



SMART AND EFFICIENT AGRICULTURAL FARMING SYSTEM USING IOT

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Abstract : Smart agriculture is a farming system which uses IoT technology. This emerging system increases the quantity and quality of agricultural products. IoT devices provide information about nature of farming fields and then take action depending on the farmer input. In this paper, an IoT based advanced solution for monitoring the soil conditions and atmosphere for efficient crop growth is presented. The developed system is capable of monitoring temperature, humidity, soil moisture level using NodeMCU and several sensors connected to it. Also, a notification in the form of SMS will be sent to farmer's phone using Wi-Fi about environmental condition of the field.

Index Terms - :IoT, NodeMCU, sensors

I. INTRODUCTION

Agriculture is the primary occupation in India and is the backbone of Indian economic system. Agriculture provides employment opportunities to rural people on a large scale in underdeveloped and developing countries in addition to providing food. It is the process of producing food, fiber and many other desired products by the cultivation and raising of domestic animals.

Agriculture is the primary source of livelihood for about more than 58% of India's population. Climate changes will have significant impact on agriculture by increasing water demand and limiting crop productivity in areas where irrigation is most needed. Irrigation system, rain fed agriculture, groundwater irrigation are some of the methods introduced to produce healthier crops which may not use water efficiently.

II. RELATED WORK

[1] Karan Kansara, Vishal Zaveri, Shreyans Shah, SandipDelwadkar and KaushalJani

In Sensor based Automated Irrigation System with IOT mentioned about using sensor based irrigation in which the irrigation will take place whenever there is a change in temperature and humidity of the surroundings. The flow of water is managed by solenoid valve. The opening and closing of valve is done when a signal is send through microcontroller. The water to the root of plant is done drop by drop using rain gun and when the moisture level again become normal then sensor senses it and send a signal to microcontroller and the valve is then closed. The two mobile are connected using GSM. The GSM and microcontroller are connected using MAX232. When moisture of the soil become low moisture sensor sense it and send signal to microcontroller, then the microcontroller gives the signal to mobile and it activate the buzzer.

[2]Joaquin Gutierrez, Juan Francisco Villa-Medina, and Alejandra Nieto-Garibay, Miguel Angel Porta-Gandara

In Automated Irrigation System Using a Wireless Sensor Network and GPRS Module mentioned about using automatic irrigation system in which irrigation will take place by wireless sensor units (WSUs) and a wireless information unit (WIU), linked by radio transceivers that allowed the transfer of soil moisture and temperature data, implementing a WSN that uses ZigBee technology. It takes a measure of temperature and moisture using sensor and controlled by microcontroller. The WIU has also a GPRS module to transmit the data to a web server via the public mobile network. The information can be remotely monitored online through a graphical application through Internet access devices.

[3]VandanaDubey, NileshDubey and ShaileshsinghChouhan

In Wireless Sensor Network based Remote Irrigation Control System and Automation using DTMF code mentioned about using automated irrigation system for proper yield and handled remotely for farmer safety. Wireless sensor network and Embedded based technique of DTMF (Dual Tone Multiple Frequency) signaling to control water flow for sectored, sprinkler or drip section irrigation. Circuit switching instead of packet switching used by SMS controlled devices available currently in the market. The farmer can use his cell phone or landline phone for the purpose of starting and controlling the irrigation and the pesticide spraying, just by dialing and sending the DTMF commands over the GSM network

[4] G.Nisha and J.Megala

In Wireless Sensor Network Based Automated Irrigation and Crop Field Monitoring System mentioned about using wireless sensor network based automated irrigation system for optimize water use for agricultural purpose. The system consists of distributed wireless sensor network of soil moisture, and temperature sensors placed in the crop field. To handle the sensor information Zig bee protocol used and control the water quantity programming using an algorithm with threshold values of the sensors to a microcontroller for irrigation system. The system continuously displays the abnormal condition of the land (soil moisture, temperature level). Using a GSM modem with GPRS facility feature provides the information to fanners and interface with PIC 18F77 A microcontroller. The Irrigation system is automatic and manual mode.

