Raspberry Pi Weather Station

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Project Overview

This project consist of using a set of Raspberry Pi's to be able to obtain an accurate measurement of the weather, such as temperature, atmospheric pressure, humidity within a designated area. It will be our goal to capture data from several different sensors on the device and data from an external weather station source. Additionally we need to setup a method of storage and presentation of the data retrieved.

Project Purpose, Scope, Objective

The purpose of this project is to enhance the current Raspberry Pi Weather Station from the previous WSU capstone students. This enhancement will include functionality that allows a mesh network of multiple devices to be connected with a single networked access point to upload data.

The scope of the project consists of producing a mesh network of interconnected devices, a database component used for storing and retrieval of data, a possible GPS API for retrieving current device location, and a front-end web application for displaying live and historical data being collected from each device.

The objective of the project is to collect accurate weather readings from multiple locations with possible restrictions of wireless access to every device being deployed. In theory the goal is to deploy any number of devices to get readings across an area and have a single internet connected device handle all communication and storage for the area.

Team Organization (Roles and Responsibilities)

All team members will take part in every aspect of the project. As a team, it's been decided that there will be no Q/A, Documentation, or Presentation Lead. Each member will help double check the work of other team members, in addition to their own, to ensure that everything is in an acceptable state. This means that any committed code by the team does not break the baseline, any papers or presentation has been proofread by the team. Furthermore documentation accurately describes functionality and cohesiveness when put together with other members documentations.

Problem Resolution Policies

If any need for problem resolution is required, we will be instituting the following:

Seeking assistance if as conflict arises: First contact should be with your team lead to resolve conflict. If this does not yield necessary results a team meeting should be called to determine the next course of action. At this point if a solution is not reached the TA should be contacted, as a last resort the professor may need to be contacted.

Three strike rule: For general issues within the team dynamics without notice, including missed meetings and missed deadlines. If the team determines you are in the violation of this rule the seeking assistance rule should be used.

Project Plan (Iterations, Project Schedule)

Team members are expected to attend all team meetings. Team meetings consist of meetings with the TA, Dali Ismael, and/or client, collaborative team meetings, and presentations. If a team member is unable to make it to a meeting then it is their duty to inform the rest of the team of their absence with a proper excuse.

Weekly meetings with the assigned TA will be held every Monday after the lecture. Weekly team meeting will be held every week as much as needed. The team will meet to discuss and update other members on progression of the task the member is assigned and also address any issues the team may be facing. Issues may range from issues getting correct functionality or needing someone to double check their work.

Initial Client Meeting - Tuesday September 18th, 2018 11:00 AM
- Review project goals and purposes
- Create weekly client meetings

First pass of sensors and output - Monday September 24th, 2018
- Determine output and where is the output going to be stored/accessed
- Research mesh network functionality

First Prototype - Monday October 1st, 2018
- Database storage functionality
- Storage and query of data on database
- Basic front-end

On-site meeting at TARDEC - October 4th, 2018
- Meeting with full team and OU student group

Requirements Document - Monday October 8th, 2018
- Presentation

Team Development/Research - Monday October 15th, 2018
- Continuing Development of mesh network between small number of devices
- Research encrypting data over non-wired connections

Design Specification - Monday October 22nd, 2018

Test Plan - Monday October 26th, 2018

Second Prototype - Monday October 29nd, 2018
- Basic mesh network for communication between two devices
- Functioning front end
- Proper database design and schema

Third Prototype - Monday November 19th, 2018
- Mesh network between additional devices seen during second prototype
- Secure protocols for communication

Final Presentation - Monday December 10th, 2018

Configuration Management Plan
The team is using Github as source control with branching and commits. Each team member is expected to keep their commits up to date to reduce chances of losing any critical code. Furthermore utilizing Google Drive and services for document control and sharing of files.

Technologies:

Back End:
NodeJS
Python
MySQL

Hardware:
Raspberry Pi with SenseHAT
ASAIR sensors
AdAFruit

Front End:
Node Red

Testing/QA:
Mocha
PyUnit