

IOT BASED LAND MONITORING, DETECTION AND REPELLENT OF LIVING BEINGS ENTERING INTO THE AGRICULTURE FIELD

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Abstract- Internet of Things (IoT) plays a decisive role in smart agriculture. Smart farming is an emerging and innovative concept, because IoT sensors are capable of providing information about the agriculture fields. Nowadays, the conservation of crop field has been a main content and has the complex issues. To overcome this problem, this paper presenting a practical procedure toward them off, first by creating the system which monitor the crops using sensors (i.e.. DHT11 Sensor is used for detecting temperature and moisture level). Then detects the living beings by using PIR Sensor and creates a different sound and light that repel them. Alternatively by using IOT technology, if the living beings enter into the specified limit of authorized person it will be automatically alert.

Key Words- IoT, Arduino UNO, DHT11 Sensor, PIR Sensor, Raspberry Pi.

1. INTRODUCTION

A special-purpose computer system that is fully encapsulated by the device it controls is an embedded system. An embedded system has specific necessities and performs pre-defined tasks, disparate a general-purpose personal computer. An embedded system is a pre programmed hardware device. A programmable hardware chip is the 'raw material' and it is programmed with particular applications. This is to be understood in comparison to older systems with full functional hardware or systems with general purpose hardware and externally loaded software.

It is EMBEDDED because the Micro Controller is 'inside' some other system. For case a Micro Controller is 'EMBEDDED' into your TV, car, or appliance. The consumer need not think about how to make it perform or process. It avoids lots of Electronics Components.

A microcontroller is a kind of minuscule computer that you can find in all kinds of Gizmos. A quantity of examples of common, every-day products that encompass microcontrollers are incorporated. If it has buttons and a digital display, chances are it also has a programmable microcontroller brain.

Every-Day we are using lot of devices that contain Microcontrollers. If we try to make a list and count how many devices and the events using microcontrollers that we are using in our routine life, it will be more. Here are some samples: if your clock radio goes off, and you hit the snooze button a few times in the morning, the first thing you do in your day is interact with a microcontroller. Heating up some food in the microwave oven and making a call on a cell phone also involve operating microcontrollers. That's just the beginning. Here are a few more examples: Turning on the Television with a handheld remote, playing a hand held game, using a calculator, and checking your digital wrist watch. All those devices have microcontrollers inside them that interact with you. Consumer appliances aren't the only things that contain microcontrollers. Robots, machinery, aerospace designs and other ultra-modern devices are also built using microcontrollers.

2. EXISTING WORK

Conventionally, Agricultural lands are monitoring by the formers directly. The existing System was related to wireless sensor network where the researchers measured soil related parameters such as temperature and humidity. Sensors were placed below the soil which communicates with relay nodes by the use of effective communication protocol providing very low duty cycle and hence increasing the life time of soil monitoring system. The system was developed using microcontroller, universal asynchronous receiver transmitter (UART) interface and sensors while the transmission was done by hourly sampling and buffering the data, transmit it and then checking the status messages.

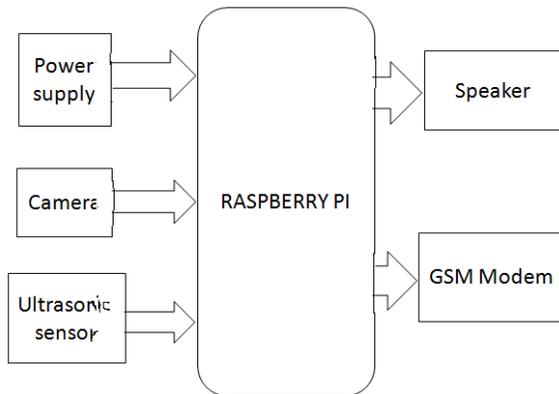


Fig -1: Block diagram of existing work

3. PROPOSED FRAMEWORK

A sensor node is installed in every Agricultural Lands. It senses moisture and temperature of the field falls below the brink. In Agricultural Lands, The wild animal's recognition can also be mechanized in addition to irrigation.

When living being enters in to the land, the PIR will detect and resist them by using sound, light and smoke producer. The notifications are sent to the authorized person mobile from time to time and updated in IoT Cloud. The farmers' can able to monitor the field conditions from where they are. This system will be more valuable in areas where water is in scarce. This system is more efficient than the conventional approach.

Farmers need not to wait and watch to protect the animals to enter into their agricultural lands. Since most of the monitoring is done remotely, it will help the farmer to gain information which is crucial for the business during his/her additional time.

