Automatic Plant Waterer

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Introduction

The Automatic Plant Watering System is an innovative project designed to simplify plant care by automating the whole process. To build this circuit, we would need teamwork and to put in effort to succeed. Initially, our goal was to not fail and just do it. On the other hand, I wanted to go into this with a different mindset rather than the typical “just get it done” mindset. My goal was to create this circuit, make it work & learn from this. Raspberry Pies are a really cool circuit in itself. You can program it to do a lot of things. My aunt used one to display a calendar from an iPhone app onto a bigger screen and have it update in real-time.

A close-up of a circuit board

Description automatically generatedThe System & How It Works

Figure 1: The System displayed on a desk.

A circuit board with wires and a screen

Description automatically generatedThe automatic plant watering system using a Raspberry Pi Pico works by monitoring the soil's moisture levels with a soil moisture probe. When the soil becomes too dry, the Raspberry Pi Pico activates a DC motor water pump to draw water from a reservoir and sends it to the plant through a tube. The system makes to use efficient water usage by only watering the plant, when necessary, which is programmed into the probe. Additionally, users can manually override the system to water the plant on demand. This setup simplifies plant care by automating watering and conserving water when the soil moisture is sufficient.

Figure 2: A different design of an Automatic Plant Waterer using a Raspberry Pie Pico. Design by kheniji25 on Tinkercad.

Results & Expectations

For the circuit, the Automatic Plant Watering System is expected to monitor the soil’s moisture levels and activate the water pump only when necessary. To ensure efficient water usage without leaks. The manual override should also work flawlessly without breaking the code or system. The system must be energy-efficient, durable enough for indoor or outdoor use, and scalable to accommodate various plant setups. Additionally, it should also be easy to assemble and maintain, so it is convenient to use and setup for plant care.

A computer and blue plates on a table

Description automatically generated  
The building process was not that painful. I was right. Programming this was a pain   
to do, even after looking up countless tutorials, help guides, and designs. It didn’t help we didn’t have a plant to properly test this on. We had 2 bowls, one of them had water the other was empty. When the sensor was dry it dispensed water. Once the probe detected water, it turned off. The circuit worked as intended. The manual switch would not work with the code we got.

Figure 3: The Final Setup

Conclusion

In conclusion, we successfully built the automatic plant waterer. It turned out to be a rather painful process. When we connected the Pico to the sensor, pump, and the relay module, we created a system that could monitor the soil's dryness and water the plants as needed. The only difference is that the sensor would go off when it didn’t detect wate, because we did not have a plant to use. This project was difficult, but interesting because we got to build something automating a real-world task.