



Walking Navigation App

USER GUIDE

VERSION 2.0.0

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Introduction and Purpose

We have coded and designed an web-based application which can direct users to a destination through a series of paths/waypoints. The application will direct the user along paths comprising of ordered lists of geographical locations (represented as latitudes and longitudes) where the user must change direction. The app will monitor the user's location and direct them from waypoint to waypoint, noting when they reach it and directing them to the subsequent locations until they reach the required destination.

Besides, the users can add in their own paths other than those preset paths stored in server. Global Positioning System (GPS) is used to navigate the users to their desired locations. All kinds of navigation info such as Average Speed of User and Distance Travelled are shown. The app features and limitations will be explained in detail in this manual.

Today's generation of human beings are very reliant towards mobile phones more than anything else. Hence, we have made this application specifically for mobile application based navigation. This application has can be used by all groups of people, young or old and that is one of the main functions of this application.

App Features

The application supports mainly mobile devices such as smartphones and tablets, basically any devices that has a GPS sensor, a gyroscope and an accelerometer. However, our application has been specifically designed as a mobile application and the layout of the application might vary with different devices due to this reason.

The application has a variety of features that users can take advantage of. Firstly, the application will provide you with the list of predetermined routes. User can either choose one or opt to add their own route. Then in the navigation page, the application will determine the user's current location and draw a pathline between current location and the starting location of the chosen route. If the user goes off course, the application will direct user to the next waypoint. All of these functions are only supported when there is an Internet connection to load the Google Map API. Moreover, only JavaScript-enabled Internet browsers are able to run the app.

Furthermore, our application provides the user various information that is commonly expected from a navigation application. The features are such as 'Total Distance Travelled', 'Distance to next Waypoint', 'Total Distance Remaining' and also 'Number of turns required'.

Last but not least, the application supports multiple platforms such as Android, IOS, Windows, Linux and so on. This application can only be used on JavaScript-enabled browsers such as Google Chrome and Mozilla Firefox.

Instructions for Use

1. Main Page

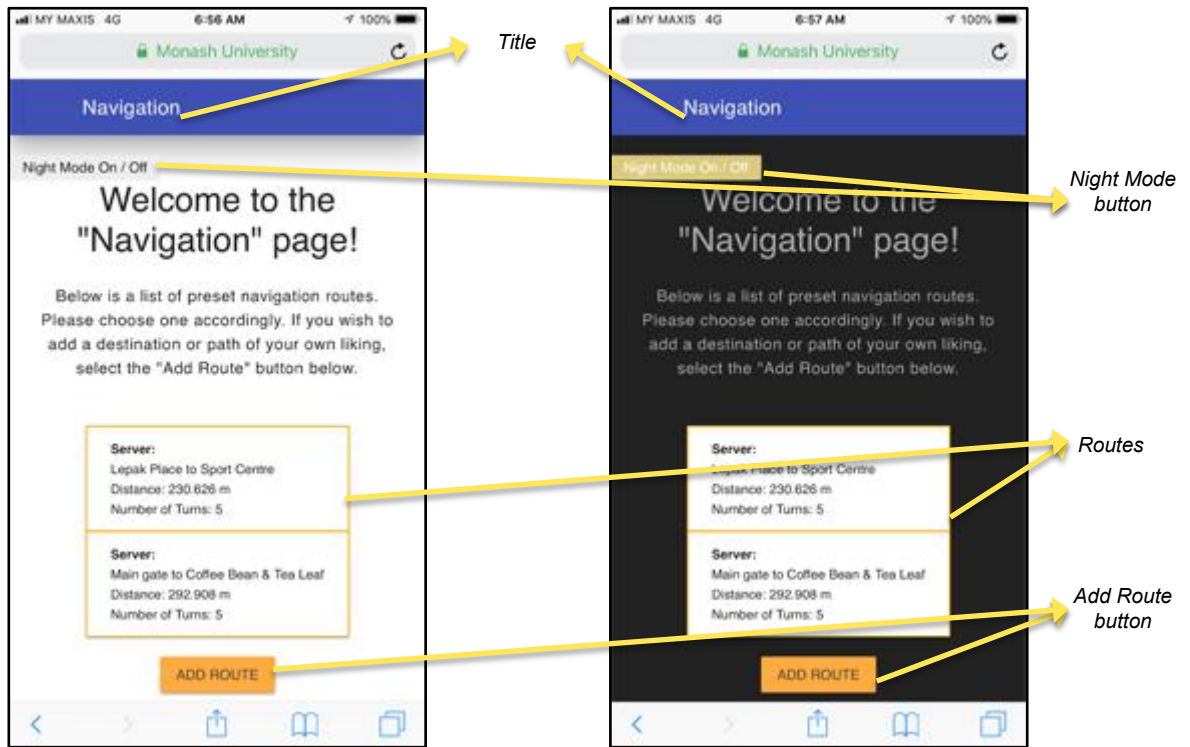


Figure 1 - Main Page (Day)

