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RAINY SEASON PLANT PROTECTING SYSTEM

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Abstract: In this work, a system is developed to monitor crop-field using sensors (water level and rain sensor) and automate the irrigation system. The data from sensors are sent to Web server database using wireless transmission. This low productivity is because of one main reasons i.e., Crop destroyed by nature object. Our system will avoid natural destroy with help of roof top mechanism, which is controlled by IoT. The water level sensor is used to detect the level of water inside the agriculture land. The pump/solenoid valve will be turned ON/OFF based on water level in surrounding environment and status updated in the cloud automatically. The proposed method is also easy to implement and environmentally friendly. It can save human life and property. In future, Use of solar power to need the power requirements of various sensors and also to power the water pump, connected circuitry, embedded circuits and associative devices also connected with conventional power sources during monsoons, night time or any solar power failure.

Keywords: Arduino Uno, Rain sensor, Water level sensor, PIR sensor, Solar panel, Buzzer.

I. INTRODUCTION

India is one of the scarce water resources in 13 countries in the world; due to low utilization of the water resources our country is facing the risk of overheating. In order to effectively reduce the impact of inadequate water resources on India's economy, from modern agricultural cultivation and management perspective, according to the basic principles of Internet, with sensor technology, this article proposes precision agriculture irrigation systems based on the IoT technology It focuses on the hardware architecture, network architecture and software process control of the precision irrigation system. Internet of Things (IoT) is a shared network of objects or things which can interact with each other provided the Internet connection. IoT plays an important role in agriculture industry which can feed 9.6 billion people on the Earth by 2050. Smart Agriculture helps to reduce wastage, effective usage of fertilizer and thereby increase the crop yield. IoT stands for Internet of Things. The Internet of Things refers to the ever-growing network of physical objects that feature an IP address for internet connectivity, and the communication that occurs between these objects and other Internet-enabled devices and systems.

II. RELATED WORKS

There are many successful IoT applications in agriculture sector implemented throughout the world including China, Taiwan, Thailand, Malaysia and other countries.
In the area of environment monitoring, China has developed a low cost and low power environment monitoring system in a greenhouse. Practical implementation of the system shows that the system is reliable which reduces the cost of manpower by sending the instructions remotely and timely. As a result of the IoT implementation, fertilization rate was reduced about 60% whereas pesticides up to 80% and labour cost by 60%.
Taiwan have produced a low cost IoT platform for precision farming to monitor the soil conditions. The platform has been implemented to monitor the turmeric cultivation. By implementing the IoT system, amount of chlorophyll in the Turmeric plants was increased from 40~60% which is more than existing traditional methods whereas 70% of water also saved. In Thailand, IoT water control system has been designed to monitor the water consumption. The result indicates that humidity level should be 70- 80% for lemons growth whereas for the high productivity of vegetables and lemons temperature was 29 °C and 32 °C. In Malaysia, IoT system was developed for fruit traceability. Ministry of Science, Technology, and Innovation of Malaysia (MOSTI) developed an IoT-based solutions called Mi-Trace.
The developed system is a tracking platform to trace any agricultural products especially musing king fruit which is advantageous for sellers and exporters to ensure the origin and quality of the fruit.

III. OBJECTIVE

To save water and reduce human intervention in the agriculture field. Continuously monitoring the status of water through

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sensors and provide signal for taking necessary action. To get the output of the sensor and provide water to crop. To observe water level for better yield. The irrigation system allows cultivation in places with water security thereby improving sustainability. The traditional farm-land irrigation techniques require manual intervention. With the automated technology of irrigation, the human intervention can be minimized.

IV. NEED OF AUTO IRRIGATION

This system avoids natural crop destroy due to cyclone/flood. Simple and easy to install and configure. Saving energy and resources, so that it can be utilized in proper way and amount. Farmers would be able to smear the right amount of water at the right time by automating farm or nursery irrigation. Avoiding irrigation at the wrong time of day, reduce runoff from overwatering saturated soils which will improve crop performance.

Automated irrigation system uses valves to turn motor ON and OFF. Motors can be automated easily by using controllers and no need of labour to turn motor ON and OFF.

