Automatic Plant Watering System

Group No. 11

“Smarties”

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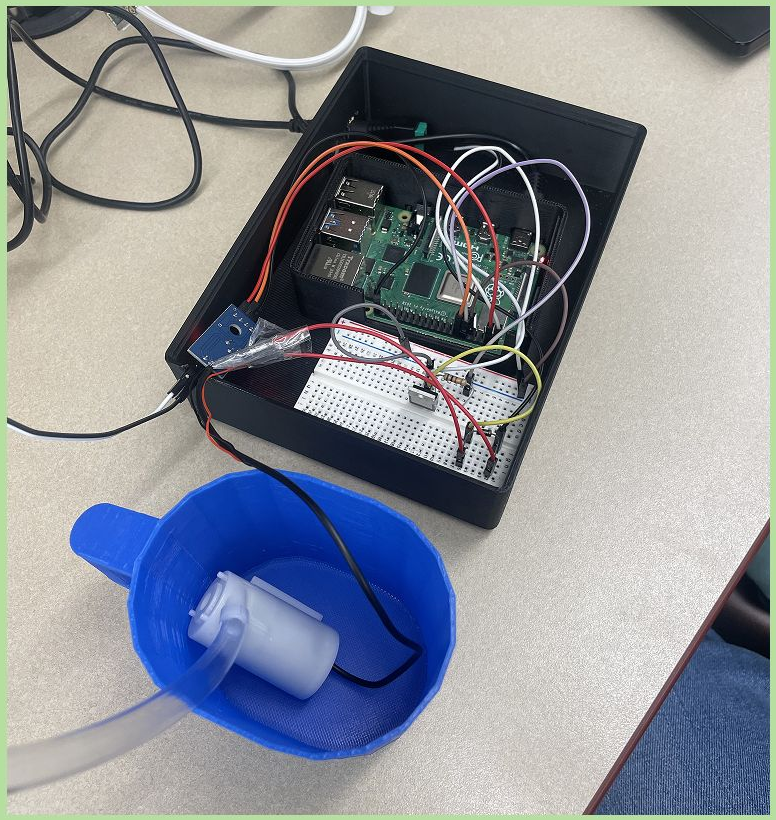
Intro

Many people who have plants in their house struggle with watering them consistently. Owning a plant requires frequently checking whether it needs a water and watering if its needed. All these aspects of owning a plant might be inconvenient for some people and this project will help with this problem. The system will take care of plant's water needs so the users don't have to worry about it.

Features

The system consists of a box that holds all the hardware components and water container as wells as moisture sensor and water pump' tube coming out of the box. The tube and the sensor have to be inserted inside the plant' soil. The system will be checking when the plant needs watering, and water the plant when the soil is dry. The user will be able to access the information about watering and refilling through a web server.

What's inside the box?

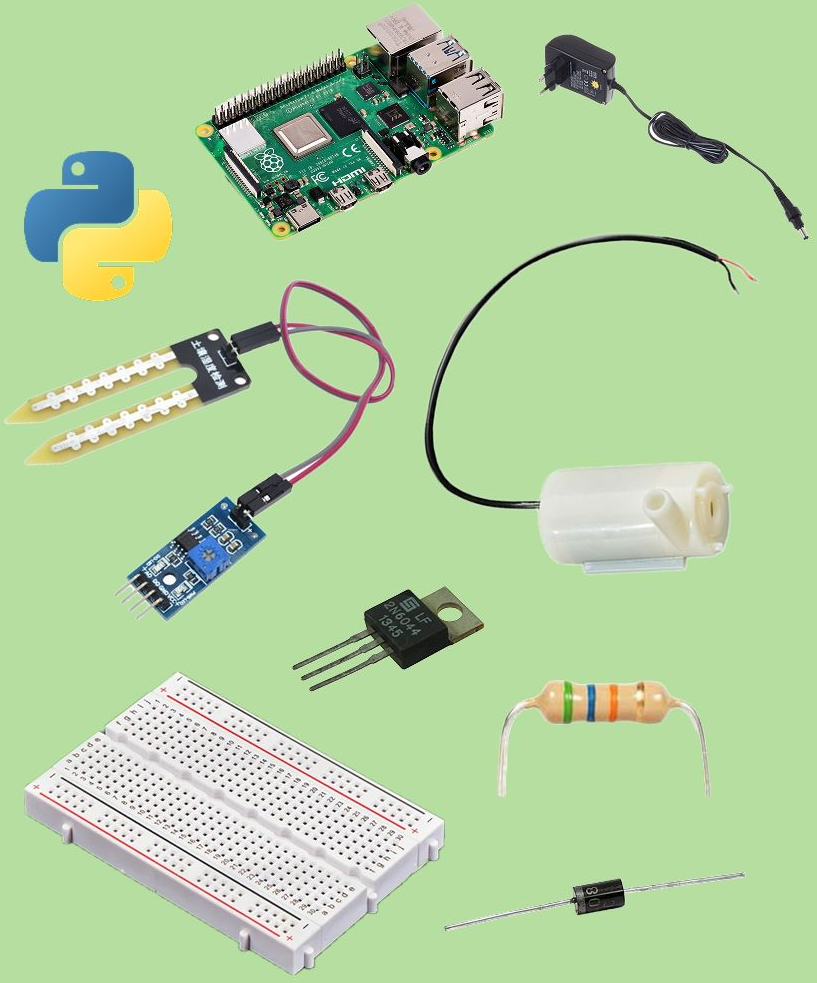


This is how it looks underneath the lid

Hardware components

Hardware components that were used to build our project:

- Breadboard
- Moisture sensor
- Resistor
- Transistor
- Diode
- Water pump
- DC power



Automatic Plant Watering System

Additional Services

We also used Apache HTTP Server that allowed our to build a web server as a part of this project. The web server shows when was the last time the plant was watered and whether the refill is needed

Automated Plant Watering System

Last Watered: 2025-03-18 14:14:46, Refill Needed: Yes

Implementation

For this project we used moisture sensor' ability to detect whether the soil of a plant needs water. The code checks for moisture in the soil every hour. When the sensor doesn't detect moist the code turns the water pump on for 5 seconds. After turning the pump off the code checks for moisture again to detect whether the water was pumped into the soil. If the soil is still dry after watering, it means that there is no water in the water container, and the code displaces that the refill is needed in the shell and on the web server.

Implementation

We were able to control the pump from the Raspberry Pi using a transistor and Python's PWMOutputDevice library. This is the same library that we used in the class to control the speed of the DC motor. When the pump is turned off the PWM index is set to 0 (0%) and when the pump needs to be turned on the index is set to 1 (100%).

Demonstration/results

Watch

Conclusion

We had many difficulties while working on the project. At first, it was hart to gain a control over the water pump through Raspberry PI. We also struggled a lot while creating a web server.

Our project is ready to use, but there is always a room for improvement. Some of our ideas are adding manual control as well as sending notification to the user when the refill is needed.

Codes

Herre is a link to our Python code posted on GitHub:

https://github.com/khrystynakoko/Smarties/blob/main/CSC299%20-%20Automatic%20Plant%20Watering%20System

Thank you for listening!