Figure 2 - Main Page (Night)

The main page is viewed upon launching of the application, displaying a list of pre-build-in routes within the Monash campus for the user to navigate from a starting point to a desired destination.

Here, an additional “Night Mode” is build in for users who prefer a darker theme to a main page. Upon selection of the “Night Mode On / Off” button, the page alternates between the two modes. Furthermore, An “Add Route” button is also displayed on the screen, allowing the user the choice of creating their own routes to and from locations not listed within the pre-built-in routes.

2. Add Route Page

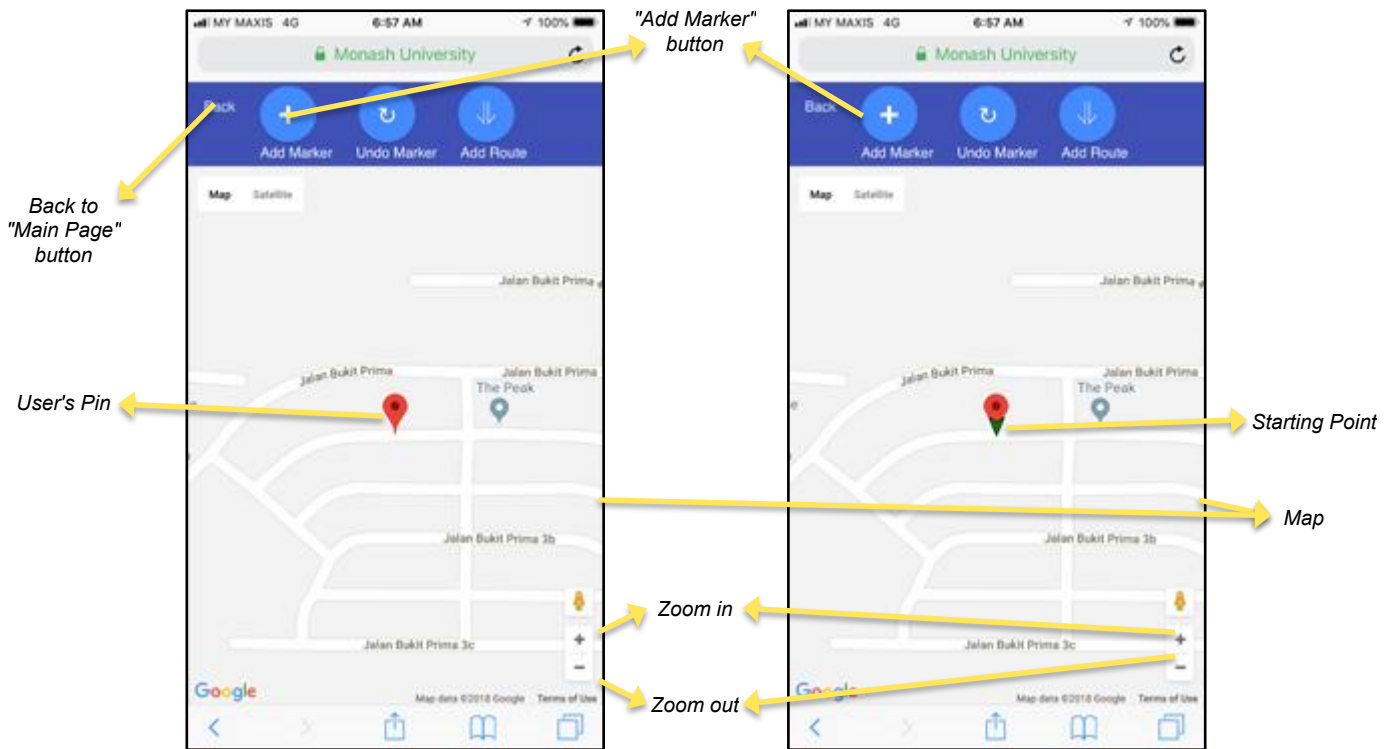


Figure 3 - Add Route (Empty)

Figure 4 - Add Route (Start)

Upon clicking the “Add Route” button, the page shown in Figure 3 is shown (note that the map is not the Monash campus. This is due to the ease of testing by the developers). There are four buttons that can be used; the “Back” button, the “Add Marker” button, the “Undo Marker” button and the “Add Route” button. The “Back” button will relocate the user to the Main Page (Figures 1 & 2).

