Evaluation 1: Website, Stakeholders, Goals and Task Analysis

Application: Soil Infiltration

Team #4: Soil Infiltration:

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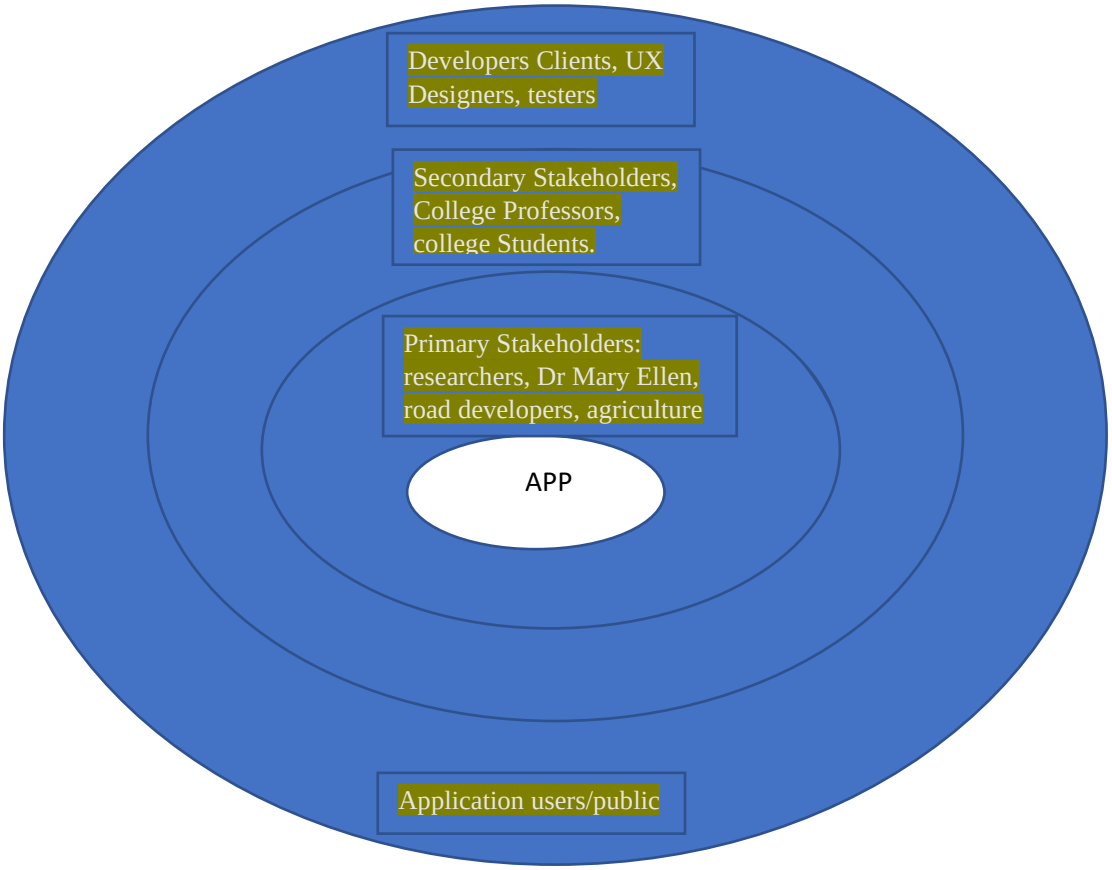
Graduate: Pooja Mothukuri

Description of System :

This app will be used throughout a myriad of different scientists with all different agricultural aspects from one single device called a Soil Infiltrometer. A Soil Infiltrometer is a device that will penetrate the ground - it must be conducted in a loamy environment like soil. A user then will pour water through a top funnel that then allows a user to watch it drain through time. A user then will record the time difference (from start) and the recorded volume of water that was lost throughout the process. This is an incremental step that is done in different time based intervals, for example: if a user selects time intervals for every 30 seconds, they will then record the volume lost every 30 seconds until the water drains

Stakeholder Onion Diagram:



Stakeholder Description:

Primary Stakeholders:

- Researchers/Scientists - soil science researchers use this app to determine unsaturated hydraulic conductivity and infiltration rates on a range of soils, evaluate erosion hazard.
- Agriculturist: agriculture researchers use this app to check soil fertility
- Earth burn researchers, irrigation system design engineers.
- Dr Mary Ellen want to use this application to store the time, volume and location of the research and export the information when ever needed

Secondary Stakeholders:

- Nominal use - A college professor or student may be required to collect data. They would click on the view data page and select the test they want to look at. From there they can either view the data from the app or choose to export it as an excel file to someone's email.
- Error use - A college professor or student may be required to collect data, but they may not know where it is. They can read the about page to find where the data may be. After that they go to the view data page on the device. They can then view each test. They should have also learned the button to press to export the data, but may still be unsure.

Tertiary Stakeholders:

- Developers - The undergrads who are developing the application.
- UX Designers - The undergrads who are working on the UX of the application.
- Testers - The grad students and those on the team who are testing the application.
- Application users/public: people who ever want to know more on how water enters in to earth and how water is stored and used for plants can use this app to record their data and can analysis this later.

Stakeholder Goal Influence Table:

Stakeholders	Goals	Contributing Influence	Constraining Influence
Researchers	To determine unsaturated hydraulic conductivity and infiltration rates	Recording the data collected during research and exports it as an excel	To save time of researchers , make data available to export

Farmer	To determine the fertility of soil	It helps farmers to decide which crop is best for the current fertility of soil	Helps farmers with crop rotation
Earth burn researchers	To check the soil hydraulic function after soil burn	To record and access the measurements before and after the burn	Easy to access the data
Irrigation system design engineers	Soil infiltration characteristics are important for evaluation, design and management of surface irrigation system	To record soil infiltration rates	To analysis the data before construction
College Professor	Professors who does research on soil use this app to collect data	Receive the collected data and share it to email	Easy access to data
College Students	Students who does research on soil use this app to collect data	Receive the collected data and share it to email	Easy access to data
Developers	Develop and test the application. Collaborate with team to achieve the target.	Develop the application for end users.	Developing and fulfilling the requirement.
UX Consultants	Evaluating the progress and process of the application.	Gives an informative feedback which is essential for next steps of application.	Understanding the application.

Testers	Successful completion of project Bug and vulnerability free project	Tests Feedback	Time Availability of features ready to move to the testing phase

Summary of the Stakeholder Goal Influence Table:

- Nominal Use Scenario - The user, prior to using the app, downloads it while internet connections are established. Once the app is downloaded, they travel to the site of the soil infiltration app and boot up the app. The user is presented with a home screen with options to perform a test, learn how to perform a test, view prior data, and see useful links related to the infiltrometer and soil infiltration. The user can also view locations of past tests, but the map is empty. Since this is their first time, they click learn how to perform a test, which takes them to a page that acts as a tutorial, and tells the user how the app works. Once they have completed this they return to the home page and click on take a test. They are then prompted to enter type of infiltrometer, suction level, initial volume, and time intervals to record volume. After entering this information, they click ok. The new page displays a timer, a volume entry box, and a data table. They hear 3 two one, go, and allow the water to begin to drain. A few seconds prior to the first interval they hear a noise that indicates that a recording time is coming up, and at that time they hear a different noise. They enter the volume and hit enter, and the time and volume are entered into the table. This process repeats until there is no water left and they hit the end test. The final time is recorded into the table. Once they end the test they are prompted to see if they want to add GPS and picture to the test data. The user then uploads a photo of the test location and GPS is autofilled based on device location. After they hit accept the user is taken back to the home screen. They can now see where their test was taken on the home screen. They hit view data and select their test from the list. Here they can see the data table and a graph of the time vs volume. They click the export file and are prompted to enter an email address. After they hit accept they are returned back to the test list, where they then choose to return to the home screen.
- Error use - The user, prior to using the app, downloads it while internet connections are established. Once the app is downloaded, they travel to the site of the soil infiltration app and boot up the app. The user is presented with a home screen with options to perform a test, learn how to perform a test, view prior data, and see useful links related to the infiltrometer and soil infiltration. The user can also view locations of past tests, but the map is empty. They click on the perform a test. They are then prompted to enter type of infiltrometer, suction level, initial volume, and time intervals to record volume. They are confused by this information and decide to return to home, then click on how to perform a test. Once they do this, they go back to the perform a test page to enter their information. After entering this information, they click ok. The new page displays a timer, a volume entry box, and a data table. They hear 3 two one, go, and allow the water to begin to drain. A few seconds prior to the first interval they hear a noise that

