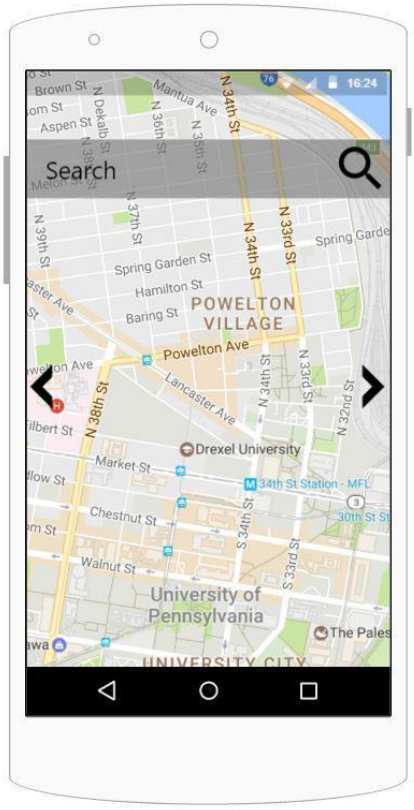
Figure 7-1 – Possible System Entities

Product: Elevate
Team: 46
Date: 02/22/2017

Type	Name	Description or Notes
screen	homeScreen	This screen is when users are presented when they launch the app. Shows recent locations and location search bar.
screen	dataScreen	When user swipes right from homeScreen, user will see this screen, which shows a small amount of data about them at bottom of screen. If a location was entered or hill selected, this screen will be showing the directions.
~~screen~~	~~hillScreen~~	~~When user swipes left from homeScreen, this screen will show users hills around their general location.~~
screen	hilldataScreen	On hillScreen, if user selects a hill, this screen will provide data about the selected hill (elevation, distance, travel time).
screen	indepthScreen	On dataScreen, if user selects in-depth view, this screen will provide them with more detailed information.
database Content Management System	~~gpsJSON~~Zope Plone	Storage location for coordinates from helmet / mobile application Allows users to access database
API file	Gmap collJSON	Allows for map overlay and waypoint integration of data in database Storage location for collision data from helmet
code	arduino	Code for Arduino in order to provide helmet functionality

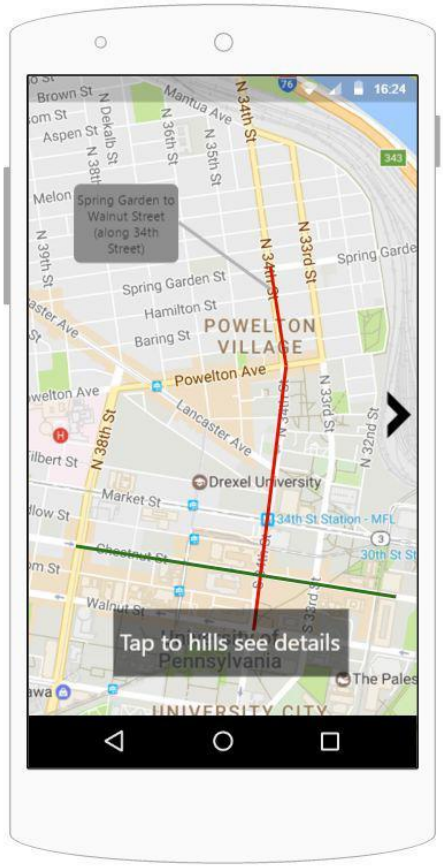
Figure 7-2 – Template for Detailed Design for a Screen

Name: homeScreen
Type: Screen
Purpose: This screen meets requirement 6.
Description: This screen contains a search bar, used to enter location to get directions, and option to see a list of recently visited locations.
Layout:



