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IoT Enabled Automatic Intelligent Irrigation System Using Sensors

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ABSTRACT: The objective of our project is to route the overflow water to the secondary land and avoid waste of water and protect the land from flood. Soil moisture sensor is used for identifying the moisture level of the soil for automatically turning on the pump and supplies the water to the land. Soil moisture sensor is also used as water level sensor for identifying the overflow of water and opens the solenoid valve, so that this land water will be routed to secondary land. Also the system is connected to internet via Wi-Fi model so that each and every action that is performed in the land will be monitored from the remote location from anywhere from the world. Also fire sensor is used to identify the fire. There are 4 fire sensors used for each direction and based on the direction of the fire the pump will rotate using servo motor and turn to the position of the fire and pump the water to extinguish the fire.

KEYWORDS: Arduino, Soil moisture sensor, Fire sensor, Wi-Fi Module, IOT cloud.

I. INTRODUCTION

In India, agriculture plays an important role for development in food production. In our country, agriculture are depends on the monsoons which is not sufficient source of water. This system will be a substitute to traditional farming method. We will develop such a system that will help a farmer to know his field status in his home or he may be residing in any part of the world. It proposes automatic irrigation system for the agricultural lands. Currently the automation is one of the important roles in the human life. It not only provides comfort but also reduce energy, efficiency and time saving. Now the industries are use automation and control machine which is high in cost and not suitable for using in a farm field. So here it also designs a smart irrigation technology in low cost which issuable by Indian farmers. An automated irrigation system was technology in low cost which is usable by Indian farmers. An automated irrigation system was developed to optimize water use for agricultural crops. Automation allows us to control appliances automatically. The objective of this paper is to develop IOT based automated irrigation system to reduce water requirement and increase the productivity. This system is best suited for places where water is scarce and has to be used in limited quantity.

II. EXISTING METHOD

The project irrigation control using tackle the problems of agricultural sector regarding irrigation at times, motor pumps are left running for longer than what is necessary because of the effort involved. In the existing system farmers have to travel to fields often at odd hours just to switch on/off the motor due to erratic power supply. Existing aids like auto starters are especially when a farmer in switching off. To overcome the drawbacks of existing system like

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high cost, difficult in maintenance and more wired connection, we introduce a new system which will have wireless connection between server and nodes. We introduce a new design of embedded web server making use of IOTS network technology in this paper. Compared to the wired link web server system, this system is characterized by having no wires between the web server and terminal nodes. In proposed system the irrigation will take place only when there will be intense requirement of water.



Fig. No. 1: Irrigation

Irrigation system uses valves to turn irrigation on and off. These valves may be easily automated by using controllers. Automating farm or nursery irrigation allows farmers to apply the right amount of water. To avoid these problems a microcontroller based embedded after the research in the agricultural field; researchers found that the yield of agriculture goes on decreasing day by day. Use of technology in the field of agriculture plays important role in increasing the production as well as in reducing the extra man power efforts, water requirement and fertilizer requirement after the research in the agricultural field, researchers found that the yield of agriculture goes on decreasing day by day. Use of technology in the field of agriculture plays important role in increasing the production as well as in reducing the extra man power efforts, water requirement and fertilizer requirement. Internet of things helps the things to communicate each other using IOT module.

III. WORKING METHODOLOGY

The main aim is to control the water management for an irrigation system by automatic method. This method does not require any manual operators. It is designed to manage the irrigation system based on the response to the real time status of the soil moisture. Irrigation system controls valves by using automated controller allow the farmer to apply the right amount of water at the right time. Due to the variable atmospheric conditions some may vary from place to place in large house, which makes very difficult to maintain the uniformity at all the places in the farmhouse manually. For this GSM is used, it sends the report through the android mobile. So it reduce runoff from over watering saturated soil, avoid irrigating at the wrong time .it also helps in time and energy saving ,removal of human error in adjusting available soil moisture levels and to maximize their net profits.

