ICS4U

TRAFFIC HELPER

USER GUIDEBOOK

Date: May 26, 2024

Association: Merivale High School

Course Code: ICS4U

Teacher: Courtney Edwards

Creators: Matthew Zhou, Rohan Bahl, Alex Shi

This guide will consist of a full user guide and is only for the frontend, and is available at /frontend/guide.html. The backend CLI guide is at /backend/cli_tutorial.txt, printed when ‘man’ is entered in the app’s terminal. Note: Only frontend is described here since it is UX.

2.1 Getting Started

On first access to the website, the user will encounter the home page. The user's first step is to explore the home page and discover what the project’s purpose and use is for. Refer to Figure 1 for the respective home page.

Figure 1 - Home Page

2.2 Log In

2.2.1 User Log In

The user's next step is to use the conventional all-user based log in system with the (Log In) button in the top right corner, where only a username for user appeal is required. Refer to Figure 2 to see where anyone can input their username to gain access to the application's main and regular functionalities.

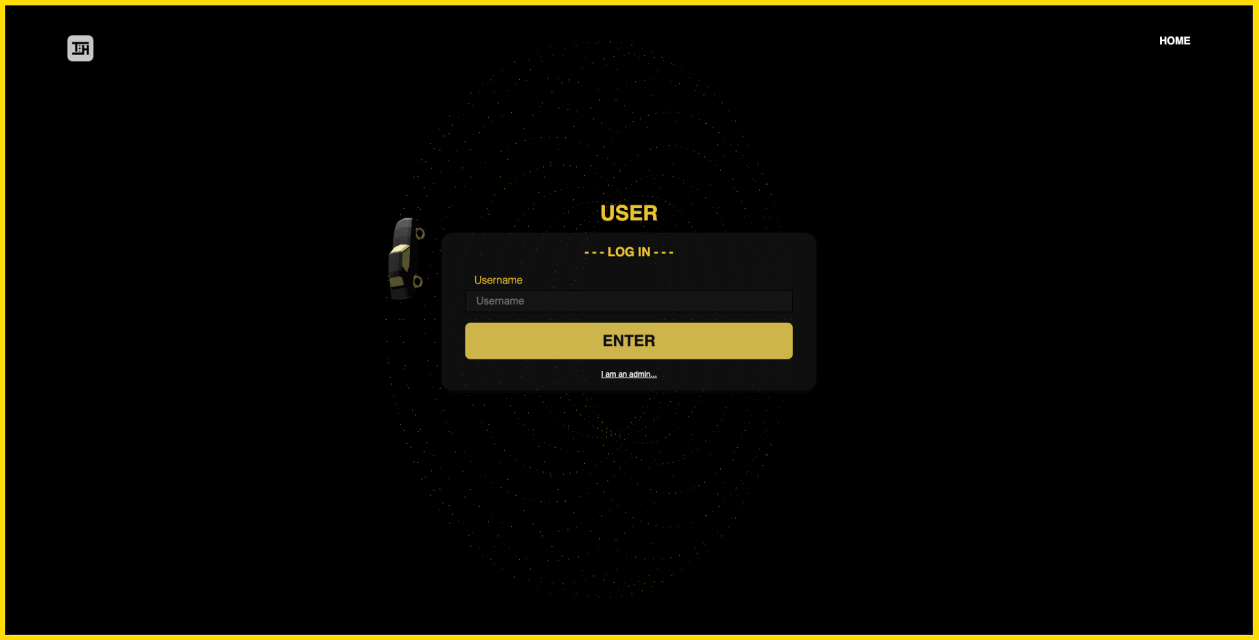

Figure 2 - User Log In

2.3.2 Admin Log In

Another path in the all-user Log In system is by logging in as an admin. This works if the user clicks on "I am an admin" below the Enter button on the User Log In page (see Figure 2). On clicking, you will be brought to a page in order to authenticate the user's administrator identity (Administrator Log In page), allowing access to more complex functionalities of the website. Currently, the admin can enter an username however one authentication code (passkey) is **testkey**. Note that if the 'admin' enters an incorrect key, they are redirected to the regular log in page with a pop up saying that they have entered an invalid administrator key. Refer to Figure 3 to see the admin Log In system. To purposely return to the User Log In page, click on "I am a regular user…" below the admin information Log In input area box.