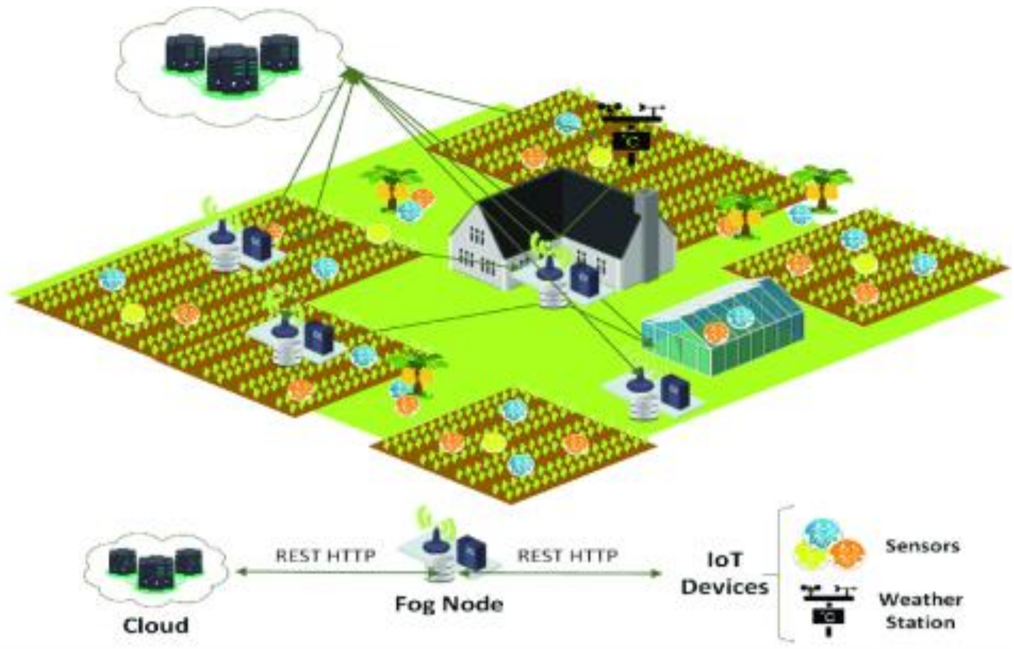

fig: auto irrigation with IoT

V. PROPOSED SYSTEM

In our proposed system consists of rain sensor, water level sensor, microcontroller (ATMEGA 328), Driver & Relay circuit with pump, roof mechanism and IoT module.

The communication with all distributed sensor node placed in the farm through IoT and itself act as a coordinated node in the wireless sensor network. The programming on the Arduino microcontroller is such way that after every minute sensor node sends land parameter data to coordinator node via the IoT wireless communication protocol. The goal of coordinator node is to collect the parameters like water level and rain status. PC (webpage)/Mobile application stores collected data in the database and analyses the stored data. The system will work according to the algorithm developed for watering the crop. The IoT module has a Wi-Fi shield interface and runs the simple data web server. Hence coordinator collects the data over IoT wireless communication protocol and allow user to monitor the data from a web browser.

The system will reduce the water consumption and giving uniform water to the crop results in increasing yield. We can gather information from our mobile by using IoT through the sensors controlling the information from the Arduino board. A farmer should visualize his agricultural land's rain status from time to time and water level of source is sufficient or not. IOT based smart irrigation system displays the values of the sensors continuously in smart phone or on computer's web page and farmer can operate them anytime from and anywhere.

The PIR sensor responsible for the detection of motion adjusts itself to the infrared signature of its surroundings and keeps watching for any changes. In the absence of motion, the LED indicator will remain dim and the program will continue updating the surroundings. If sensor detects movement and consequently the motion detection indicator will light up and sends message to the owner after the buzzer makes sound, the hardware is interfaced with the sensors in the board.

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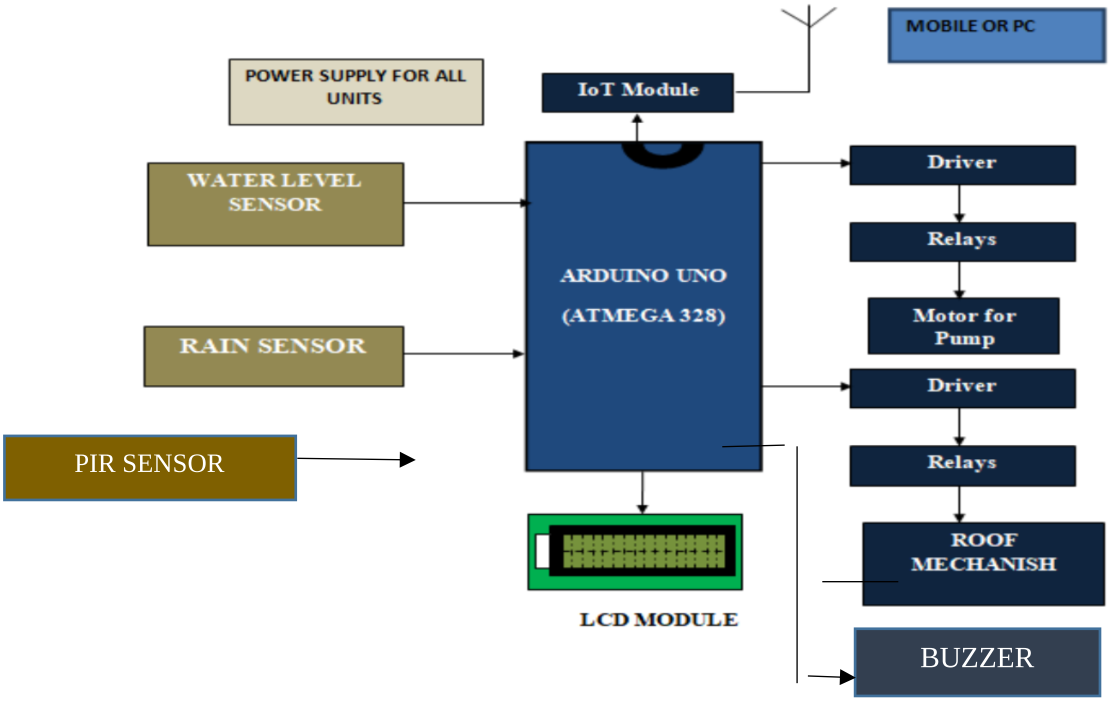
VI. SYSTEM OVERVIEW



VII. METHODOLOGY

a) Arduino Uno: It is a microcontroller board based on the ATmega328. Arduino Uno is a microcontroller. It is an easy USB interface. It has a memory for storing the code and button to reset the code.

