WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Arduino & Moisture Based Automatic Irrigation System with Message Alert

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ABSTRACT-

In India, agriculture is the primary source of income for people. India is a nation that relies heavily on agriculture. It has a significant impact on the national economy. However, there are obstacles in agriculture these days because of the migration of people from rural to urban areas. Crop output may be increased by means other than just monitoring environmental factors. A multitude of variables contribute significantly to a drop in output. Therefore, automation has to be used in agriculture to solve these issues.

INTRODUCTION

Our plants require frequent watering, so we used to worry about them whenever we were out of town for a few days. Thus, we are utilizing Arduino to create an Automatic Plant Irrigation System that supplies automatically. Give your plants water, and we'll send you updates via text message on your phone. The soil moisture sensor in this plant watering system measures the soil's moisture content. If the moisture content is low, the Arduino turns on the water pump, which hydrates the plant. When the system detects that the soil has enough moisture, the water pump shuts off automatically. The status of the water pump and soil is updated and a message is delivered to the user via the GSM module whenever the system switches on or off the pump.

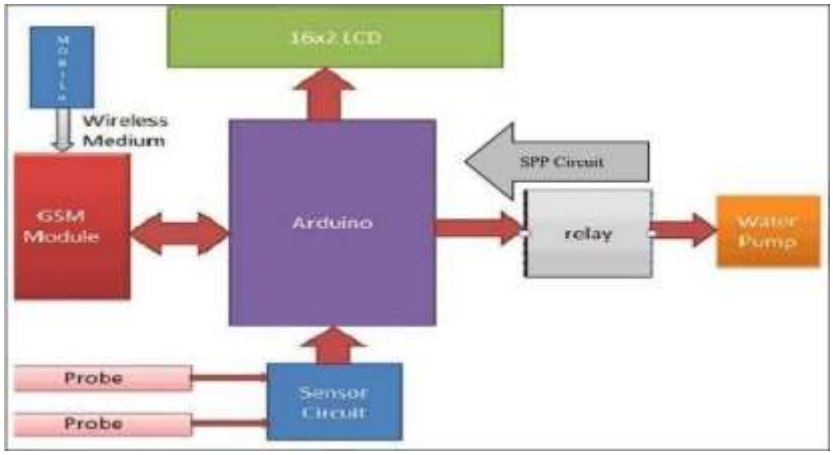
The transistor drives the relay and the diode protects the circuit from high voltage spikes while switching the relay ON/OFF. The LED indicator shows the status of the relay. If the LED glows the relay activated and if the LED is off, the relay is deactivated. Insert a valid SIM on the GSM modem and try to take advantage of the offers availed by the network provider for SMS such as rate cutters, which will reduce the expenses for SMS. With the wide spread use of cellular networks, this approach is also popular when small amount of data is to be transferred through the network. Extensive work has been carried out by researchers using this approach especially in medical field. (Chen Peijiang and Jiang Xuehua,

LITERATURE REVIEW

A research paper is a document of a scientific article that contains relevant expertise, including substantive observations, and also references to a specific subject of philosophy and technique. A) Title: “IoT Based Smart Agriculture Aid System using Raspberry Pi” Author: Priyanka Bhardwaj, Adarsh Srivastava, Abhishek Kumar Pandey, Abhishek Singh, Bhartendu Tripathi Proposed System in Paper: In the paper main controller is Raspberry Pi. Soil moisture sensor, humidity temperaturesensor, water pump, Ph sensor, rain sensor are the components used. Values of all the sensorsread by raspberry pi. Project Proposed system: In our project rain sensor, soil moisture and humidity and temperature sensor are used We are using Arduino as main controller. Our system is cost effective. We are using these components which are efficient in working and affordable.

B) Title: “Smart Agriculture Monitoring System Using IOT” Author: Dr. Sanjay N. Patil, Madhuri B. Jadhav Proposed System in Paper: This Project includes sensors such as temperature, humidity, soil moisture and rain detector for collection the field data and processed. These sensors are combined with well- established web technology in the form of wireless sensor network to remotely control and monitor data from the sensors. Project Proposed system: In our project rain sensor, soil moisture sensor, humidity and temperature sensor are used. Sending the data of the sensor to the web server. The project will implement in less cost.