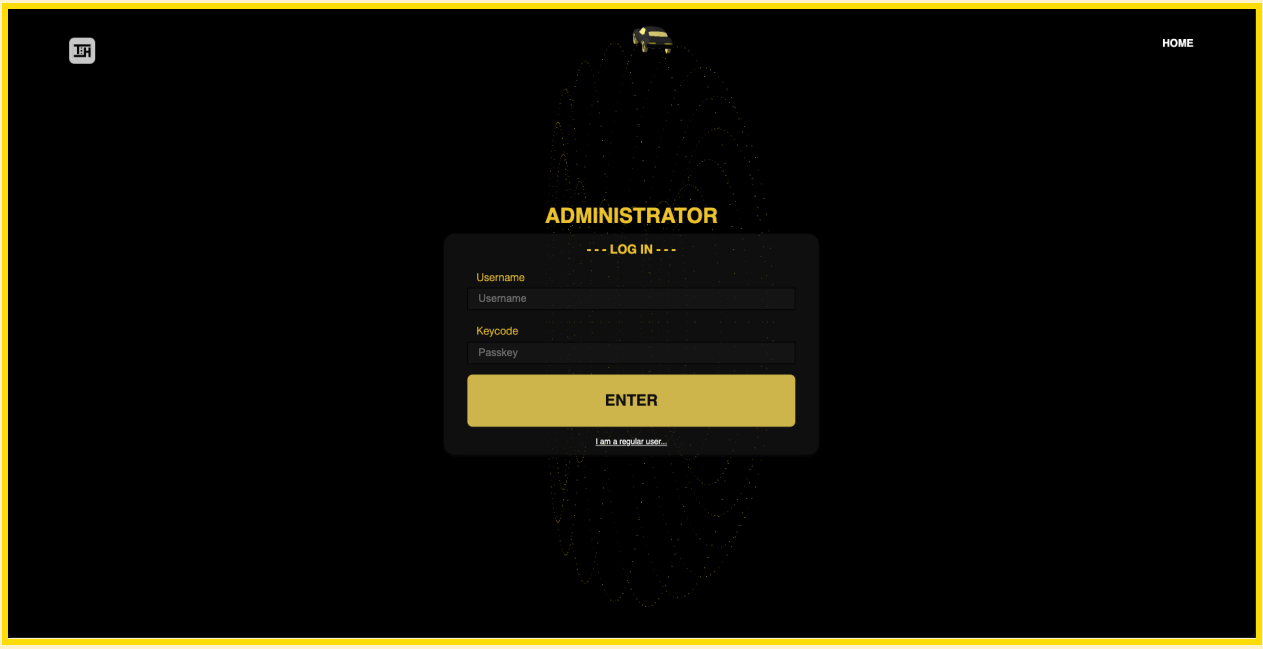

Figure 3 - Administrator Log In

2.3 Home Page + Navigation

2.3.1 User

Once signed in as a regular user, the user will have the view for the home page (for normal users), shown in Figure 4 below.

Figure 4 - User Home Page

The user can navigate the website using the navigation bar located at the top of the screen (See Figure 5 for a visual).

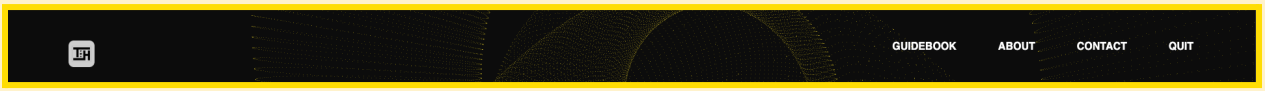

Figure 5- User Navigation Bar

2.3.2 Admin

Once signed in as an administrator, the admin will have the view for the home page (for admin users), shown in Figure 6 below.

Figure 6 - Administrator Home Page

Then, the admin can navigate the website using the navigation bar located at the top of the screen (See Figure 7 for a visual).

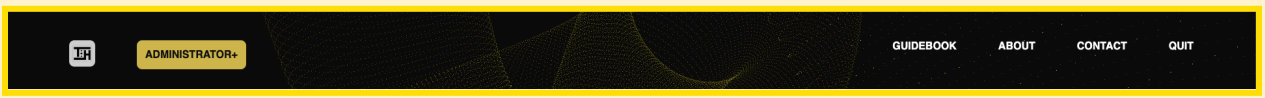

Figure 7 - Administrator Navigation Bar

From any navigation bar, the user/admin can access the following pages/functions:

1. All-User-Accessible Pages: These are pages that do not require the user to be an admin (including the Home page ⇒ changes depending on admin or user, Guidebook, About, Contact). Refer to Figure 7 for location of these navigation tools.
2. Quit: This allows the user to sign out and go back to the home page (See Figure 7 for location).

