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IOT BASED FARM PROTECTION AND IRRIGATION SYSTEM

Anamika Upadhyay, Shikhar Sharan, Shailesh Verma

BABU BANARASI DAS NORTHERN INDIA INSTITUTE of TECHNOLOGY
Lucknow, Uttar Pradesh, India

ABSTRACT

Water scarcity is a big problem for farmers today, and with our country's growing population, agriculture is becoming a major problem facing our farmers today. The main goal of this project is to create an automatic irrigation system that uses the Internet of Things (IOT) to detect soil moisture to turn on and off motor pumps. With the right irrigation methods, human intervention can be reduced. This project consists of an Arduino microcontroller and a sensor, which is programmed to receive an input signal through the sensor to change the soil moisture condition. As soon as the controller receives this signal, the output relay turns on the operation of the water pump.The sensing device consists of two metal rods inserted into the agricultural field tobe monitored.

Keywords : Irrigation, Arduino, Sensors, Agriculture, IOT

I. INTRODUCTION

India is a predominantly agricultural country and all resources depend on agricultural products. Even in the conditions of the modern industrialization era, agriculture is a key sector that determines the economic growth of the country. Agriculture also accounts for 8.56% of the country's total exports.

Agriculture is the most important sector in India. Irrigation is the science of planning and designing efficient, affordable and economical irrigation systems designed for natur al conditions. Establishing a proper distribution system and ensuring adequate watering will increase crop yields. Agriculture is undoubtedly India's biggest livelihood. As the population grows, there is a need to increase agricultural production. The demand for fresh water used for irrigation is also increasing to support higher yields on farms. Agriculture currently accounts for 83% of India's total water consumption. Unplanned water use leads to unintended water use. This suggests that there is an urgent need to develop a T system that can prevent water loss without burdening farmers. Over the past 15 years, farmers have begun using computers and software systems to organize financial data, track transactions with third parties, and monitor their crops more effectively.

Need of an Automatic Irrigation:

- Easy and convenient to install and adjust.
- Resources and energy can be stored so that they can be used in appropriate and appropriate quantities.
- Automated irrigation to distribute equal amounts of water at the right time to farms and nurseries.
- Improve yield by reducing soil moisture saturation to prevent unnecessary over-

watering at the wrong time.
- Automatic sprinkler systems use valves to turn the engine on and off. The motor can be easily automated with the controller, reducing labor costs.
- This irrigation method is a useful tool for precise control of soil moisture in highly specialized greenhouse vegetable crops.

Need of Farm Protection:

- Increase the farm production
- Farmers can focus on other parts of Farms work
- Farmers can take rest
- The system has a configuration that signals the farmers about any attack from wild animals.

1.1 PROBLEM STATEMENT

Design and develop automatic irrigation systems that use the Internet of Things (IOT) to detect soil moisture to turn on and off motor pumps.

2. LITERATURE SURVEY

The birth of internet in 1989, since then connecting "Things" in the internet began widely in use. Trojan Room Coffee pot is possibly application of this kind [1].

In 1990, John Romkey developed the first Internet "device"[2], a toaster that could be turned on and off over the Internet [3].

Paul Saffo [4] first provided a brief description of sensors and their future behavior in 1997. Sensors are deployed everywhere, and these sensors convert raw physical data into digital signals that are sent to the control center [5].

The term Internet of Things was coined by Kevin Ashton, who invented an RFID-based object identification system in the same year [6].

Dr. V. Vidya Devi, G. Meena kumari. "Real-Time Automation and Monitoring System for Modernized Agriculture", Temperature moisture level was sensed for unpredictable environment present a need of proper utilization of water [7].

Juan Francisco Villa Medina, Alejandra Nieto Garibay, an inspection and irrigation plan for a system with dual communication lines powered by solar panels and based on a cellular internet interface, a web page programmed with an irrigation scheme, contains an algorithm designed with temperature thresholds and soil moisture. There is. It is programmed into the gateway based on a microcontroller to control the amount of water [8].

Y. Kim, A system designed for distributed wireless networks of sensors designed for variable rate irrigation, real-time measurements in the field, and precise linear movement system control for a specific site has been developed. Productivity with minimal water use [9] .

R. Suresh, S. Gopinath, K. Govindaraju. T. Devick. N. Suthantira Vanitha was developed. GSM-based automatic irrigation control using sprinkler guns can save large amounts of water as irrigation requires intensive water [10].

- Favitra D.S.M.S. Srinath developed a GSM-based automatic irrigation control system for resource efficiency and crop planning using Android Mobile.

- Support monitoring and decision-making for water management using systems with GSM (RS232) modules.

- A plant's vitality can be tested by testing the soil's temperature and moisture content to retain its nutrients.

[11], Laxmishabadi, Nandini Patil, and Nikita. M, Shruti, Smith. P and Swati. C is an irrigation control system that uses Android and GSM to efficiently use water and electricity, the system uses valves to turn motors on and off, and a controller makes it easy to
automate these valves. Remote Sensing and Control of
Irrigation Systems Using a Distributed Network of
Wireless Sensors Yunseop (James) Kim, Robert G. Evans and William M. Iversen installed a technical system based on a relatively efficient system that developed a Windows application for field monitoring. Microcontroller-based automatic watering system for plants, Venkata Naga Rohit Gunturi, System. A system microcontroller programmed to provide
an interrupt signal to the sprinkler.

