

Team 092 (SHRM) - Detailed Project Description

- **Describe what data is stored in the database. (Where is the data from, and what attributes and information would be stored?)**

The database we are utilizing from Kaggle contains information about public transportation in the city of São Paulo. It describes the public bus services such as the timings, route itinerary, fares, stops, frequency of bus availability, etc. within the major city. All this information from the dataset is formatted as per the General Transit Feed Specification to describe the scheduled information for transportation services.

- **What are the basic functions of your web application? (What can users of this website do? Which simple and complex features are there?)**

The basic functions that our web application aims to provide include providing users with trip itineraries adhering to their specifications. The users will be able to input their current location as well as their destination to find the best route. They can optimize their travel based on which itinerary will be the fastest, or the cheapest and choose from their options. In the end, they will be provided with clear instructions as to which scheduled buses to take to reach their final destination.

- **What would be a good creative component (function) that can improve the functionality of your application? (What is something cool that you want to include? How are you planning to achieve it?)**

- Recommend Destinations - Sao Paulo is one of the most well-known cities in Brazil. Lots of brilliant tourist places can be found here, thus, it will be convenient for tourists if the transportation spots are close to popular attractions. By storing the recent destinations that other users may have been to, we can recommend to people who are new to the city some trendy locations as inspiration.
- Maybe Not Today – Since there are plenty of travelers around the area, we can reuse the previous table to indicate that those sites may be packed with people at this moment, so people who prefer more undisturbed tourist destinations can choose to avoid going to those places at this time.

- **What is the project title?**

OptiBus

- **Provide a project summary.**

The project's objective is to design a user-friendly public transportation app that helps residents of Sao Paulo, Brazil, navigate their city's public transportation system seamlessly. The data used in the app will come from the GTFS data set, which is a comprehensive collection of information about the city's public transportation system, including route details, trip types, and itinerary paths. The GTFS data will provide the backbone for the app's algorithms, which we will optimize to provide accurate and efficient route options.

The app will allow users to input their starting point and destination, and based on this information, the app will calculate and display the best bus route options for the user. It will consider numerous factors, such as route length, estimated travel time, fares, and available connections. Additionally, the app will display real-time information about the buses, including their location and estimated arrival time at the selected starting point and destination. Overall, the project goal is to improve the user experience for those utilizing the public transportation system in Sao Paulo, making it easier and more efficient for them to get around the city.

- **Provide the description of an application of your choice. State as clearly as possible what you want to do. What problem do you want to solve, etc.?**

Our application's goal is to provide users with an optimal travel itinerary based on their needs. This is specifically targeted at users who may be visiting the city, or others who are unfamiliar with the public transportation system. We aim to ease their traveling experience by calculating which buses to take at what time so they can simply follow the route. We will provide a user interface where they can input their start and end locations as well as if they would like to search for the cheapest or fastest trip. Our application will then provide them with an itinerary of which scheduled buses to take at what time, specifying any connections along the way.

- **Explain as clearly as possible why your chosen application is useful. Make sure to answer the following questions: Are there any similar websites/applications out there? If so, what are they, and how is yours different?**

Our transportation app offers a distinct advantage over Google Maps as it is dedicated to providing bus route suggestions and real-time information on bus busyness. Unlike Google Maps, which relies on crowdsourced opinions to determine bus crowdedness, our app utilizes previous data to make more reliable conclusions. Tailored specifically for the city of Sao Paulo, our app allows us to pay closer attention to the city's specific nuances and recent transportation developments, providing a more accurate experience than other transportation apps that have to cater to multiple cities.

- **Describe what your data is and where you will get it.**

Our proposed dataset, suggested by TAs, is the Public Transportation Service dataset. The dataset contains information about the public transportation system of São Paulo, a major Brazilian city. We get our data from the Kaggle dataset. To make the most of this data, we plan to fetch and utilize the following outlined files from the dataset, accompanied by a brief description of their intended purpose.