From the administrator navigation bar, the admin can access the following pages:

3. Admin Authentication Required Pages: These are pages that require the user to be logged in as an administrator. There is notably just one page that is accessible to an administrator and not a user, and it is the Administrator+ button shown in the navigation bar (See Figure 7 for Administrator+ navigation)

2.4 User Functionality

This section shows the core user functionalities that are general to all users who have logged in, containing both administrators and regular users.

2.4.1 User/Admin Queries

In order to get to the first core function, the user (any user) must click on the large yellow button on the home screen named “Discover Route Paths”. The user queries are a core functionality of the application for regular users (See Figure 8 for an entire view). How this and proceeding processes work is that there are 2 core parts. There is a **Queries** section (Refer to section 2.5 User Queries) and there is a **Routing** section (Refer to section 2.6 User Routing). Here, the user can personalize queries.

Figure 8 - User/Admin Queries

Vehicle Type

To begin, the user form starts with the user selection of his/her/their preferred vehicle type (See Figure 9 for visual representation). This is done through a dropdown menu, where the user clicks on the dropdown button and selects one of the options. The default value is a car.

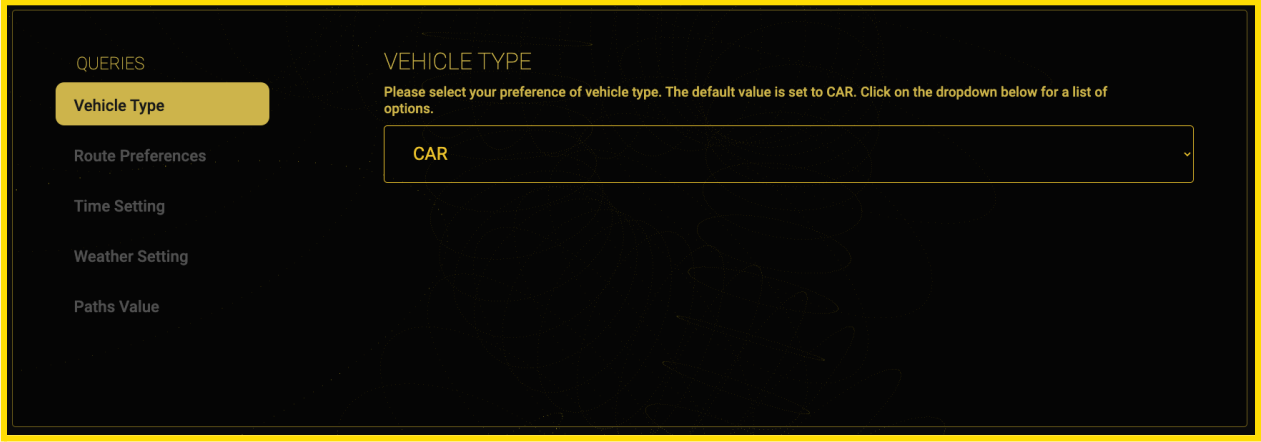

Figure 9 - Selecting Vehicle Type

Route Preferences

After the selection of the start and destination points, the user can set their route preferences, involving sliders (out of 100) for safety, distance, and speed (See Figure 10 for a visual representation). Each one of these are presented through a slider on a scale of 100 (percentage), as seen in Figure 10.

Figure 10 - Initiating Route Preferences: Safety, Distance, Speed

In order to edit the route preferences, the user can drag the indicator on each individual slider, for instance the safety slider can be dragged left to right relative to the scale of 100. As the user does this, the percentage indicator value on the right of each slider will change and will be what is submitted when the user later clicks the submit form button. The default route preference value is 50% for each slider,

however upon changing, there is also a reset button below the sliders. This button allows the user to reset all values to 50% which is the recommended values for the route calculations.

Time Setting

Next, the user can select their time Setting (See Figure 11 for a visual representation).