[5] Kavianand G, Nivas V M, Kiruthika R and Lalitha S

In Smart drip irrigation system for sustainable agriculture mentioned about using fully automated drip irrigation system which is controlled and monitored by using ARM9 processor.PH content and the nitrogen content of the soil are frequently monitored. For the purpose of monitoring and controlling, GSM module is implemented. The system is used to turn the valves ON or OFF automatically as per the water requirement of the plants. The system informs user about any abnormal conditions like less moisture content and temperature rise, even concentration of CO₂ via SMS through the GSM module.

III. EXISTING SYSTEM

In the Existing System, people used to check and verify the moisture content in the fields manually. This is very difficult and risk process to check the condition in the mid-night. Even though the climate is good the humidity is unknown, so in the previous system we have some disadvantages. This is very difficult and risk process to check the condition in the mid-night.

IV. PROBLEM DEFINITION

The main problem facing in agriculture are usually land-related.It is very difficult to find water content in the soil at the night time.So to solve that problem we use some sensors to find the water content in field automatically.

V.PROPOSED SYSYTEM

Different sensors such as soil moisture, DHT11, IR (intruder detection network) are connected to Arduino microcontroller's input pins within this device. The sensed sensor values are displayed in LCD. If the sensed value exceeds the threshold values set in the system, the relay circuit automatically switches the pump ON / OFF and it is connected to the driver circuit which helps to switch the voltage. The farmer will be intimated via GSM module about the current condition of the field. By using this device, the farmer can at any time access the details of the field condition anywhere. Animal detection system is designed to detect the presence of animal and offer a warning. In this project we used IR to detect the movement of the animal and send signal to the controller. It diverts the animal by producing sound and signal further, this signal is transmitted to GSM and which gives an alert to farmers immediately.

IV. RESULTS AND DISCUSSION

4.1 Testing and Evaluation

Moisture level of the soil can be tested by soil moisture sensor and the pump gets ON automatically when the soil is detected dry.

Figures

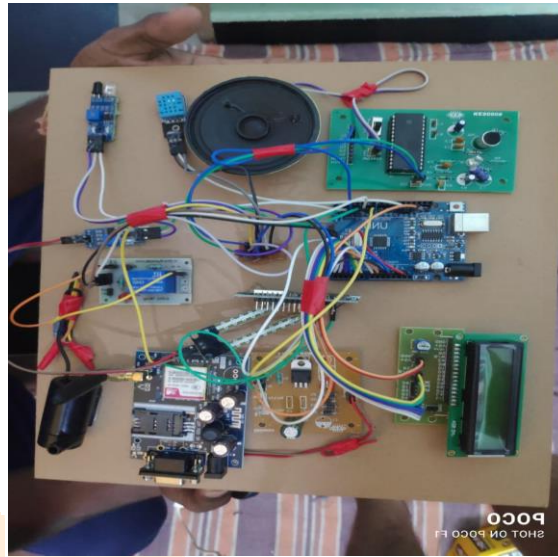


Fig:Experimental Setup

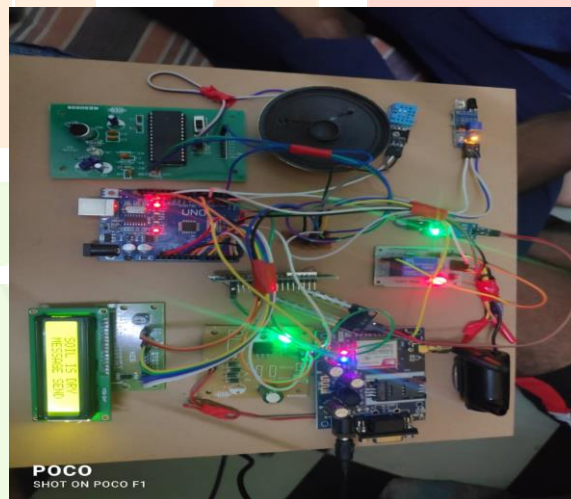


Fig: Final Output

V. CONCLUSION & FUTURESCOPE

In this study, a monitoring system for the micro-climate horticulture system is presented. An electronic sensors board is implemented to monitor air, water, and soil condition at the horticulture site. The results are collected into a monitoring database. This database is also be integrated with the IOT, which consists of weather data at the horticulture area. This study limitation is only on the design and development of monitoring system. From the proposed method we get the proper growth of the crop.

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