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LA TIERRA : Soil Moisture Detector With Automatic water Irrigation

[1]Sushmitha Murali (USN:1DS21EC210), [1]Ruchika Raju (USN:1DS21EC173),
[1]Lalit SM (USN:1DS21EC104), [1]Kundan Harsha (USN: 1DS21EC072),
[2]Adithya T.G., [3]Dr. Pavithra G., [4]Dr. Sindhu Sree M.,
[5]Dr. T.C.Manjunath* Ph.D. (IIT Bombay), Sr. Member IEEE, Fellow IE, Chartered Engineer
[1]First year BE UG (ECE) Second Sem Students, Dept. of Electronics & Communication Engg., Dayananda Sagar College of Engineering, Bangalore, Karnataka
[2]UG B.Tech. (CSE) Student of Third Semester, Dept. of Computer Science & Engg., PES University, Bangalore
[3]Associate Professor & mini-project guide, ECE Dept., DSCE, Bangalore, Karnataka
[4]Assistant Professor, ECE Dept., DSCE, Bangalore, Karnataka
[5]Professor & HOD, ECE Dept., DSCE, Bangalore, Karnataka

Abstract
In this paper, we present a brief conceptual development of the soil moisture detector with automatic water irrigation system. The oxygen that is provided by proper watering is essential for container-grown plants and trees. Because of inappropriate scheduling or inadequate watering, many people are confused of how to take good care of pricey plants or trees like bonsai. In this case, a computerised system that can recognise when to water plants properly could be useful. In this study, an Arduino microcontroller board with an ATMEGA 328p chip was employed. It has a few sensors built in to monitor lighting, soil moisture, and water level in the plant's pot. The Arduino has been programmed to obtain the sensor's norm, compare it to our predetermined standard threshold, and turn on or off the water pump depending on the needs of the plants. If there is a problem supplying water from the source, the owner will be notified via a message alert system that has been set up. The work presented here is the mini-project work of the 2nd sem students of electronics & communication engineering department of dayananda sagar college of engg., bangalore.
Keywords—Soil, Moisture, Detection, Experiment.

1. Introduction

A brief introduction about the related work is presented in this paper. We introduce the work's fundamental introductory concepts in this part. The oxygen that is provided by proper watering is essential for container-grown plants and trees. Because of inappropriate scheduling or inadequate watering, many people are confused of how to take good care of pricey plants or trees like bonsai. In this case, a computerised system that can recognise when to water plants properly could be useful. In this study, an Arduino microcontroller board with an ATMEGA 328p chip was employed. It has a few sensors built in to monitor lighting, soil moisture, and water level in the plant's pot.

A unique gadget called a soil moisture sensor monitors the amount of moisture in the soil and, with the help of an appropriate mechanism, enables irrigation of different soils with different amounts of water. Using an automated irrigation system, this permits the flow of water to the plants or the cessation of water to the plants.

The Arduino has been programmed to obtain the sensor's norm, compare it to our predetermined standard threshold, and turn on or off the water pump depending on the needs of the plants. If there is a problem supplying water from the source, the owner will be notified via a message alert system that has been set up.

Open-source electronics platform Arduino is built on simple-to-use hardware and software. Arduino boards can take inputs like a sensor's light, a user's finger on a button, or a tweet and convert them into outputs like starting a motor, turning on an LED, or posting anything online. Over the years, countless of projects, ranging from simple household items to intricate scientific instruments, have used Arduino as their brain. Around this open-source platform, a global community of markers has collected, and

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their contributions have built up to an astounding quantity of accessible knowledge that may be very helpful to beginners and professionals alike.

At the Lvrea Interaction Design Institute, Arduino was created as a simple tool for quick prototyping geared for students with no prior experience in electronics or programming. The Arduino board started evolving as soon as it started serving a larger audience, distinguishing its offering from basic 8-bit boards to goods for industrial, wearable, 3D-printing, and embedded contexts. Since every Arduino board is fully open source, users can construct them on their own and eventually customise them to suit their specific needs.

