ECE 1000 Final Report: Automatic Plant Watering System

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Abstract—This report explains the Automatic Plant Watering System, which combines mechanical parts, electronic devices, and basic programming to help farmers manage water use. The system is controlled by a Raspberry Pi Pico microcontroller, which checks soil moisture using a sensor and starts watering only when needed. It uses a small motor, a water pump, a tank, and tubes to water plants efficiently, saving water and helping plants grow better.

I. INTRODUCTION

We wanted to find a way to save water in farming and support eco-friendly practices. To do this, we combined mechanical parts, electronic tools, and simple programming. This project is important because it helps the environment and uses engineering to solve real problems. Our team is made up of Matthew Potts and Jack Goodwin. We are focused on using automation to improve plant watering and make farming more sustainable. In this report, we'll explain how the project works, how we built it, and how it can help farming be more eco-friendly.

II. BACKGROUND

While developing this automatic system, we relied on many resources, such as an Instructable Diagram by Colin Chidiac showing how to design the wiring for the system. WIP

III. PROJECT DESCRIPTION AND FORMULATION

Materials:

1.Raspberry Pi Pico: The central processing unit for the data processing, decision-making, and control of other components.

2.Soil Moisture Probe: This tool measures the moisture level below the plant to determine whether it should be watered.

3.Water Tank: This holds the water that goes into the plant.

4.Tubes: Will transport the water to the plant

5.DC Motor Water Pump: Will draw the water from the tank

IV. DISCUSSION AND RESULTS

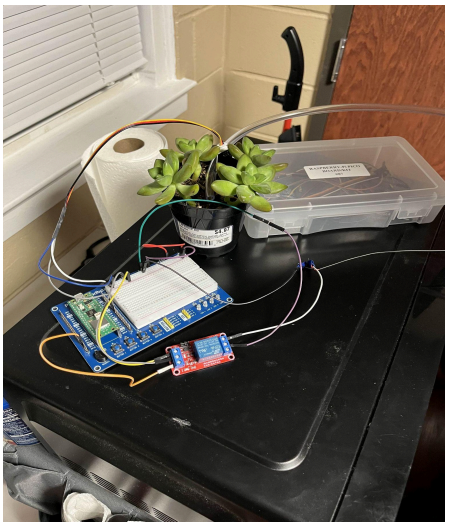
The automatic plant watering system yielded good results, we did make an issue by choosing a plant that held water greatly and required minimal watering. It made our creation a little less useful, but it didn't affect our project itself. We would love to add a digital screen as well at some point to have a visual aspect of the machine to let the user know if it is watering or not.

Contributions:

Matthew Potts mainly worked on the circuitry, using his prior knowledge to skillfully set up our machine, while Jack focused more on

the digital side, using his small background in coding to help write the main functions.

Overall, we created a great base point for an automatic plant watering system with the items we were provided and learned a lot about what goes into a project of this scale, we also left lots of room for improvement in future builds that others or even we may use to improve our machine. ***Figure 1: Our completed build***



V. CONCLUSION

The Raspberry Pi Pico collects and processes soil moisture data, decides when to water based on set limits, and controls the water pump and LED to keep plants well-hydrated.

Its flexibility and ability to connect with other components make it a key part of the Automatic Plant Watering System, providing easy automation and simple operation.

This system is the result of teamwork and innovative design, combining mechanical engineering, electronics, and microcontroller programming. It offers a scalable solution to improve water management in agriculture, saving resources, boosting plant health, and supporting environmental sustainability.

REFERENCES

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