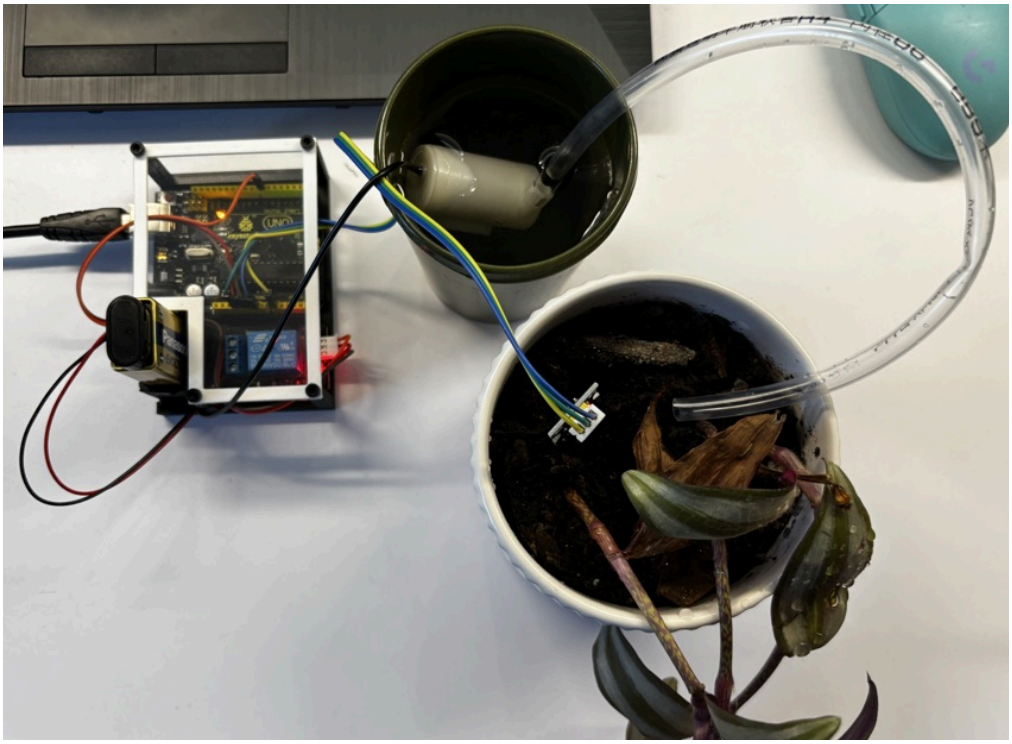
Automatic Plant Watering System



Overview

This project was born out of a common challenge faced by residential advisors: residents needing someone to water their plants while they are away. The system is an automatic, self-contained plant watering system designed to keep plants healthy and happy, giving residents and RAs peace of mind.

The system uses a simple moisture sensor to detect when a plant's soil is dry. An Arduino-controlled pump then activates to deliver a small amount of water to the plant, ensuring it stays properly hydrated without over-watering. The system is housed in a custom-designed, 3D-printed enclosure with a Perspex cover for both protection and a clean aesthetic.

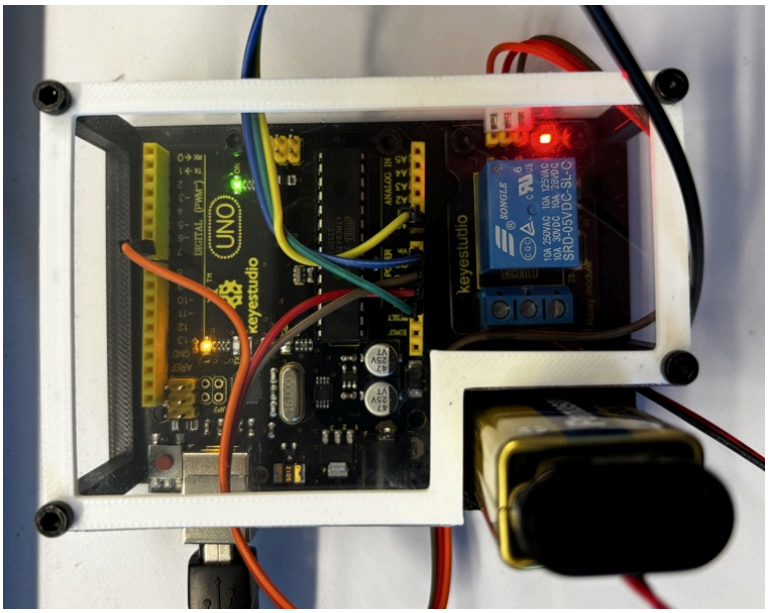
Problem Statement

As a residential advisor in university halls, I frequently encountered a simple but recurring problem: residents going away for weekends or holidays would ask me to water their plants. This often led to plants being forgotten or watered irregularly, sometimes to their detriment. This project provides a reliable, automated solution to this problem, ensuring plants are cared for consistently without manual intervention.

Features

- **Automated Watering:** The system waters plants only when the soil moisture drops below a certain threshold.
- **Modular Design:** All electronics are neatly housed in a custom-designed, 3D-printed enclosure, making it easy to set up and move.
- **Aesthetic Appeal:** The combination of a PLA 3D-printed enclosure and a Perspex cover creates a clean and modern look, suitable for any dorm room or living space.

Hardware Components



The following components are required to build this project:

- **Microcontroller:** Arduino Uno
- **Pump:** 5V submersible mini water pump
- **Relay Module:** Compatible 5V relay module to control the pump
- **Moisture Sensor:** A soil moisture sensor
- **Power Supply:** A 9V battery
- **Enclosure:** Custom 3D-printed enclosure and PCB mount, along with a laser-cut Perspex edge cover.
- **Cables:** Jumper wires and other connecting wires.

3D Printed Enclosure

The CAD files for the 3D-printed enclosure and its components are included in this repository. The design is specifically made to house the Arduino Uno, the relay module, and the 9V battery, providing a compact and secure setup.

- pcbEncloserAssembly.SLDASM: The main SolidWorks assembly file for the enclosure.
- PCBmount.SLDPRT: The SolidWorks part file for the internal mount that holds the PCB.
- edge cover.SLDPRT: The SolidWorks part file for the aesthetic Perspex cover.

Software

The Arduino code is responsible for reading the soil moisture sensor, checking if the soil is dry, and activating the water pump via the relay module. The code includes a simple loop that runs the check at regular intervals.

[Can be seen in the PlantWateringSystem.ino file]

Setup Instructions

1. **3D Printing:** Print the enclosure components using the provided CAD files. The main enclosure and PCB mount were printed in PLA.
2. **Assembly:**
    - Mount the Arduino Uno, relay module, and 9V battery inside the 3D-printed enclosure.
    - Secure the Perspex cover.
3. **Wiring:**
    - Connect the moisture sensor to the Arduino's analog input pin.
    - Connect the relay module to a digital output pin on the Arduino.
    - Wire the 5V mini water pump to the relay module and to a power source.
    - Connect the 9V battery to power the Arduino.
4. **Software Upload:**
    - Open the Arduino code file in the Arduino IDE.
    - Connect your Arduino Uno to your computer.
    - Upload the code to the board.
5. **Placement and Calibration:**
    - Place the moisture sensor in the soil of your plant.
    - Place the mini pump in a reservoir of water.

- You may need to adjust the moisture threshold in the code to calibrate it for your specific plant and soil type.

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