Weather Station Development Plan

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REPRESENTATIVES
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PROJECT OVERVIEW

Weather conditions are notorious for being difficult to accurately track. One can always get general weather information for an area, but it may not be exact for a very specific location. Our client, the Department of Defense, is looking to create a portable weather station that will gather and provide information on the current nearby weather conditions. The data gathered from the weather station will be displayed on a website for users to easily be able to see current conditions. Drastic changes to the weather could also cause problems for the users, so our project must be able to send out alerts if conditions change.

PROJECT PURPOSE, SCOPE, OBJECTIVES

The goal of this project is to create a portable weather station that can track and relay data to a website that displays nearby weather conditions to users. This weather station will utilize different climate sensors to measure the current conditions surrounding the device such as temperature, humidity, wind speed, and atmospheric pressure. These sensors will be hooked up to a Raspberry Pi which will function as the central communication hub between the sensors and the website.

The website will feature a full front end that will display the individual numbers relayed from the weather sensors. The back end of our website will contain historical weather data which can be viewed at any time by the users. If specific conditions are met, the website should be able to alert nearby users of inclement weather. If communication to the weather station is lost, our website will alert users of the connection interruption and display the last received weather information.

TEAM ORGANIZATION

Team Lead: Brandon Jackson
The Team Lead is responsible for assigning tasks and checking that those tasks are being completed on time and are at a satisfactory quality. They will be the main point of contact between the team and the client. The Team Lead will also be responsible for submitting all completed documents.

Hardware Lead: Trevor Malarkey
The Hardware Lead is responsible for understanding and assisting other teammates with the general setup of the Raspberry Pi and connection of the weather sensors. In addition, the Hardware Lead will track the total price and estimated battery life of the hardware.

Architecture Lead: Brian Atiyeh
The Architecture Lead is responsible for ensuring the dataflow from the Raspberry Pi to the front end of our web application is working in a clean and uniform way.

Documentation Lead: Jeswanth Kodali
The Documentation Lead is responsible for setting up any formal documents to be completed by the team. They will have to ensure that documents are assembled in a manner that is organized and flows properly.

Presentation Lead: Brandon Jackson
The Presentation Lead is responsible for creating the framework for the initial document that the team will work on. The final draft of the presentation document will have to receive the approval of the Presentation Lead before it is considered complete.

PROBLEM RESOLUTION POLICIES

Our goal this semester is to attempt to solve any conflicts through warnings and team discussion prior to issues requiring escalation. Warnings will be issued to members who are unable to complete their required tasks, submit low quality work, regularly do not attend meetings, or that do not promptly communicate issues that may affect their contribution to the project. If a team member believes they will be unable to complete their work by their deadline, the team lead should be notified as soon as possible so the work can be redistributed. Team members are also expected to notify the team lead if they are unable to attend any meetings at least 24 hours in advance.

If any of the aforementioned issues persist with an individual team member for more than 3 warnings, the TA will be notified during our weekly meeting. Professors will be contacted only in the event of a critical issue such as a team member missing a project deadline or prototype without planning ahead of time.

PROJECT PLAN

Task	**Date**	**Goals**
Introductory Client Meeting	1/26	● Ask client questions regarding project ● Establish clear list of goals for project ● Set up a weekly meeting with client
Development Plan Documentation Development	1/16 - 1/23	● Write a very clear and simple project overview. ● Identify clear project deadlines and goals. ● Analyze different technology stacks for the project. ● Present on 1/25
First Prototype Development	1/25 - 2/4	● Develop a very basic frontend to display current weather data taken from the Weather Underground API. ● Implement one placeholder API endpoint to retrieve data from the Raspberry Pi. ● Present on 2/6
Requirements Documentation Development	1/29 - 2/11	● Extract requirements from client during first two to three meetings. ● Develop a wireframe UI to follow during

		app development. ● Write up each individual requirement. ● Present on 2/13
Design Specification Documentation Development	2/10 - 2/25	● Create architecture diagrams for the hardware, software, security, and communication pieces of the project. ● Write all possible use cases for the project. ● Develop data flow and sequence diagrams. ● Present on 2/27.
Second Prototype Development	2/4-3/5	● Have multiple weather sensors sending data to the frontend. ● Have the UI design finalized. ● Present on 3/6
Third Prototype Development	3/6 - 3/26	● Almost all weather sensors should be sending data to the frontend. ● Weather alerts should have at least minimal functionality such as sending a basic email based on severe wind speeds. ● Present on 3/27
Test Plan Documentation Development	2/15 - 4/1	● Develop testing approach and clearly define pass and fail criteria. ● Present on 4/3
Final Product Development	3/27 - 4/16	● All necessary weather sensors should be sending data to the frontend. ● Extensive testing for any bugs. ● Present on 4/17

Weekly Client Meetings: *Thursday at 2:30 P.M - 3:30 P.M*
These meetings will be used to ensure the requirements of the project are being met and allow us to update the client on the current progress of the project.

Weekly TA Meetings: *Thursday at 4:30 P.M - 5:15 P.M*
These meetings will be used to keep the TA up to date on our group's progress and allow us to communicate any issues that may have occurred.

CONFIGURATION MANAGEMENT PLAN

Our team will be using a private Github repository for source control with a slight modification on the feature branching workflow. We will create a new branch for each developer. As each team member finishes features, the code will be merged into a development branch. After all

necessary features for a prototype are merged and conflict free in the development branch, we will merge it into master and update the version number. A working version of the development branch will be merged into the master branch at least two days before due dates.

TECHNOLOGIES

Software	**How and Why**
Python - v3.6.4	We will be using Python both on the Raspberry Pi, and on the backend of our website due to the team's previous experience with it and the multitude of great learning resources for using Python with a Raspberry Pi.
Django - v2.0.1	We expect to use Django as our web framework due to its great ORM for database queries and ease of use.
MySQL - v5.7.21	We expect to use MySQL for our database to store each day's weather information. Our first choice is MySQL because of our team's experiences in database courses.
Ubuntu - v16.04	We will be using Ubuntu as the operating system for the Raspberry Pi due to client security concerns with smaller operating systems.
Open Weather Map API	We will be using the free tier of the Open Weather Map API to gather additional weather data. It allows for 60 calls per minute.

Hardware	**How and Why**
Raspberry Pi 3 Model B	A Raspberry Pi will be used due to the client's direction and will be powering the weather sensors for collecting the necessary data. We selected the Raspberry Pi 3 due to its onboard Wifi and Bluetooth capability.
Weather Sensors	Weather sensors like an barometer, hygrometer, and thermometer will be used to gather all the individual pieces of data that we will need.
Solar Panel + Lithium Ion Battery	We plan to use a combination of a solar panel and rechargeable battery to power our Raspberry Pi. This will ensure long battery life and a very portable weather station.