3. PROPOSED DESIGN METHODOLOGY

3.1 PROPOSED SYSTEM

Agriculture currently faces major challenges due to water scarcity. To cope with the difficulties, an intelligent irrigation system using various sensors such as pH sensor, soil moisture sensor, temperature sensor was used, and in our project we use a soil moisture sensor connected to a pin. The resulting value from the Arduino microcontroller is stored on the Adafruit server, and when the values match, the water pump automatically turns on and off at a value of 0. It allows farmers to access field health information anytime, anywhere.

3.2 PROPOSED SYSTEM ARCHITECTURE

A block diagram of a smart irrigation system compares the main components:
Arduino, nodeMCU, soil moisture
sensor, Adafruit server, relay, motor.
When the sensor circuit detects the condition of the soil it compares it to a 5v reference voltage. If the soil condition is below the reference voltage of 5V, the soil is considered dry and immediately sends a logic signal to the microcontroller. The microcontroller then turns on the motor driver circuit and waters the plants. If the measured value is greater than the 5V reference voltage, a logic 0 signal is sent to the microcontroller to disable the motor driver circuit.

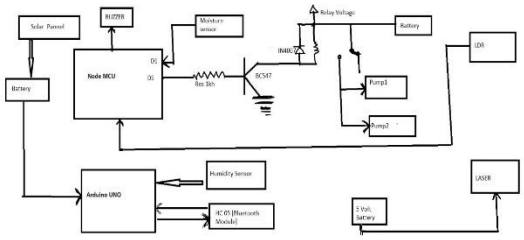

Figure 3.1: Block Diagram of Smart Irrigation System and Farm Protection

3.3 HARDWARE AND SOFTWARE REQUIREMENT

The hardware and the software tools essential for implementing this project are given below:

- Hardware Requirement:
- Arduino
- CNodeMeU
- Relay
- Solonoid

Software Requirement:

Arduino IDE

4. RESULTS AND DISCUSSION

The developed system is tested under various conditions. Soil moisture testing tests the soil for all climatic conditions and the results are interpreted successfully. Takes and updates humidity readings in various weather conditions. Wireless transmission was made using WiFi. Data is stored on Adafruit servers and then successfully retrieved data from Adafruit used for monitoring purposes. Soil Moisture Sensor value depends on soil resistance. Sensor values range from 0 to maximum wet.

The received value is sent to the microcontroller via NodeMcU, in this state the motor pump is OFF.

The maximum threshold for dry soil is 1023. When the value measured by the sensor reaches a threshold, the microcontroller activates a relay and the motor starts.

Motor pump automatically turns on and off when sufficient water is supplied to the plant.

CONCLUSION AND FUTURE SCOPE

Irrigation system automation is affordable and affordable for access to water sources for agricultural management. Regular server updates can give your system the knowledge it needs and keep it running smoothly for an indefinite period of time. Reduce the energy and strength of the human factor.

Project is used for the following

The field is maintained by maintaining the moisture level in the root area. The distribution of water in the field is uniform. This method of irrigation reduces labor costs. The consumption of water and electricity is greatly reduced.

Future Work

The project has a great opportunity to develop it and make it more user-friendly, with additional features such as:

- You can install a webcam on any device that can be sent to a database for capturing pictures.
- Implemented a voice option for people who cannot read.
- Integrate GPS devices to locate farmers and provide more accurate weather forecasts for cropland and orchards.
- All functions of the device can be translated into local languages, making it easier for farmers to read.

REFERENCES

1. Vipul Gupta and David G. Simmons, Sun Labs, Oracle "Building Web of Things with Sun SPOT", Java One 2010, Handson Lab.
2. https://romkey.com.
3. http://wearcam.org/myview.html.
4. http://www.saffo.com/essays/sensorsthenext Wave of InfoTechInnovation.
5. Ross Yu,
Thomas Wattain “Reliable, Low-Power Wireless Sensor Networks for the Internet of Things: Making Wireless Sensors As Affordable as Web Servers” White Paper, LT 1213, © Linear
Technology Corporation, 2013.
6. http:///www.rfidjournal.com/articles/view?49867. Nandurkar SR, Nandurkar VR. Thool, R. C. Thool,

"Design and Development of Precision Agriculture System Using Wireless Sensor Network", IEEE International Conference on Automation, Control, Energy and Systems (ACES), 2014.

7. Joaquin Gutierrez, Juan Francisco VillaMedina, Alejandra NietoGaribay, and Miguel Ángel PortaGándara, "Automated Irrigation System Using a Wireless Sensor Network and GPRS Module", IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT, 00189456,2013
8. Y. Kim, R. Evans, W. Iversen, "Remote Sensing and Control of Irrigation Systems Using Distributed Wireless Sensor Networks," IEEE Transactions on Metrology and Measurement, p. 1379–1387, 2008.