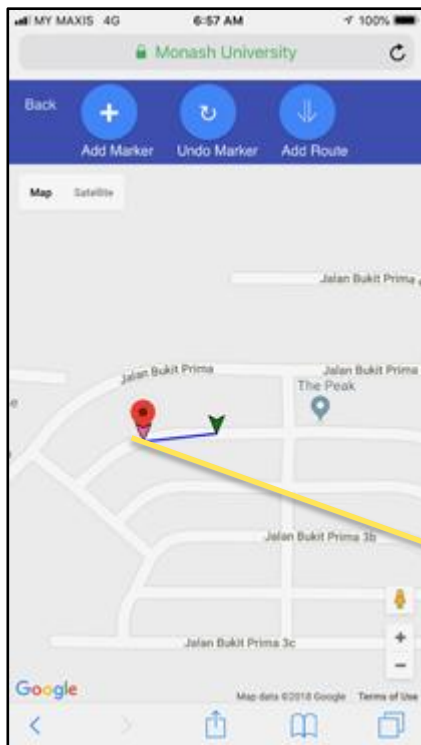


Figure 5 - Add Route (End)

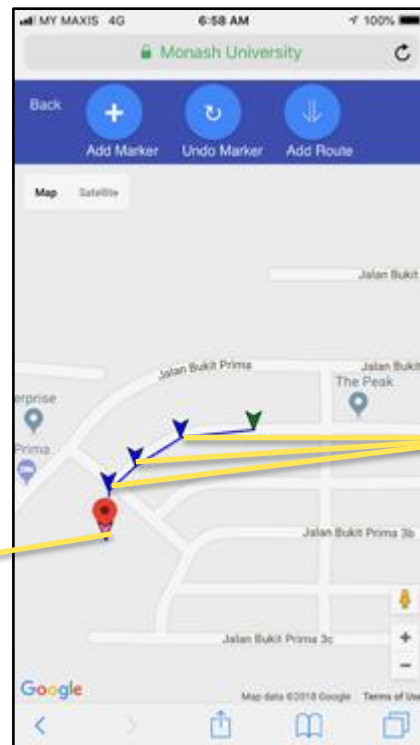


Figure 6 - Add Route (Waypoint)

Upon the clicking of the “Add Marker” button, an initial green marker, known as the start point, will be added on top of the user (green marker) shown in Figure 4. After sliding the marker to a different point and pressing the button again, a second marker, known as the final marker (pink) shown in Figure 5, will be added.

If a third marker is to be added, the last-added marker will become the final marker, and a waypoint (blue), shown in Figure 6, will be the marker in between the start and final markers.

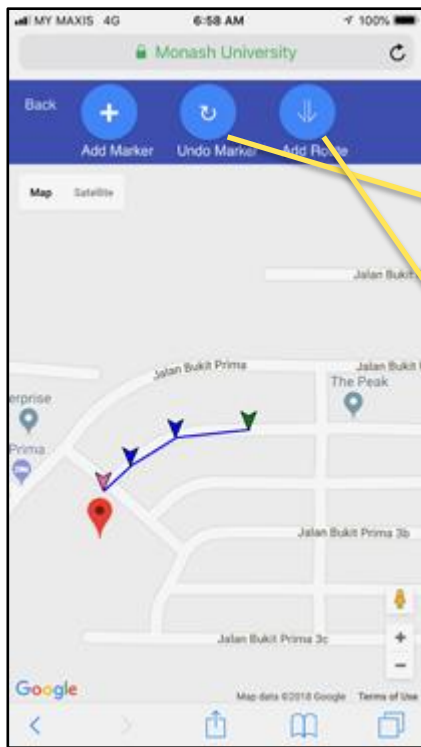


Figure 7 - Add Route (Undo)

