

G.A.R.D.E.N.I.R.S.

Nicholas Chitty - Electrical Engineer

Brendan College - Computer Engineer

Scott Pierce - Optical Engineer

Justin Pham-Trinh - Electrical Engineer

Dept. of Electrical and Computer Engineering,
University of Central Florida, Orlando, Florida,
32816-2450

Abstract—This paper will show the application of near infrared spectroscopy and how it can measure electromagnetic waves from the emission of soil. Near infrared spectroscopy is an absorption spectroscopy method that can help determine the chemical composition of a substance through the radiation the substance gives off. Soil itself is a mixture of organic and inorganic substances that all together directly contribute to a garden's environment. We are starting with soil with unknown qualities, so comparisons will be made between our soil and soil of known qualities to match and ensure that our plant is in a healthy and suitable environment.

in making this as hands-off as it can be. There are many different communication protocols such as Bluetooth, Zigbee, Thread, and even short-range/long-range protocol, but for this project we decided to go with WiFi because of its decreased bandwidth and that we aren't expecting to produce or receive large amounts of data.

I. INTRODUCTION

IN the past year, we have seen a great increase in remote sensing, wireless communication, API integration, and so much more. All of which have been made more available and economical. The internet has also seen its share of "DIY" projects and its continuing growth.

In the agriculture industry, there have been new advancements in technology with high performance water distribution, network communication, and remote sensing. This research is intended to advance the field by producing a system that can maintain a suitable environment for a plant to grow. In the environment, there will be sensors that will help modify the conditions within the environment. In addition to this system, it will feature a web interface for notifications and the ability for the user to set settings.

Monitoring soil isn't always the most fun or the easiest task, because things could get dirty or we might forget about our plant. This project will feature an on-the-rise technology in the form of a spectrophotometer. Smart systems nowadays are big learning machines that are constantly aware of its surroundings. For a smart agricultural system, it would need to determine variables such as moisture levels, nutrient content, pH levels, and so much more. This paper will introduce near infrared spectroscopy as another method to soil sensing that may prove to be more beneficial over traditional products or techniques.

This project will also present other fields such as system controls, power, and web, all to provide a "set it and forget it" home gardening experience. A home gardening experience where the garden bed can communicate with the user and the user can provide instruction of what to do. Like any smart device too, the internet plays an important role