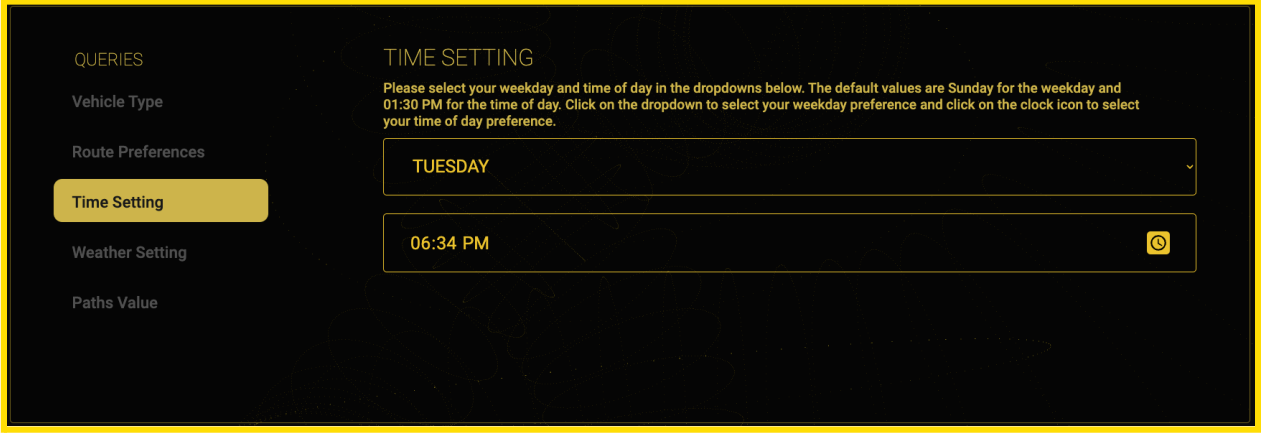

Figure 11 - Selecting Time Setting

This is separated into 2 sections where in the first section the user can select the weekday (in order to account for more details on weekends versus weekdays, etc) and in the second section the user can select the time of day in the format of an integer between 1 and 12 inclusive, and then a dropdown for AM and PM options which is later converted to 24 hour format when computed. For both there are drop downs for respective values. The default values are SUNDAY and 1:30 PM.

Weather Setting

On this query, the user can select their preferred weather type (See Figure 12).

Figure 12 - Selecting Weather Setting

Similar to the vehicle type, in order to select the weather type the user can click on the dropdown button and then select an option. The default value for the weather type is CLEAR (no weather).

Route Value

In addition, the user can input how many routes they would like the output to show. This will be limited to a maximum of 5 routes due to computational efficiency and runtime impacts. In order to edit the value, the user clicks on the input box and then types in an integer (anything that is not a positive integer above 0 will not work), as shown in Figure 13 below.

Figure 13 Inputting Paths Value

2.4.2 User/Admin Routing

The continuation of the queries page brings the user/admin to the routing page, another core functionality of the website application.

Starting & End Locations

Here, the user can select their start and end points either by dragging and dropping the location points (where yellow represents starting point and blue represents destination point). However, if the user wants to enter an address, they can do so in the address section at the bottom. It should be recognized that whatever you put in the address boxes are prioritized over the drag and drop on the actual map. This is for precision and performance purposes. So, if the user wants the system to read only the location (coordinate-based) points on the map, the user must leave the starting location address and destination location address input boxes **empty**. Reference Figure 14 for an overview of the Routing page.

As well, the map is interactable. The user can zoom in with the top left buttons or the scroll wheel and drag around the map in order to move the satellite camera and thus the user's map view.