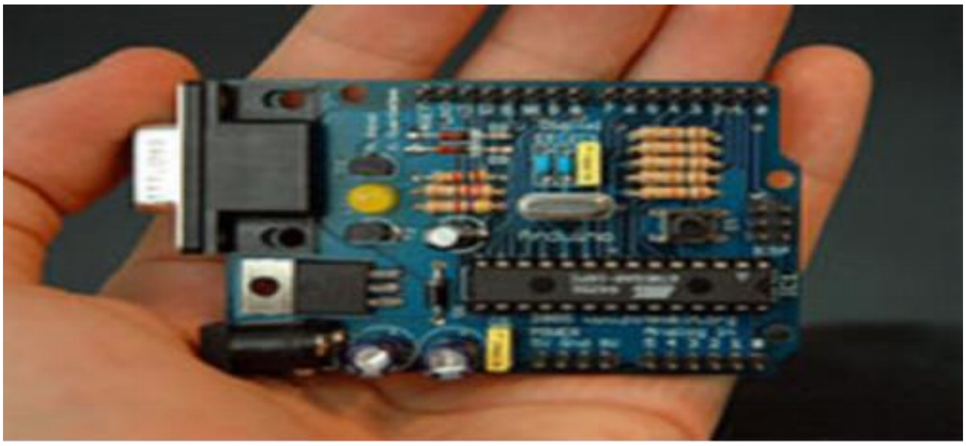


Fig: Arduino uno

b) Rain Sensor: The sensing pad includes a set of uncovered copper traces which mutually work like a variable resistor or a potentiometer.
Here, the sensing pad resistance will be changed based on the amount of water falling on its surface. So, here the resistance is inversely related to the amount of water. When the water on the sensing pad is more, the conductivity is better & gives less resistance. Similarly, when the water on the surface pad is less, the conductivity is poor & gives high resistance.

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fig: rain sensor

c) Water level sensor: The water level sensor is a device that measures the liquid level in a fixed container that is too high or too low.
A float switch detects the level of a liquid in a tank or container. It floats on top of the liquid surface and acts as a mechanical switch as the liquid level goes up or down.
So here, the more water the sensor is immersed in, results in better conductivity and will result in a lower resistance. The less water the sensor is immersed in, results in poor conductivity and will result in a higher resistance.

Fig: float switch

d) PIR sensor: It is used in home appliances, industries, agriculture etc. It consists of pyro electric sensor that detects the infrared radiation emitted from intruder. Their ranges are:

- Indoor passive infrared: Detection distances range from 25 cm to 20 m.
- Indoor curtain type: The detection distance ranges from 25 cm to 20 m.
- Outdoor passive infrared: The detection distance ranges from 10 meters to 150 meters.
- Outdoor passive infrared curtain detector: distance from 10 meters to 150 meters

e) Buzzer: It is an alarm device used in sensor to create a noise when it detects the intruder. In the absence of owner near his field, it is protected by this device.

f) LCD display: Liquid crystal cell displays (LCDs) are used in similar applications where LEDs are used. These applications are display of display of numeric and alphanumeric characters in dot matrix and segmental displays.

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fig: LCD display

VIII. RESULT AND DISCUSSION

The framer need not to be tensed about the crops in field which is been protected now by all these innovations since the main aim of this project is to implement the modern technology in required fields like agriculture. Using IoT technology in agriculture, this system makes agriculture monitoring easy. The benefits as mentioned like water saving and labour saving are required the maximum in current agricultural state of affairs. Consequently, using the sensor network in the field of agriculture makes clever irrigation. The information from IoT is sent to the client using cloud.

Thus, the smart agriculture using IoT will revolutionize the world of farming and it will increase the productivity as well as improve the quality and can save lives of farmer. With the recent advancement of technology, it has become necessary to increase the annual crop protection output of our country India, an entirely agri centric economy. The ability to conserve the natural resources as well as giving a splendid boost to the protection of the crops is one of the main aims of incorporating such technology into agriculture domain of the country.

IX. CONCLUSION

Precision agriculture has grown to meet increasing worldwide demand for food using technologies that make it simpler and cheaper to collect and apply data, adapt to changing environmental conditions, and use resources most efficiently.
So, by this project the farmer is notified with the information regarding field condition through mobile periodically. This system will be more useful in areas where there is scarcity of water and will be worth efficient with satisfying its requirements related to the rain level and water level. The crops are also protected using the roof mechanism depending upon the rain condition.

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