Software Requirements Specification

for

CarLife

Version 1.0 approved

Prepared by SAMMY

Nanyang Technological University

18th August 2022

## **Target Users**

The target users are vehicle drivers within Singapore.

## **Requirements Elicitation**

Software Requirements Specification

1. The app must prompt the user for their personalised parking needs when the app is first opened.
   1. The app must prompt the user for their vehicular type
      1. If the user selects “Lorry”, the app must prompt the users for their vehicular height.
   2. The app must prompt the user for their mobility friendliness requirements.
   3. The app must request the user for permission to access their live location during the app’s usage.
2. The app must allow users to input their intended travel destination whenever the app is subsequently used.
   1. The app shall suggest possible travel locations based on the user’s current text input.
   2. Upon confirmation, the app must issue a request to the backend with the intended travel destination alongside the user’s settings to generate a list of recommended carparks with relevant information.
      1. The backend must retrieve required information through various API calls.
         1. The backend must issue an API call to Google Maps for the estimated arrival time of the user to the user’s intended travel location.
         2. The backend must issue an API call to data.gov.sg to obtain weather information and HDB carpark details.
         3. The backend must issue an API call to datamall.lta.gov.sg to obtain commercial carpark details.
         4. The backend must retrieve carpark pricing data from the carpark pricing database.
      2. The backend must generate a list of 10 recommended carparks based on retrieved information and user-provided input parameter within 60 seconds and the predicted weather details
         1. If the user selected difficulty in mobility in 1.2, the backend shall further filter the list based on the carpark type, limiting results to only “Surface Car Park”.
         2. If the user selected an electric vehicle as his vehicle type in 1.1, the list of carparks must include at least two carparks with electric chargers.
            1. If the initial search returns a list of 10 carparks without any electric chargers, the backend shall remove the last 2 carparks on the list.
            2. The backend shall fill these 2 carparks using the nearest two carparks equipped with electric chargers from the intended travel destination, onto the list.
         3. Return the predicted weather forecast for the user’s intended travel destination within a two-hour range of the user’s arrival at the destination.
      3. The backend must sort the list of carparks with descending order of suitability as defined in data dictionary.
      4. The backend shall generate an event data object for any carpark that is in the vicinity of any ongoing events.
         1. The backend must issue an API call to STB Tourism Information and Services Hub obtain events happening during that date.
         2. The backend must filter the results to events happening during a one-hour range of the user’s arrival at the carpark.
         3. For each of the carpark on the recommended list, if the carpark is within 200m of any ongoing events, the backend shall add that carpark and the corresponding event to the data object.
      5. The backend must include the estimated capacity of each carpark in the list throughout that day through retrieval from its predicted capacity database
         1. The backend must maintain a database of the average capacity of every carpark for a week at 30-minute intervals.
         2. The database shall refresh its contents once a month.
         3. The backend must retrieve the estimated carpark capacity of the carparks of interest for that day within 10 seconds.
3. The app must receive a response from the backend with the list of recommended carparks, weather forecast and event data object within 10 seconds.
4. The app must display the list of recommended carparks in the appropriate format in 10 seconds.
   1. The app must render a map of the region of the intended travel destination with the recommended carparks.
      1. The app must render a map of intended travel destination with the appropriate scale to clearly identify the intended travel destination.
         1. The intended travel destination must be indicated with an icon.
         2. For each of the carparks on the recommended list, the app must indicate the specific location of the carpark with an icon.
         3. The map must mark out the user’s current location with an icon.
   2. The app must offer the option to search for carparks near the user’s current location.
      1. The app must have a button that retrieves the user’s current location
      2. The app must carry out 2.2 with the user’s current location as the input.
   3. For each of the carpark on the list of carparks, the app must display the relevant carpark details in a standardized format
      1. The predicted weather details will be displayed.
         1. The weather details must include the probability of it raining at the user’s intended travel destination.
         2. The weather details must include the estimated duration of the rain occurring at the user’s intended travel destination.
      2. For each carpark on the list, the carpark details must include its name.
      3. For each carpark on the list, The carpark details must include its postal code.
      4. For each carpark on the list, The carpark details must include its distance from the intended travel destination.
      5. For each carpark on the list, The carpark details must include the calculated cost of parking for an hour.
      6. For each carpark on the list, The carpark details must include its current capacity.
      7. If the carpark is within the event data object, the specific carpark details must include an event icon.
      8. If the weather is predicted to rain, display an icon in the specific carpark details
         1. If the carpark is a “surface car park”, the icon must be an umbrella icon
         2. If the carpark is a sheltered carpark, the icon will be a sheltered icon
      9. For each carpark on the list, the carpark details must include a redirect to GoogleMaps for assisted navigation.
         1. The carpark details must include a button that redirects to GoogleMaps assisted navigation from the user’s current location to the intended travel destination.
         2. GoogleMaps must be launched within 10 seconds of the button being pressed.
         3. GoogleMaps must recommend the fastest route to the intended carpark.
      10. For each carpark on the list, the carpark details must display more formatted information upon clicking upon a specific carpark name
          1. The display information must be displayed on a new page
          2. The page must contain a back button to return to the recommended list of carparks.
          3. The displayed information must display the estimated capacity of the carpark for the entire day with the current capacity of the carpark.
          4. The displayed information must display more detailed parking charges of the carpark.
          5. If the carpark is in the event data object, the displayed information must contain the additional event information.
             1. The additional event information must include the event’s name.
             2. The additional event information must include the event’s address.
             3. The additional event information must include the event’s duration.