Feature 1: Required: Tracking Location Computation

Description: As a user I can track the location of the source and receive its coordinate.

Estimate: 8 story points

Conversation: The user can use the application to track the current location and view its coordinate. The computation uses the current beacon coordinates and sound recordings the using the inverse squared transform and trilateration algorithm outputs the source coordinate.

Acceptance tests:

1) Test to see if the correct coordinates are outputted if valid location (pass)
2) Test to see if coordinates are displayed if invalid location (fail)
3) Test to see the location is displayed visually is correct if valid location (pass)
4) Test to see the location displayed visually if invalid location (fail)

Feature 2: Required: User Login Functionality

Description: As a user I can login to the application with valid login information

Estimate: 5 story points

Conversation: The user can login to the application using login username and password credentials which are verified with the sql database before the user can access the audio processing and computation functionality

Acceptance tests:

1) Test to see if the user can login with valid credentials (pass)
2) Test to see if the user can login with invalid credentials (fail)
3) Test to see if the user can login with null credentials (pass)

Feature 3: Required: Audio Processing Functionality

Description: As a user, I want the microphones to obtain the audio volume levels recorded from each of the three beacons.

Estimate: 8 story points

Conversation: The microphones from each beacon should record the current audio input and then process this to determine a decibel rating for each beacon which is output to the user.

Acceptance test:

1) Test to check that the audio processing returns sound values if valid sound (pass)
2) Test to check that the audio processing returns sound values without valid sound (fail)
3) Test to verify the recorded sound values are within the standard range(0-50 dB) (pass)
4) Test to verify if sound values are outside standard range (not within 0-50 dB) (fail)

Feature 4: Required User Database Functionality

Description: As a user, I should have access to a database of user information.

Estimate: 5 story points

Conversation: We want to use the raspberry pi as a database that can store, access, and modify information pertaining to a users account as well as a unique identity key, the user should be able to view the information on the users.

Acceptance tests:

1) Test that the database can store user data (pass)
2) Test that the program can connect to the database (pass)
3) Test that the database display username and userID data (pass)
4) Test if the database will display password data for users (fail)
5) Test if the database contains duplicate userID values (fail)
6) Test to see if the database can contain duplicate username and password (pass)

Feature 5: Required: Results Database User Functionality

Description: As a user, I can store and view results of trials in a database.

Estimate: 8 story points

Conversation: We want a user to be able to store users ID, trial number and coordinates of the trial in a database, as well as be able to view the results of the database

Acceptance test:

1) Test that the database can store result data (pass)
2) Test that the user can view result data (pass)
3) Test that the database can store duplicate results with different ID (pass)
4) Test that the database cannot accept duplicate trial ID (fail)
5) Test that the user can connect to the database (pass)

Feature 6: Required: User Account Creation

Description: As a user, I can create a unique user identity through the application

Estimate: 3 story points

Conversation: We want the user to be able to create their own username and password with a unique userID that can be used to distinguish themselves from other users.

Acceptance test:

1) Test that a user can create an account (pass)

2) Test the user creating an account with a duplicate userID (fail)
3) Test the user creating accounts with duplicate username (pass)
4) Test the user creating accounts with duplicate username and password (pass)
5) Test the user creating an account with an invalid ID (fail)

Feature 7: Required: User Account Deletion

Description: As a user, I can delete my previously made user identity

Estimate: 3 story points

Conversation: We want the user to be able to interface with the application to delete an account that they already created from the database

Acceptance tests:

1) Test the user to delete an account that exists with correct input (pass)
2) Test the user to delete an account that doesnt exist (fail)
3) Test a user to delete an existing account twice in a row (fail)
4) Test to see if a deleted account is still in the database(fail)
5) Test to see if a user can delete an account with incorrect

input (fail)

Feature 8: Required: Graphical Visualization of Results

Description: As a user, I can use a visually view the results of a trial on the application.

Estimate: 5 story points

Conversation: We want the user to be able to visually see the coordinates of the beacon and source graphically via the application.

Acceptance tests:

1) Test that the user can view valid output data graphically (pass)
2) Test to see if the user can visualize invalid input data (fail)
3) Test that the source and beacons are distinct visually (pass)
4) Test that negative source coordinates are not visible (pass)

Feature 9: Required Trilaterate Source Computation

Description: As a user, I can determine the location of a source coordinate by giving three beacon coordinates and their sound recording levels.
Estimate: 8 story points

Conversation: We want the user to be able to interface with the application and input the coordinates and sound recordings of the beacons such that the application computes the source method using the inverse squared transform and trilateration algorithm.

Acceptance tests:

1) Test if the inverse squared algorithm returns the correct output (pass)
2) Test if the inverse squared algorithm handles invalid input (fail)
3) Test if the trilateration algorithm handles invalid input (pass)
4) Test if the trilateration algorithm handles invalid input (fail)
5) Test that the trilateration computation displays the result coordinate (pass)

Feature 10: Optional Accept Other Media

Description: As a user, I can pass other forms of data such as images, videos or strings to the software for tracking.

Estimate: 8 story points

Conversation: We can allow the user to provide images, video, and strings as input to allow the software to obtain more data about its location which can be stored and analyzed by the software.

Acceptance tests:

1) Test that the user can pass images (pass)
2) Test that the user can pass videos(pass)
3) Test that the user can pass strings (pass)
4) Try to pass the program an invalid piece of data (fail)
5) Try to pass nothing to the program (fail)
6) Test to see if the data is not stored correctly (fail)
7) Test that the device stores the data correctly (pass)
8) Test that image, video and string data can interact with existing data (pass)

Feature 11: Optional: Multiplexing multiple users

Description: As a user, I can track data from multiple users' devices simultaneously

Estimate: 3 story points

Conversation: We want the use to be able to run multiple user devices simultaneously in the same room using distinct signals, such that data can be obtained independently.

Acceptance tests:

1) Test that each device has its own distinct sound pitch (pass)

2) Try to use the same pitch for each device (fail)
3) Try to get multiple devices to be recognized as one (fail)
4) Test that each device is correctly tracked (pass)
5) Test that the software can handle if more than 5 devices are registered (fail)

Feature 12: Wish List: Neural Network analysis

Description: As a user, I want to obtain the most accurate location of my devices using neural networks to analyze new and existing data

Estimate: 13 story points

Conversation: We want the user to obtain accurate coordinates if the program is developed using neural network technology to combine existing database data and analysis to predictively interact with new data to create a smoother and accurate analysis of data.

Acceptance tests:

1) Test that the neural network interacts with existing data (pass)
2) Test that the neural network can interact with incoming data (pass)
3) Test that the developer can choose if the neural network is implemented (pass)
4) Try the neural network on null data (fail)
5) Test if the neural network causes decreased accuracy of results (fail)

Feature 13: Wish List: Facebook login

Description: As a user, I can login with facebook to have improved analytics

Estimate: 8 story points

Conversation: We want the user the option of logging in with Facebook to provide additional data for which this software can interact for improved analytics.

Acceptance tests:

1) Test that user data is obtained from facebook (pass)
2) Test using a nonexistent facebook account (fail)
3) Test that multiple users can login with facebook (pass)
4) Test that facebook data can be applied to existing analytic (pass)
5) Test that facebook data can be stored in the database (pass)
6) Test that the data stored does not match the facebook data (fail)