1. BLOCK DIAGRAM:



Details Of Individual Blocks

Arduino: This widely recognized open-source development board is a favorite among engineers and makers, facilitating the creation of electronic projects effortlessly. Equipped with both analog and digital pins, it consists of a tangible programmable development board, based on the AVR family of microcontrollers, coupled with an integrated development environment (IDE). The IDE serves as a software tool to write and upload code to the microcontroller board.

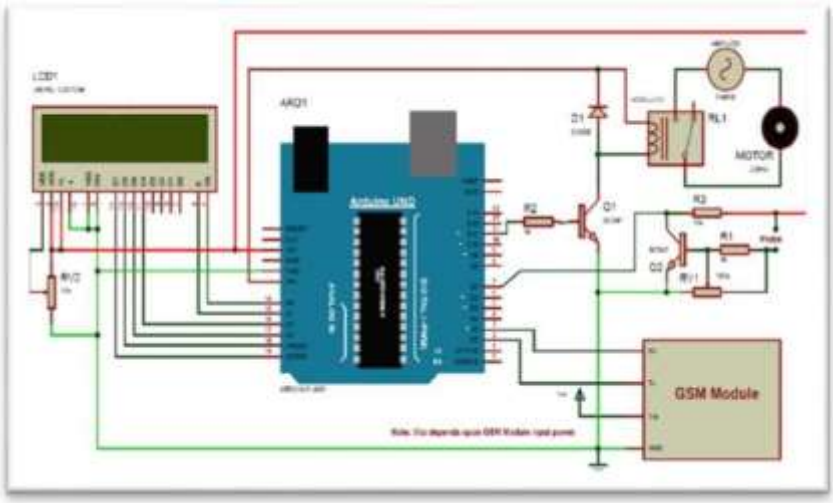
GSM Module: Utilizing the TTL SIM800 module, a full quad-band GSM/GPRS module, users can conveniently send SMS messages. Opting for the TTL SIM800 GSM module allows for direct provision and acceptance of TTL logic. However, it's crucial to thoroughly review the datasheet beforehand, given its high sensitivity to voltage ratings. Understanding the voltage at which it operates is imperative for optimal performance.

ADVANTAGES AND DISADVANTAGES

Advantages

1) Low power consumption
2) Global range
3) Easy to operate
4) Flexible to run at specific intervals
5) SMS To Get the Status of device
6) GSM Technology, Reliable operation, Worldwide Connectivity

CIRCUIT DIAGRAM



SPECIFICATIONS OF PROPOSED SYSTEM

In an automated plant watering system, also known as a smart irrigation system, an Arduino microcontroller serves as the central control and sensing unit. One essential component is the soil moisture sensor, which detects and measures soil moisture levels.

The purpose of irrigation extends beyond simply watering plants; it plays a crucial role in agricultural crop growth, landscape maintenance, and soil revegetation, especially in arid regions or during periods of low rainfall. Additionally, irrigation serves various functions in crop production, such as protecting against frost, controlling weed growth in grain fields, and preventing soil compaction.

The integration of technologies like the Internet of Things (IoT), smartphone applications, and sensors enhances the capabilities of modern irrigation systems. These advancements enable farmers to monitor precise field conditions in real-time, including soil temperature, required water levels, weather forecasts, and more, facilitating more efficient and effective agricultural practices.

Disadvantages

1) Communication delays
2) Not work in remote areas
3) Network required

APPLICATIONS

1) GSM based home automation
2) Vehicle tracking system based on GPS and GSM
3) GSM home alarm
4) RFID attendance system using Arduino with GSM
5) Industrial automation
6) Security alerts

CONCLUSOIN

The project titled "GSM modem-based irrigation water pump controller for individuals with limited literacy" has been successfully developed and tested. Leveraging highly advanced integrated circuits (ICs) and the continuous evolution of technology, the project has been effectively deployed. This innovation provides significant flexibility to farmers, particularly during power outages.

The prototype of the system adhered to the specified requirements and performed satisfactorily. Its components are readily accessible, relatively affordable, and operate reliably. By automating irrigation processes, the system alleviates the burden of manual intervention while conserving water resources.

For future iterations of the project, we suggest considering the use of a more robust water pump for large-scale implementation, enhancing its capability to meet the demands of extensive irrigation systems.

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