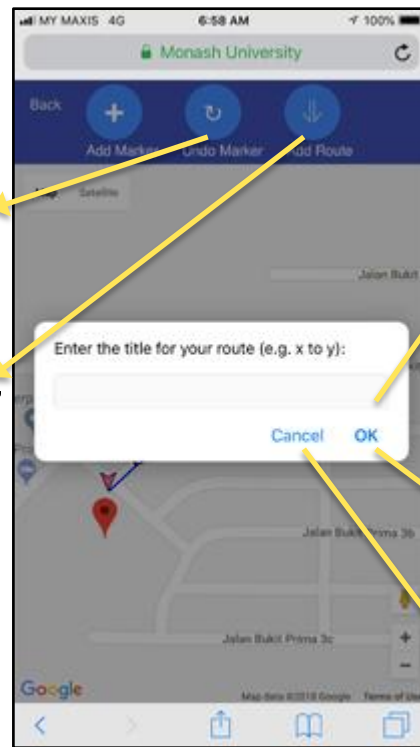


Figure 8 - Add Route (Add)

In the event that the user accidentally adds a wrong waypoint, the user can click on the “Undo Marker”. This will revert the last added waypoint (shown in Figure 7).

Upon confirmation of all waypoints, the user then can save the route by clicking on the “Add Route” button. The application will then ask the user to enter a suitable name for the custom route (Figure 8). If the user decided to want to add a new waypoint, the user can click the “Cancel” button.

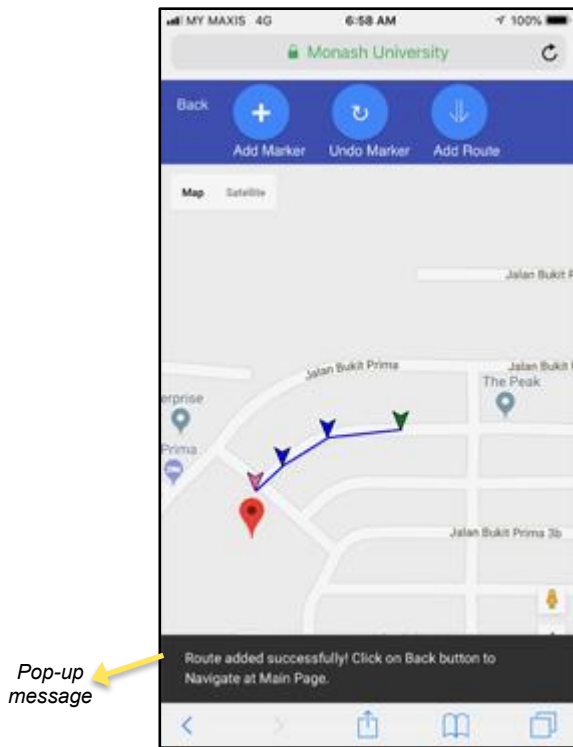


Figure 9 - Add Route (Saved)

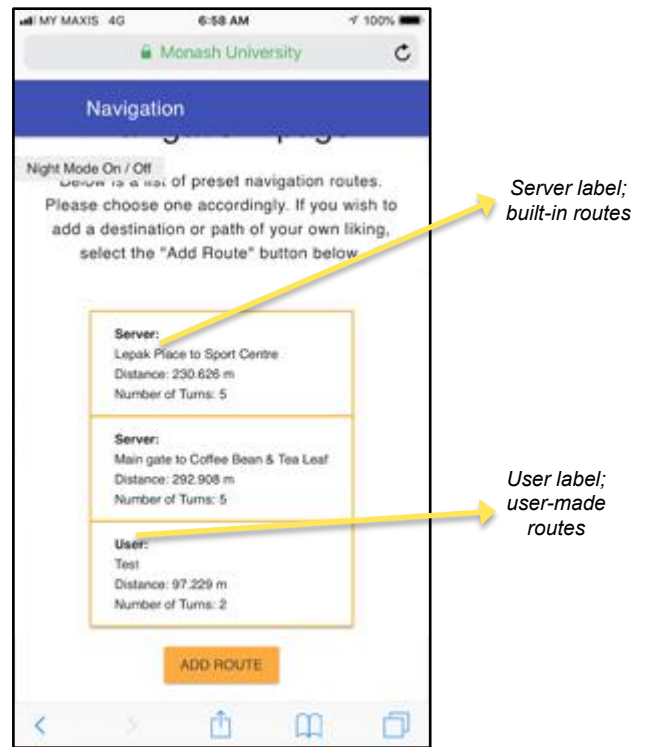


Figure 10 - Main Page (With User)

When the “OK” button (Figure 8) has been chosen, a pop-up message will appear, indicating to the user that the route has been saved. Upon clicking the “Back” button (which directs the user to the Main Page), there will now be a new route for the user to choose (Figure 9). The “User:” title indicates that the users themselves have added the route, whereas the “Server:” title indicates that it is a pre-built-in route.

