LCD is also connected to the pic microcontroller.all data coming from the sensors which is given to the pic microcontroller. Data from sensor is displayed on the LCD. In pic microcontroller sets the threshold values for sensors reading because of that we get a particular name of disease. The pic microcontroller transmits all data collected by the sensors to the GSM and GSM is used to send the message on mobile phone. When soil moisture sensor take reading below 20% then water motor is turned on

VI. RESULT

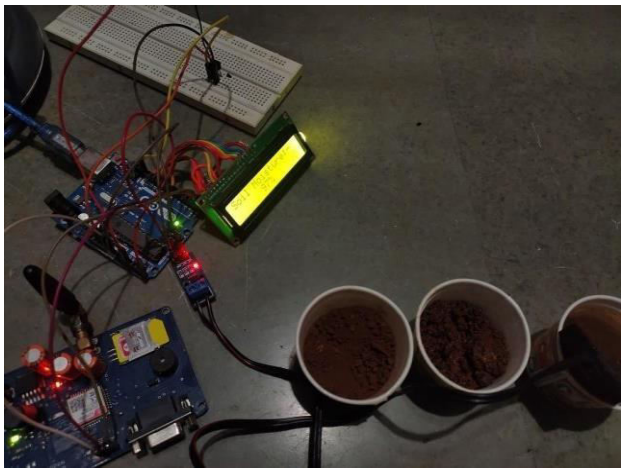

Fig 2: System Design

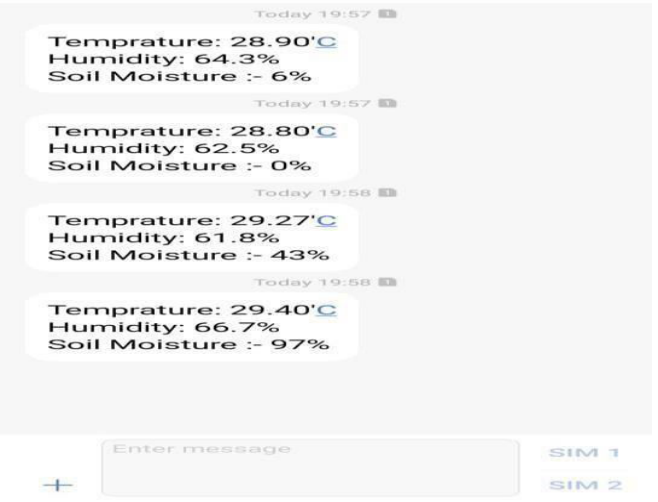

Fig 3:Alert Messages

[1] ,Above is the output image that shows the real time temperature and humidity data. This data also gets escalated to GSM module to transmit SMS alerts on registered Phone number. After analyzing this entire data farmer can determine and try to predict their good or bad effects on the crops and will take actions accordingly. Having all of this data can also help us to research more and more about growth of plants and aspects which affect their growth in both positive and negative ways. This is an effective way of determining if crops are in good condition or taken care of. We can take actions accordingly so that we won't face any losses in future. Also, In botany field researchers always try to help to get better results. A good hybrid can help in great amount of crop production with minimal efforts.

VII. ADVANTAGES

1) Easy to use.
2) Real time results.
3) Easy and efficient to implement
4) Helpful for farmers for real time updates regarding crops.

VIII. FUTURE SCOPE

The other issue farmers are confronting is the demolition of crops by wild creatures. So the future work incorporates the design of the system which is capable of monitoring the agricultural field by introducing serial cameras and installing sensors at the boundaries.

The camera module may take a depiction once the sensor identifies the passage of animals and transmit the real time pictures by coordinating with other data.

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IX. CONCLUSION

Conclusion Precision agriculture provides farmers the ability to apply crop inputs more efficiently than traditional procedures. It provides greater quality crops without harming the environment, “doing the right thing in the right place at the right time” is the strong feature of this system.

The proposed system is very low cost model where the real-time environmental data is transmitted to remote area using GSM network. The farmer may use the received data to control the activities of the field.

X. REFERENCES

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