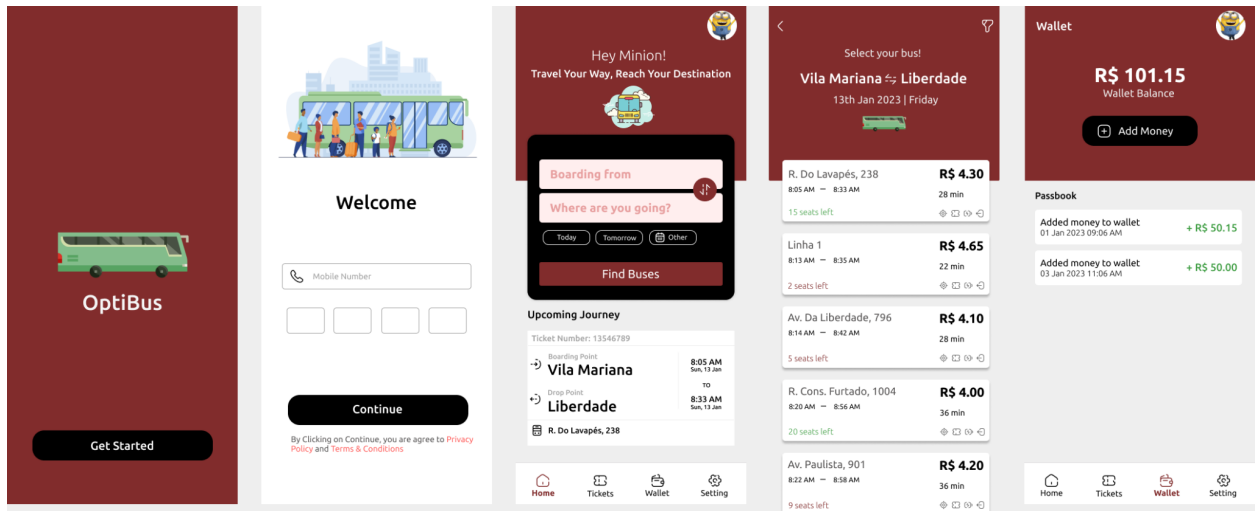
- agency.txt: This file contains information about the agencies that control the transportation system. We may use it to specify the companies operating specific routes.
- calendar.txt: The data in this file indicates possible bus schedules and their periods of operation. We will use it to generate routes for different days.
- fare_attributes.txt & fare_rules.txt: These files describe fares in the system, where prices vary according to the payment method or the duration of the routes. By combining data from the two files, we can implement a function enabling users to determine how expensive their trip may be.

- stops.txt: This file contains information about stops, such as a stop's name and location. We will connect this data with other files to collect more details regarding a specific bus route.
 - routes.txt: This file stores the name, color, and descriptions of various routes. It serves as a critical foundation for route construction.
 - trips.txt: Since each route may have more than one trip, we will need to combine this file with the previous ones to display the whole path clearly.
 - stop_times.txt: This file shows planned arrival and departure times for each stop on a trip, as well as their order. By incorporating this data into our work, we can indicate detailed information about the route timings.
 - shapes.txt: This file stores the location and order of each point, and we can use it to complete the visualization of our bus routes.
- **Describe the functionality that your website offers. This is where you talk about what the website delivers. Talk about how a user would interact with the application (i.e., things that one could create, delete, update, or search for). Read the requirements for stages 4 and 5 to see what other functionalities you want to provide to the users. You should include the following:**
 - **A low-fidelity UI mockup: What do you imagine your final application's interface might look like?**
 - **The project work distribution: who would be responsible for each task or subtask? List of the person responsible for which exact functionalities in section 6. Explain how backend systems will be distributed across members.**

Our app offers several functionalities to help users navigate the Sao Paulo public transportation system efficiently. It will provide users with the following features:

- **Route calculation:** Users can input their starting point and destination, and the app will calculate and display the best bus route options based on various factors such as route length, estimated travel time, fares, and available connections.
- **Real-time information:** The app will display real-time information about the buses, including their location and estimated arrival time at the user's selected starting point and destination.
- **User-friendly interface:** The app will have a user-friendly interface that makes it easy for users to navigate and find the information they need.

Low-fidelity UI mockup:



- The final application's interface will have a simple and intuitive design. The main screen will have an input field where users can enter their starting point and destination. We will design the interface to provide users with all the information they need in one place, making it easy for them to find the best route options.

Project work distribution:

- Route calculation: Shreshta will be responsible for developing the algorithm that calculates the best route options for the user.
- Real-time information: Richard will be responsible for integrating real-time information regarding the buses into the app.
- User interface: Meghna will be responsible for designing and developing the app user interface.

Backend systems distribution:

- Database management: Meghna would be responsible for managing the GTFS data set.
- Server management: Hsiang-Yin will be responsible for setting up and maintaining the server on which we can host the app.