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IV. BLOCKDIAGRAM

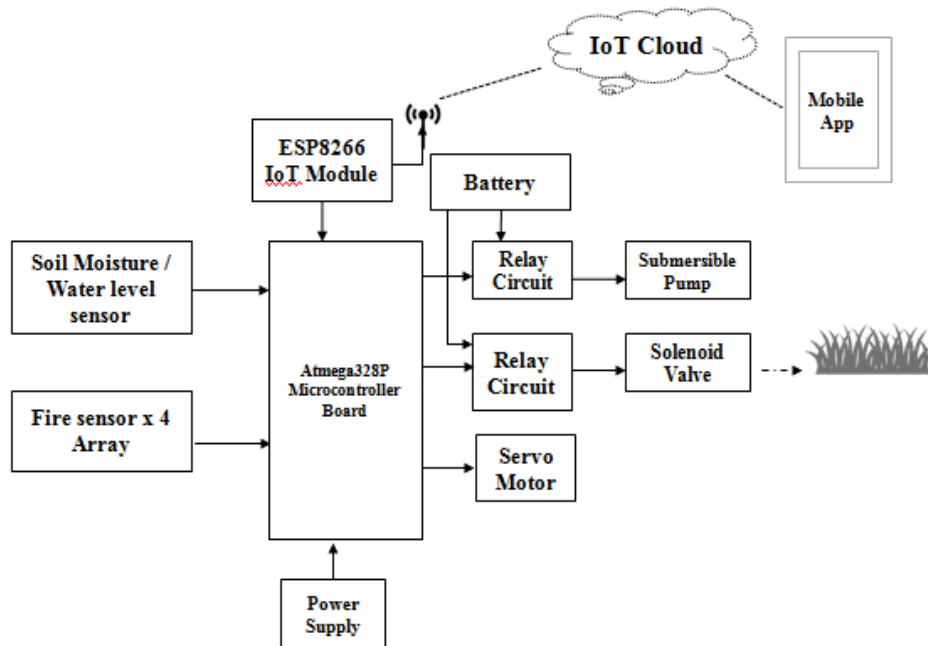


Fig. No. 2: Block diagram of Proposed System

V. BLOCK DIAGRAM DESCRIPTIONS

(i) Arduino:

In the below figure it is showing an Arduino board is an open source platform used for building electronics projects. Arduino is a programmable circuit's board which we can write a program based on your projects. Arduino program will be uploading with IDE (Integrated Development Environment) software that runs on your computer, it is used to write and upload computer code to the Arduino physical board. Arduino language is merely a set of C/C++ functions that can be called from your code.



Fig.No.3: Arduino Uno R3 board

(ii) Relay :

In the figure, shows are a relay is an electrically operated switch. Several relays use a magnet to automatically operate a switch, however alternative in operation principles are used, like solid state relays. Relays are used wherever it's necessary to regulate a circuit by a separate low-power signal, or wherever many circuits should be controlled by one signal. The essential relays were handling in long distance communicate circuits as amplifiers, they unbroken the signal coming back in from one circuit and re-transmitted it on another circuit.

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Fig.No. 4: Relay

(iii) *Soil Sensor :*

Soil moisture sensors measure the humidity of water content in soil. Since the direct hydrometric measuring of free soil wetness needs removing, drying, and coefficient of a sample, soil wetness sensors live the meter water content indirectly by victimization another property of the soil, like electrical phenomenon, nonconductor constant, or interaction with neutrons, as a proxy for the wetness content.

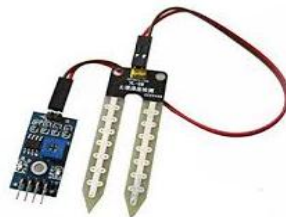


Fig. No. 5: Soil moisture sensor

(iv) *Fire sensor:*

This module is sensitive to the flame and radiation. It also can detect ordinary light source in the range of a wavelength 760nm-1100 nm. The detection distance is up to 100 cm.



Fig.No. 6: Fire Sensor

(v) *Motor :*

An AC motor is an electrical motor driven by Associate in alternating current (AC). In figure: 5, The AC motor normally consists of two basic components, an outdoor stationary stator coil having coils furnished with AC to supply a rotating flux, and an indoor rotor connected to the output shaft manufacturing a second rotating flux. The rotor flux could also be made by permanent magnets, reluctance striking, or DC or AC electrical windings.

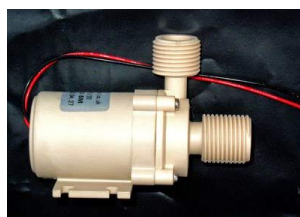


Fig. No. 7: Motor

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(vi) *Transistor :*

The 2N2222 may be a common NPN bipolar semiconductor device; bipolar junction transistors (BJT) used for general purpose low-power amplifying or switch applications. It is designed for low to medium current, low amplifying current, low power, medium voltage, and might operate at moderately high speeds. It had been originally created within the TO-18 metal.



Fig. No. 8: Transistor

(vii) *Servo motor:*

Servos are controlled by sending an electrical pulse of variable width, or pulse width modulation (PWM), through the control wire. There is a minimum pulse, a maximum pulse, and a repetition rate. A servo motor can usually only turn 90° in either direction for a total of 180° movement.



Fig.No. 9: Servo motor

(viii) *Wi-Fi Module:*

ESP8266 is a complete and self-contained Wi-Fi network solution that can carry software applications, or through another application processor uninstall all Wi-Fi networking capabilities. When the device, ESP8266 is mounted and as the only application of the application processor, the flash memory can be started directly from an external Move. Built-in cache memory will help improve system performance and reduce memory requirements. Another situation is when wireless Internet access assumes the task of Wi-Fi adapter, you can add it to any microcontroller-based design, and the connection is simple, just by SPI / SDIO interface or central processor AHB bridge interface. Processing and storage capacity on ESP8266 powerful piece, it can be integrated via GPIO ports sensors and other applications specific equipment to achieve the lowest early in the development and operation of at least occupy system resources. The ESP8266 highly integrated chip, including antenna switch balun, power management converter, so with minimal external circuitry, and includes front-end module, including the entire solution designed to minimize the space occupied by PCB.