3. Navigation Page

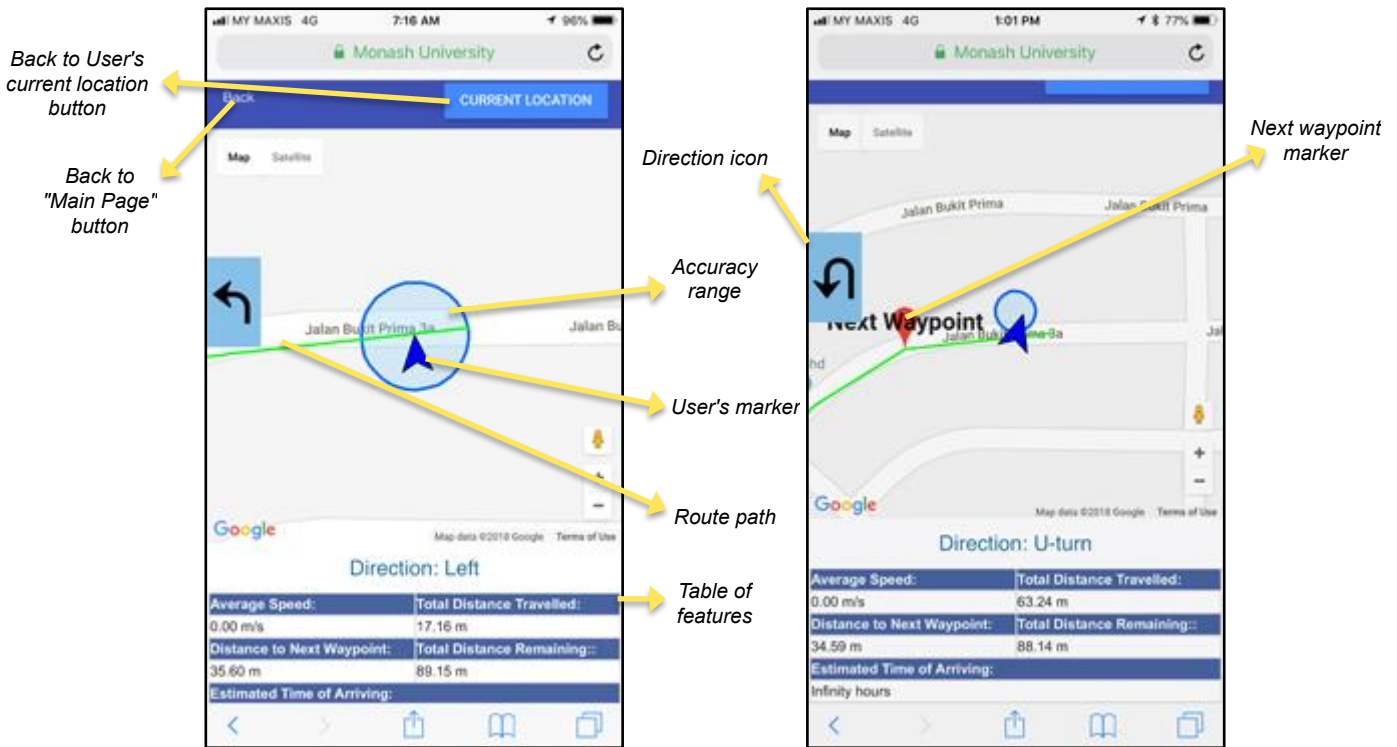


Figure 11 - Navigate (Initial)

Figure 12 - Navigate (Next Waypoint)

Upon selection of a route, the application will direct the user to the "Navigate" page (Figure 11). In this page, the user will be able to see a map with the routes contained within, as well as their current location. This page consists of multiple buttons: the "Back" button, which again returns the user to the Main Page, the "CURRENT LOCATION" button, and the "+" and "-" symbol icons, which functions as a zoom; The "+" sign being zooming in, and "-" sign being zooming out.

As the map can be panned and moved around for the user's ease of use, the user can sometimes get lost upon exploring or panning away. the "CURRENT LOCATION" button will redirect the map so that the user arrow (blue) will be centered in the map again, showing the user's current location.