indicates that a recording time is coming up, and at that time they hear a different noise. They enter the volume and hit enter, and the time and volume are entered into the table. During the test they realize they made an error. They click restart and the data clears, and they begin the test fresh. They hear 3 two one, go, and allow the water to begin to drain. A few seconds prior to the first interval they hear a noise that indicates that a recording time is coming up, and at that time they hear a different noise. They enter the volume and hit enter, and the time and volume are entered into the table. This process repeats until there is no water left and they hit the end test. The final time is recorded into the table. Once they end the test they are prompted to see if they want to add GPS and picture to the test data. The user then uploads a photo of the test location and GPS is auto filled based on device location. After they hit accept the user is taken back to the home screen. They can now see where their test was taken on the home screen. They hit view data and select their test from the list. Here they can see the data table and a graph of the time vs volume. They click the export file and are prompted to enter an email address. After they hit accept, they are returned to the test list, where they then choose to return to the home screen.

Personas:

Farmer

John Smith
Age: 21
Height: 6′ 2″
Weight: 180 lbs
Left-handed.

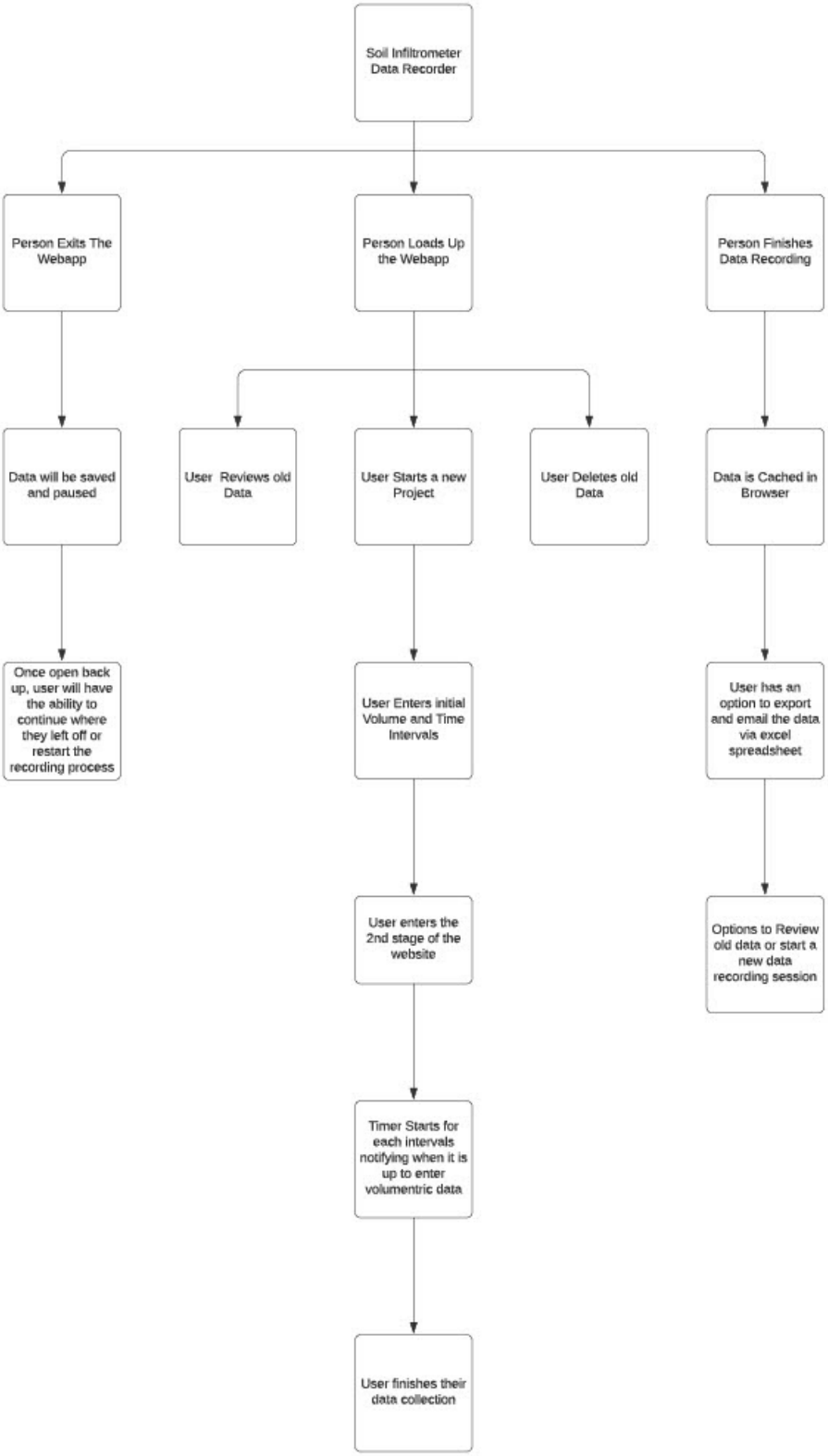
John is a farmer. He's a hard worker that effectively balances his work with his family. He's not very tech savvy but willing to put in the time to learn if it can benefit his crop yield.