Fig. No. 10: WiFi Module

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VI. RESULT

IoT Enabled Automatic Intelligent Irrigation System using Sensors is implemented using Arduino Uno and IoT platform. The photocopy of this module is shown in below.

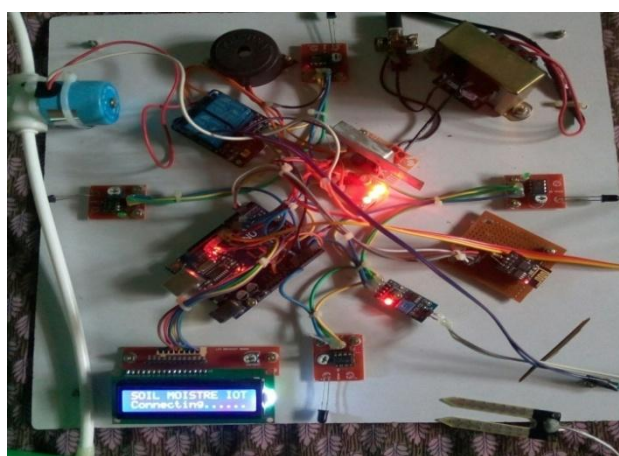


Figure No.11: Photo copy of IoT Enabled Automatic Intelligent Irrigation System

VII. CONCLUSION

Thus the "IoT Enabled Automated Intelligent Irrigation system using sensors" has been designed and tested successfully. It has been developed by integrated features of all the hardware components used. Thus, the Arduino Based Automatic Plant Watering System has been designed and tested successfully. The system has been tested to function automatically. The moisture sensors measure the moisture level (water content) of the different plants. If the moisture level is goes to be below the desired and limited level, the moisture sensor sends the signal to the Arduino board which triggers the Water Pump to turn ON and supply the water to respective plant using the Rotating Platform/Sprinkler. When the desired moisture level is reached, the system halts on its own and the water Pump is turned OFF. Thus, the functionality of the entire system has been tested thoroughly and it is said to function successfully. This paper has demonstrated ability to automatically control flood based on the water level using water level sensor probe and wireless sensor network (WSN). The system technique has provided more supervision and control than in traditional method of flood control. Available equipment especially water level monitoring devices provided needed information the control system.

REFERENCES

- [1] Y. Kim and R. G. Evans, - Software design for wireless sensor-based site-specific irrigation Compute. Electron. Agricult. vol. 66, no.2, pp. 159–165, May 2009.
- [2] D.K.Fisher and H. A. Kebede, - A low-cost microcontroller-based system to monitor crop temperature and water status, compute. Electron. Agricult. vol. 74, no. 1, pp. 168–173, Oct. 2010.
- [3] K.Srikar , M.Akhil, V.Krishnreddy," Execution of Cloud Scheduling algorithm Innovation Research Journal of Engineering and Technology, vol 02, no 04, pp.108111, 2017.
- [4] Y. Kim, J. D. Jabro, and R. G. Evans, - Wireless lysimeters for realtime online soil water monitoring, Irrigation Sci., vol. 29, no. 5,pp. 423–430, Sep. 2011.

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- [5] O. Mirabella and M. Brischetto, A hybrid wired wireless networking infrastructure for greenhouse management IEEE Trans. In strum. Meas., vol. 60, no. 2, pp. 398–407, Feb. 2011.
- [8] M. Winkler, K.-D. Tuchs, K. Hughes, and G. Barclay, -Theoretical and practical aspects of military wireless sensor networks, IJ. Telecommun. Inf. Technol., vol. 2, pp. 37–45, Apr./Jun. 2008.
- [9] M. P. Durisic, Z. Tafa, G. Dimic, and V. Milutinovic, -A survey of military applications of wireless sensor networks, I in Proc. MECO, Jun. 2012, pp. 196–199.
- [10] M. C. Rodríguez-Sánchez, S. Borromeo, and J. A. Hernández-Tamames, - Wireless sensor networks for conservation and monitoring cultural assets, IEEE Sensors J., vol. 11, no. 6, pp. 1382–1389, Jun. 2011.
- [11] G. López, V. Custodio, and J. I. Moreno, - LOBIN: E-textile and wireless sensor network based platform for healthcare monitoring in future hospital environments, I IEEE Trans. Inf. Technol. Biomed., vol. 14, no. 6, pp. 1446–1458, Nov. 2010.
- [12] J. M. Corchado, J. Bajo, D. I. Tapia, and A. Abraham, monitoring system for healthcare, IEEE Trans. Inf. Technol. Biomed., vol. 14, no. 2, pp. 234–240, Mar-2013.

BIOGRAPHY



Mr.Sadiq Basha.G received the bachelor's degree in Electronics and Communication Engineering from Periyar University Tamilnadu, India, in 2003 and Master's degree in VLSI Design from Sathyabama University, Tamil Nadu, India in 2009. At present he is working as Associate Professor in the Department of ECE, V.R.S College of Engineering and Technology, Villupuram. His main research interest includes design of Low power VLSI, Microwave Engineering and Waveguides.



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