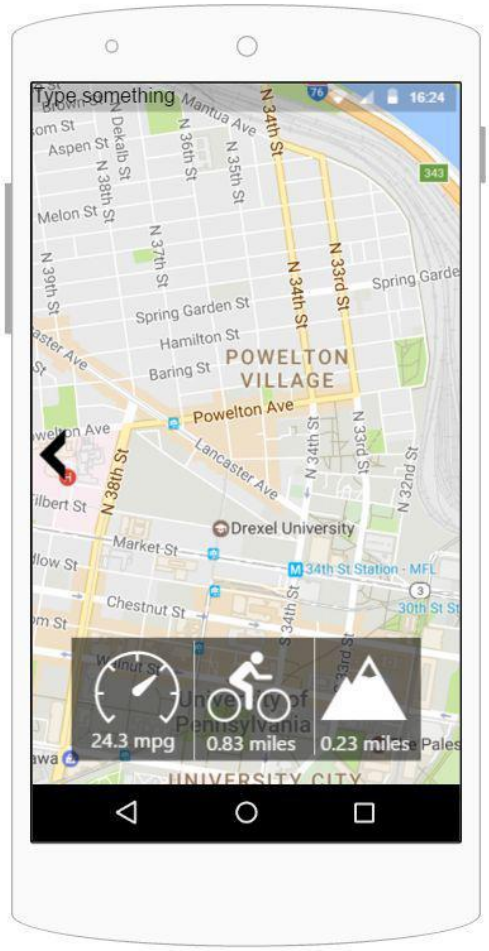
Name: hillScreen
Type: Screen
Purpose: This screen meets requirement 6.
Description: This screen contains an interactive map.
Hills with considerable elevation change will be highlighted. If a user clicks on a hill, the hilldataScreen will be shown.

Layout:



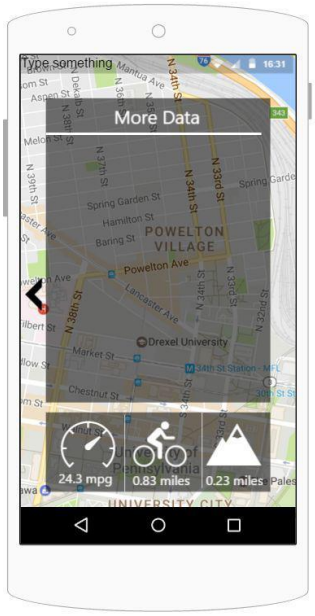
Name: dataScreen
Type: Screen
Purpose: This screen meets requirement 6.
Description: This screen is the screen where directions are shown if a hill is selected or location entered. The screen also will always show the user some data about them.
(distance traveled, current speed, elevation)

Layout:

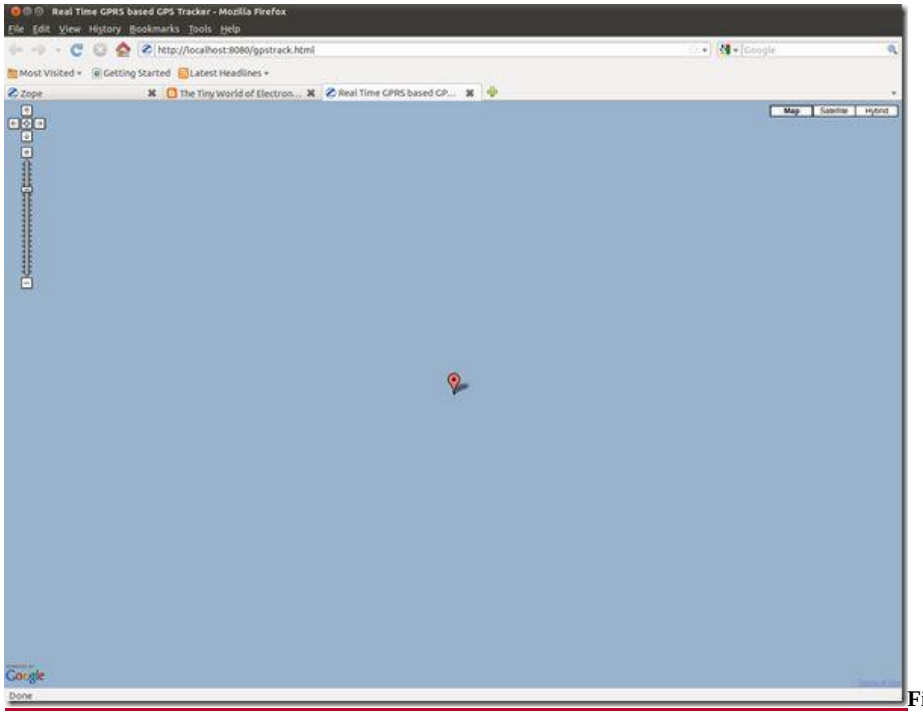


Name: indepthScreen
Type: Screen
Purpose: This screen meets requirement 6.
Description: This screen shows the user more in-depth information about their ride including : (distance traveled, time traveling, max speed, current speed, current elevation, net elevation change)