2. Problem Statement

Nowadays, people are too preoccupied with their jobs. Most of them have a tendency to concentrate on one subject until they forget about household duties like watering the plant. People's inability to effectively manage their time is the source of this. Consequently, creating a system for automatically watering plants and notifying users of any changes is the best way to address this issue. This system will alert the user, and in response to that signal, the plant will begin to receive automatic irrigation. In response to the issue, we developed an Automatic Watering Plants.

A unique gadget called a soil moisture sensor monitors the amount of moisture in the soil and, with the help of an appropriate mechanism, enables irrigation of different soils with different amounts of water. This device uses an automated irrigation system to allow water to flow or stop flowing to the plants.

3. Proposed Methodology

In this section, we present the proposed methodology that is being used in the mini project work. We have used both the hardware as well as the software part. The hardware & software tools used in the mini-project are as follows.

- Soil moisture sensors
- Arduino uno’s
- Relays
- DC motor ss
- Lcd motor

Constructing the POV display:

- Connect a power supply to an Arduino.
- Connect the Wi-Fi module to the Proteous 8.0 and Arduino IDE Apps.
- Connect the relay to the 6 volt battery to power the water pump.
- Relay is then utilised to manage the water pump.
- The relay utilised here has a built-in motor driver needed for the pump as well.
- Start gauges the plant's root zone's temperature and humidity.
- The soil moisture sensor then determines the volumetric water content of the soil using a number of indirect techniques, including gauging the soil's electrical resistance, dielectric constant, and neutron interaction.

4. Proposed Block-Diagram

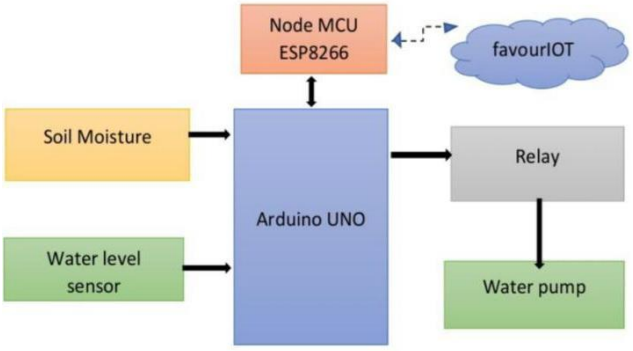

Fig. 1 : Proposed block diagram of the soil moisture detection system

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5. Results & Discussions

In this section, the results are presented along with the discussions on the results of the min-project that was being implemented by us. We can manage the soil moisture content of farmed land thanks to this research. Water pumping motor was automatically turned on or off via a relay based on soil moisture.

This increases crop output by saving water while obtaining the water level in a desired area of the plant. For optimal absorption through, a servo motor from vegetation water was evenly distributed in the water. As a result, there is less water waste.

Based on the type of plant, the soil's moisture level, and the recorded temperature, the system also enables distribution to the plant when necessary. Major agricultural regions' efforts are minimised by the suggested work.

Software can be used to fine-tune a number of system components to the needs of the plant. The outcome is a supporting technology that is scalable.

We can determine if the soil is wet or dry with this sensor. Finally, we will make our project more ideal when we run into these issues.

6. Conclusions

In this section, the conclusive remarks of the mini project has been presented in a nut-shell.

- We are able to irrigate six different potted plants using the Arduino UNO board.
- We can water even more plants by adding a few more lines of code and utilising the Arduino Mega 2560 board, which has additional analogue input pins.
- Depending on the size of the tank, we can enable the circuit to refill the tank after a certain number of days.
- We can also add an Ethernet or Wi-Fi shield and use the Twitter library, which will tweet from our plants' sides to send messages like : I need water, the tank is empty, refill the tank, thanks for the water, and so forth.
- It was successful to create and implement this suggestion for automatically watering plants.
- The proposed plan achieved not only the aims listed in Chapter One but also the targeted objectives for reducing global warming in order to rescue the globe.
- The automatic plant watering idea was built in a way that made each component that needed to be fully addressed and developed a reality and a possibility.
- Applications are watering the different plants & the soil moisture content detection in the agricultural fields.
- Problems faced during construction – LED’s were not blinking due to lose connections and forming connections.

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