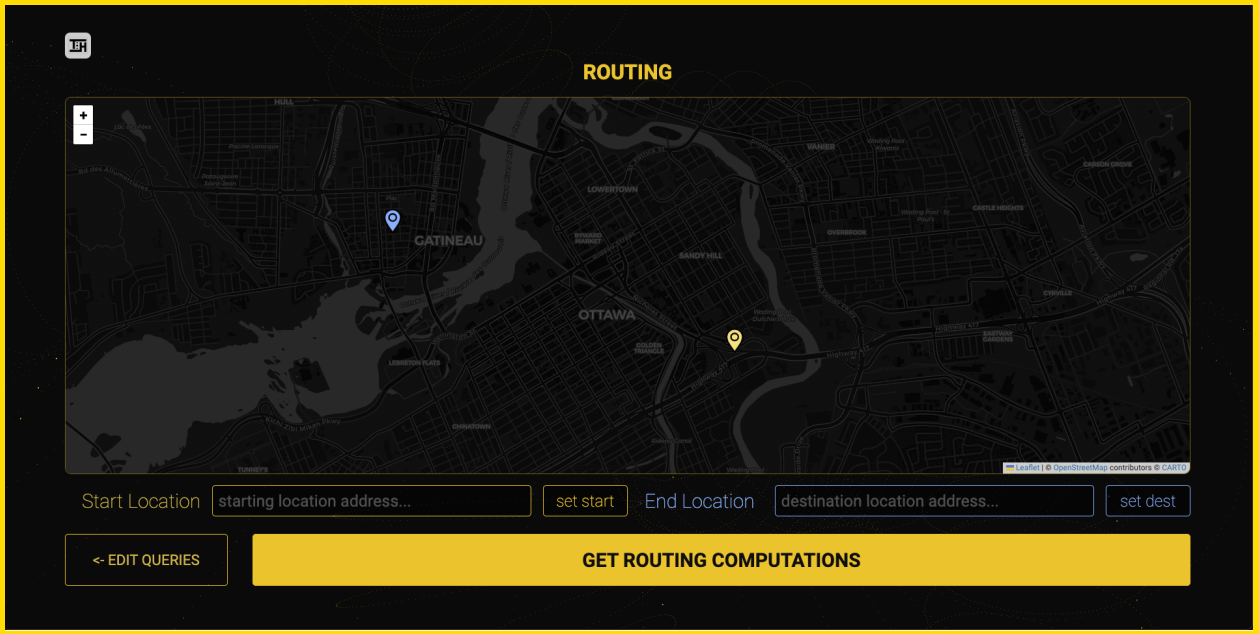

Figure 14 - User/Admin Routing

Form Submission

Below the routing and the setting of start and end locations, the user can either redirect back to the queries to change their preferences (their previous data is saved) or they can submit the form (inclusive of all the user inputted preferences from queries as well as location points/addresses in the routing section) in order to get results regarding transportation routes and their respective information (See section 2.4.3 for more details on how the results are displayed).

2.4.3 Result

The results page is the page where the user can receive and interpret the interactive map for routes for their respective start and end points, and preferences. Please reference Figure 15 for a general view of this page. On the left portion of the display, the user can observe a table that has the column headings of Route # | Risk Index | Time Required to Travel | Distance Required to Travel | Color of Displayed Route. This table has the information that the user receives about each relative route (integrated by the number of path routes that the user has prompted in the queries route number section (See Section 2.4.1 Routes Value).