Layout:



Name:
databaseMap
Type: Screen
Purpose: Waypoint mapping of the helment.
Description: This screen contains a live Google Map (default) and a waypoint to allow users to track helmet and location
Layout:



Figure

7-3 – Template for Detailed Design for a Database Table
Name: gpsJSON
Type: Database Table
Purpose: This table is needed to meet requirements 5 and 7.
Description: Figure 1 shows the contents for this table. This table provides a way to store data sent from our system in order to manipulate the object and its' properties simply and effectively. One row of this table represents a~~n~~ JSON objects' properties.
Table Contents:

Data Element Name	Data Type	Usage	Notes
latitude	JSON	gmapAPI	Latitude coordinate of the object (data sent)
longitude	JSON	gmapAPI	Longitude coordinate of the object
elevation	JSON	gmapAPI	Elevation measurement of the object
distance	JSON	gmapAPI	Distance reading of the object
User_id	string	Login SQL	Accounts username
Usr_pwd	string	Login SQL	Accounts password

Figure 1 - gpsJSON Database Table

Figure 7-4 – Template for Detailed Design for a Code
Function Name: void loop()
Type: Function
Purpose: This function is needed to meet requirements 2 and 4.
Parameters: No parameters are used to call this function. Given below is variables within the program that are manipulated.

Name	Data Type	Notes
distanceSensor	pin	Data exchange stream between our ultrasonic module and Arduino
piezoBuzzer	pin	Data exchange between our buzzer and the Arduino
collisionSensor	pin	Data exchange stream between our collision sensor and the Arduino
gpsSensor	pin	Data exchange stream between our GPS sensor and the Arduino
motion	int	Variable used by ultrasonic module to determine range of detection for the sensor

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t_interval	int	Variable used to determine how long our GPS will record coordinates
voltage	int	Variable used to determine how much voltage we will send our modules upon detection of motion / collision.
lat	double	Variable used to store our latitude coordinates from GPS sensor
lon Timestamp Network	double String Double	Variable used to store our longitude coordinates from GPS sensor Variable used by the collision sensor to timestamp when collision occurred Variable used for our network location so that the helmet can connect to the database
Duration	Int	Variable used to determine how long the device has been in use – used for battery testing

Return Type: Does not return a data type, but rather alerts users via piezo buzzer alarm **Processing:**The function, upon the Arduino receiving power, will initialize the modules by sending voltage to the GND/5V pins. The function will declare data objects associated with the sensors using distanceSensor, piezoBuzzer, collisonSensor, and gpsSensor. The function will constantly record over the previously declared ***t_interval*** GPS Coordinates into ***lat*** and ***lon*** for storage and send them across a network using the declared variable network. The ultrasonic object, when motion is detected within the range of the previously declared ***motion*** variable, will send an amount of voltage across its' data pin (distanceSensor). The function will then send that voltage to the piezoBuzzer in order to alarm the user. If collision is detected, the collision sensor will send an amount of voltage through its' data pin (collisionSensor) in order to be logged to a file within the Arduino processor using the timestamp variable. The function will constantly check motion and collision and increase the duration variable, hence the void loop() declaration.

Figure 7-5 – Team Capability Assessment

	Matt Horger	**Kevin Tayah**	**Jake Rauchen**
Arduino Hardware	3	2	2
Hardware Programming	3	3	3
Database Structure	2	2	2
Data Transfer	2	2	2
Mobile Application	2	3	3

** The table values represent an assessment of team member capabilities. The values are: 1 – No knowledge or not much relative to the needs of this project
2 – Enough knowledge to accomplish part but not all of this project
3 – Knowledge probably sufficient for this project