Road Engineer

Carl Fenlend
Age: 43
Height: 5’10”
Weight: 220 lbs
Right-Handed

Carl has been working as a road engineer for years, and has seen first hand what if preparation has caused when designing and building roads. He's looking for an app that can increase the efficiency data collection when deciding where to pick a road.

Hierarchical Task Analysis:



Summary of the HTA:

We are going to be using a cached DB that is held in the clients browser (client side database) and will be using a forked version of indexDB called localbase. Localbase makes it easier to store data in the browsers cache while offering the same functionality as indexDB. As well as making the api calls to the indexdb's database a lot easier (ie get, add, delete.. etc). Our database Schema is going to be quite simplistic because we only need to store one database with a single table of information.

Domain
- Soil Infiltrometer Data Gathering

List of Domain Classes:
- Data_Gathering: The data that gets recorded throughout the time of the test occurs

Domain Class: Data_Gathering
- Time(s): integer, time gathered at selected intervals
- Sqrt(t): integer, the square root of time gathered at selected intervals
- Volume (mL): integer, the volumetric data collected at each selected time interval
- Infilt (cm): integer, the amount of liquid lost during the process of water draining at each selected time interval.

Table: Data_recorded
- Time(s): integer, time gathered at selected intervals
- Sqrt(t): integer, the square root of time gathered at selected intervals
- Volume (mL): integer, the volumetric data collected at each selected time interval
- Infilt (cm): integer, the amount of liquid lost during the process of water draining at each selected time interval.

Appendix A: Meeting 1 Notes

Why is this app used for?
    More for general application, need to record the time for different volume

What are the requirements.
    Need to record time for the volume or vice versa
What instrument is used for this experiment.
    soil infiltration test with a minidisk infiltrometer
What kind of people use this app
    Used as a research application, engineers use it for roads, agricultural applications.
    Wildland fire group, generally people of age 20+
Is there any confidential data?
    No confidential data
Need web app or mobile app
    Standalone app is good to go

Appendix A: Meeting 2 Notes

Weekly meeting:

What are the inputs ?
What exactly are the expectations?
Wanted an app to record data even in the places without signal
Is there any data that we can access? Yes, provided
Undergrads discussed their basic idea, like how they are going to design the app