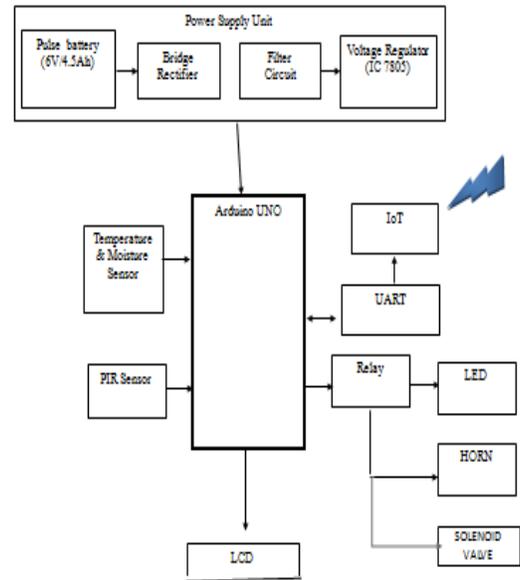


Fig -2: Block diagram of proposed work



Fig -3: Monitoring Unit

4. SENSORS DATA ACQUISITION

The sensor is interfaced with Arduino microcontroller and programmed. Once it has programmed, it will be placed inside a box and kept in the field. A **Passive Infrared sensor (PIR sensor)** is an electronic **sensor** that measures infrared (IR) light radiating from objects in its field of view. They are most often used in **PIR-based motion** detectors. The Motion sensor has fixed into 360 degree rotating motor, which is to monitor the animal activity in the agricultural land.

5. DHT SENSOR

The DHT11 temperature and Humidity sensor is used. The total amount of water vapor in air is defined as a measure of humidity. Relative humidity is calculated because when there is a change in temperature, relative humidity also changed. The temperature and humidity changes occur before and after irrigation. The amount of water droplets in air is increased after irrigation. This causes decrease in temperature which in turn increases

the relative humidity of the surroundings. The temperature and humidity reading are often notified to the user so that the user can be able to know the field conditions from anywhere. The temperature and humidity sensor can also be used in green houses.

6. WIRELESS DATA TRANSMISSION

The data acquired from sensors are transmitted to the web server using wireless transmission. Node MCU module is used for wireless transmission between the field and the web server. **Node MCU** is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. The term "Node MCU" by default refers to the firmware rather than the dev kits. The Node MCU is used here while interfacing with Arduino micro-controller and fast connection establishment. When the data from the Node MCU reaches the web server the data will be stored in Cloud server. The Ethernet cable is connected to the Arduino micro-controller using Ethernet shield for Arduino. The Arduino Ethernet will be assigned an IP Address which should be in web cloud. The Arduino is given with the address of the web server to send request. The web server designed using PHP script to insert values in the appropriate table. The web server processes the request and stores the received data in its database. Here Ubidots cloud was used for monitoring the data.

7. DATA PROCESSING AND SENDING ALERT

The data received from the field are wirelessly transmitted using Node Mcu and then saved in web server mysql database using Internet connection at receiver end. Periodically the data are received and stored in database. The data processing is the task of checking the various sensors data received from the field with the already fixed threshold values. The threshold values vary according to the crops planted. This is because different crops need different amounts of water. For example in a paddy field to produce 1 kg of rice 5000 liters of water and for wheat it is 10000 liters. Similarly, the temperature and humidity varies for different crops. The sensor values also vary according to the climatic conditions. The soil moisture will be different in summer and winter seasons. The temperature and humidity also varies in summer, winter and rainy season. The threshold values are fixed in the website after considering all these environmental and climatic conditions. The message will be sending to the farmers mobile automatically if the soil moisture value falls below the threshold and vice versa.

8. WEB APPLICATION

The web application is designed to monitor the field and crops from anywhere using internet connection. The web application is designed using HTML and PHP script. PHP is server side scripting language for the web development. PHP can be used with HTML code and with various web engine frameworks. PHP is an efficient alternative to Microsoft's Active Server pages. The PHP script will parse the data and display it on android device. The webpage developed insert the sensor data in mysql database when it receives request from the IoT Module. The webpage can be easily queried and information can be retrieved in an efficient manner using mobile.

Here, Ubidots cloud server is used for connecting the sensor data from arduino. The Ubidots Cloud is also used to monitor the crop field. The Ubidots also used to send the Mail alert to the farmers. The webpage and Arduino can be communicated using the processing IDE. The processing is an open source like Arduino IDE which includes text editor, compiler and display window. The serial library in the processing is used to read and write data to and from external devices.

9. CONCLUSION

Thus the technology can be implemented into the agricultural field to protect the land. With this modern technology, the yielding of crops has improved. This proposed framework monitors the crops using DTH11 sensors and detects the living beings with the help of PIR sensors. Then a sound will be produced whenever the living beings were entered into the agricultural land and at the same time the farmers got an alert message automatically. So the working time of farmers was reduced.

10. REFERENCES

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