Other features can be seen in the Navigate Page as well. The most important would be the black arrow in blue background icon. This shows the direction (from where the user is facing) of the next waypoint (shown in Figure 12). Above a table of information (blue letters) tells the user the direction itself, rather than an icon.

The "Average Speed" feature shows the user's average moving speed throughout the entire journey (from start to their current position). The "Total Distance Travelled" feature tells the user how far the user has moved throughout the entire journey. The "Distance to Next Waypoint" shows how much further the next waypoint is from the user (in a straight line). The "Total Distance Remaining" shows how much further the user is from the final marker. Finally, the "Estimated Time Remaining" feature tells the user approximately how much longer it will take for the user to complete the route, based on their "Average Speed" and "Total Distance Remaining" values.



Figure 13 - Navigate (Final)

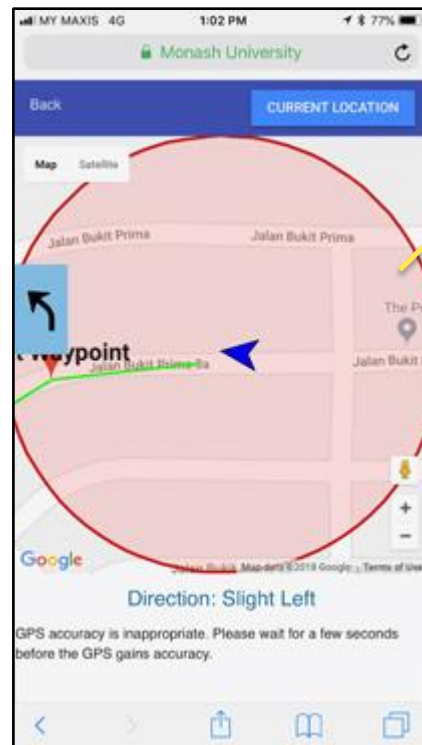


Figure 14 - Navigate (Error)

Upon reaching the destination, the entire information section will be replaced with a pop-up message to inform the user (Figure 13). In case of the location not being accurate, an error message (Figure 14) will appear, and the border becomes red.

Known Bugs or Limitations

Limitations:

- ❑ *The app works only if there is Internet connection. Without Internet connection, the map can't be loaded.*
- ❑ *The app requires the GPS to be present in the devices to determine the current location of user. Without GPS, the app will not function well.*
- ❑ *The app has a fluctuating accuracy of geolocation, especially when used in a building. The location is inaccurate when used in a building. The app could utilise the use of other sensors such as gyro sensor and accelerometer to increase the accuracy of location tracking.*
- ❑ *The app is laggy due to the fact that there is a lot of JavaScript code being run on a browser of mobile devices. The app can be coded in other native languages like Java for Android and Ruby for IOS devices for a smoother and faster app experience. Native apps are known to run faster.*
- ❑ *The app is unable to reroute and redraw the pathline if the user is off course. It will show only the direction and some other info to the preset waypoint. The app's JavaScript code can be modified in such a way that the path line will be redrawn and rerouted if the user is off course.*
- ❑ *The app is currently limited to only English. More languages can be added into the app slowly after the app has been commercialised.*
- ❑ *Due to the inaccuracy of geolocation, the app will only update the distance and user location when the user has moved a significantly large distance (e.g. 2-3 m). The info given such as 'Total distance travelled' will thus be inaccurate. Increase the sensitivity of the app by utilising other sensors such as gyro sensor and accelerometer.*
- ❑ *The 'night mode' function at the main page of the app will not work on some large screen devices and will cover the screen only partially. The code can be modified to include the whole screen as 'night mode' is triggered in its HTML file.*

- ❑ *The 'Add Route' function of the app cannot identify terrains impassable on map. This causes the probability that the user might add a route, which covers the waypoints up at rooftop or in the sea, which are both physically impossible to be reached by just legs.*

The JS code could be modified so that when the 'Add Marker' button is clicked, it will check the terrain colour of its current coordinate and prohibits the user from adding marker at that coordinate if it is a impassable terrain.

Bugs:

- ❑ *The app will continue to navigate the user to the last 'Next Waypoint' even if the user has reached the final destination through different path not stored in app.*

The JavaScript code can be modified to change the 'Next Waypoint' to waypoints nearest to the user current location instead of forcing the user to follow the path preset. The app will be more flexible in this way.