Optimization of Software for Coastal Weather Monitoring

HOW CAN WE EFFECTIVELY COLLECT WEATHER DATA WITH A MODULAR STATION?

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TECH 412 - INNOVATION SCHOLARS PROGRAM - OCEAN SENSING COHORT

Introduction

The changing climate has brought devastating storms, causing damage coast to coast. In order to plan for the conditions brought with each storm, data needs to be collected across the globe to classify regions by the weather they're subject to most often.
How can we help to aid collection of data in this ever-changing climate?

Goal

Our goal is to develop a low-cost, accessible, easy-to-use remote weather station for smaller projects, classrooms, and immediate deployment with a Pi-based station system.

Challenges

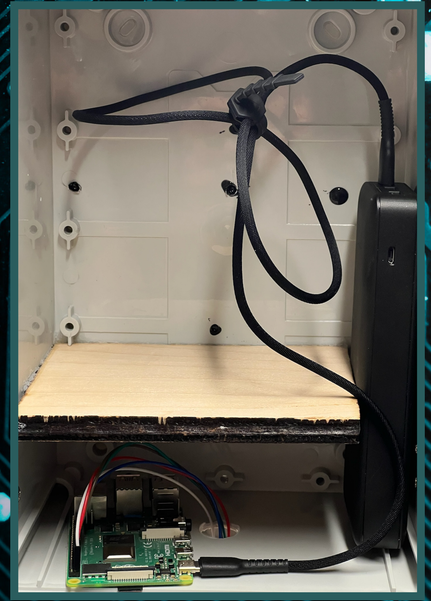
- First deployment failure (known grounding wire disconnection, software error on Arduino, no data recording to micro SD)
- Arduino Errors (Missing/outdated SparkFun Libraries, extensive software errors, not recording data)
- Pivoting to Raspberry Pi (System-wide Python install, sensors not compatible/responding)

Methodology

- Research local data from coastal stations
- Cross-reference existing data centers to determine wanted variables
- Examine and troubleshoot existing code/hardware
- Determine whether best results will come from pivoting entirely or working from existing material
- Test individual sensors (temperature, humidity, etc...) in lab
- If time, deploy in field and compare data to known statistics from location

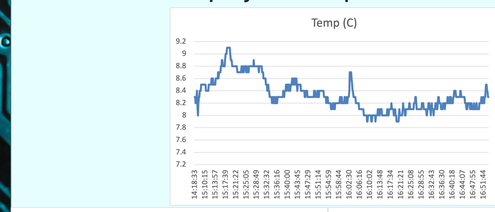
Results

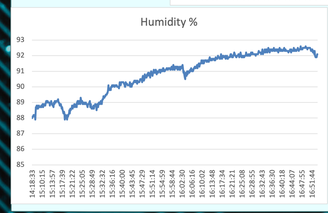
- Working Temperature, Pressure, and Humidity sensor that updates every 10 seconds
- An improved housing space for the sensors and pi
- An initial deployment to prove functionality in the field

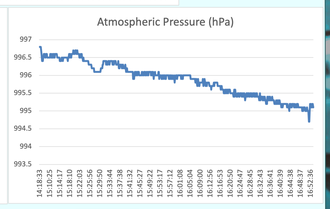


GRAPHS

Data Taken from our 2-Hour Odiorne Point Deployment, April 12, 2024







Next Steps

- Improve the Waterproof Casing
- Power source must be improved
- Look into more power-efficient boards (Pi zero?)
- Visual element to read without hooking up to computer