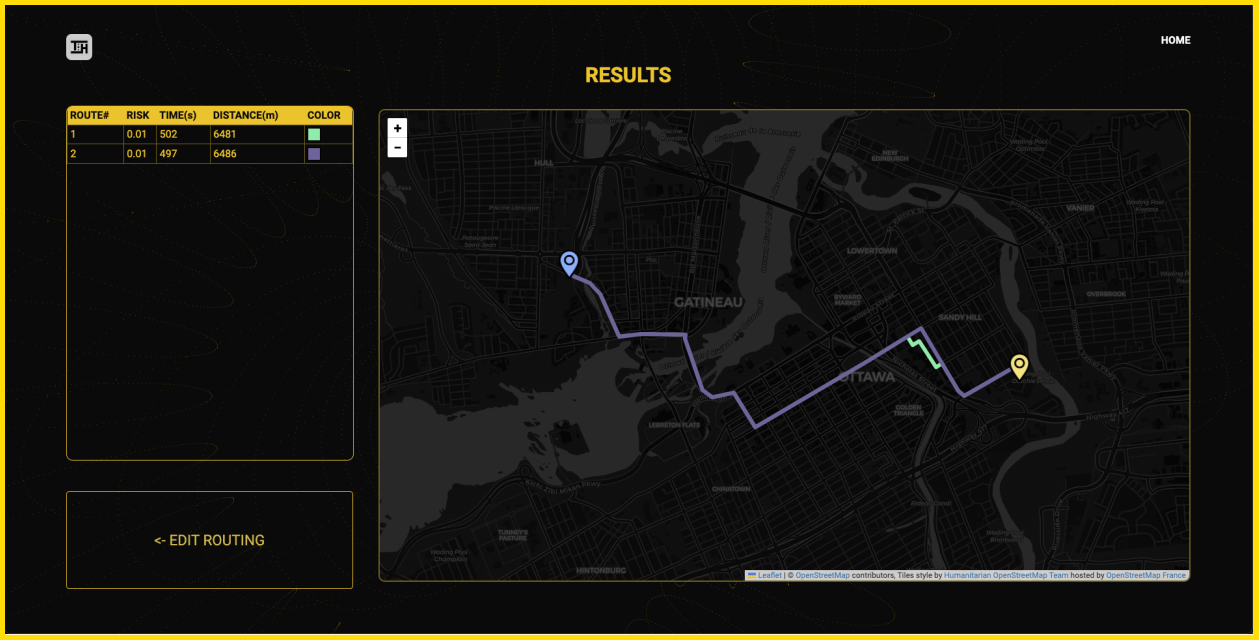

Figure 15 - Results Display

In the bottom left hand corner of the display, the user may notice the EDIT ROUTING button which allows them to go back to the routing (and in turn the queries as well) to edit their values. All prior input values are saved to local storage, even if it does not display it so the user does not have to re-input everything.

In this case, the user has entered respective query preferences as well as starting and end locations, affecting the Risk, Time and Distance factors. However, the user has also inputted the number of paths to calculate to be 2, as the user can see that there are 2 different paths in the table on the left corresponding to 2 paths within the map respectively.

2.5 Admin Functionality

The admin functionality is an admin-only form that allows users to select admin-exclusive features.

2.5.1 Administrator Inquiries

After the user selects the Administrator + button in the top right (of the navigation bar, see Section 2.3), they will be allocated to the admin exclusive form, as shown in Figure 16.

Figure 16 - Admin Specific Form Overview

Budget Value

On this admin specific query, the administrator can input an integer value depicting a budget for gadgets. See Figure 17 below for a look. This input will be incorporated automatically into the OpenAI API prompt.

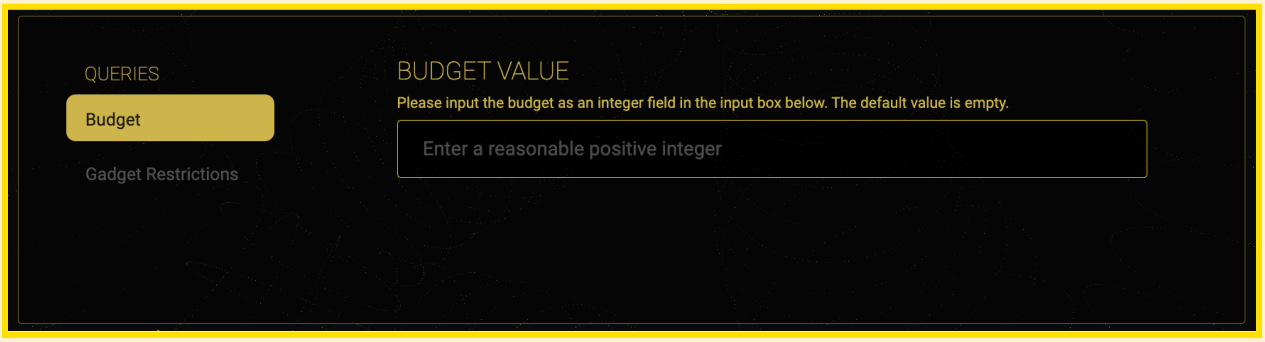

Figure 17 - Inputting Budget Value

Gadget Restrictions

Here, the administrator user can select the restrictions they want to be placed on specific gadgets, notably lanes, speed increases, stoplights, and cameras. See Figure 18 for an overview. This selection will be incorporated automatically into the OpenAI API prompt.

Figure 18 - Selecting Gadget Restrictions

OpenAPI Prompting

Lastly, the administrator's main function is to ask the openapi a question about the City of Ottawa, regarding traffic accidents from the large csv file. This is an admin-only permission since prompting the OPENAI API with so much data and for it to search through it requires "tokens" as a currency within the OpenAI API platform at https://platform.openai.com/playground/chat?models=gpt-4o. In this section, the administrator can ask the OpenAI API a prompt (See Figure 19 for an overview). The core prompting types the admin can ask is:

1. A specific statistic/data aspect from the csv that is automatically connected (note that temporarily this is limited to the much smaller trafficdata.csv file due to excess "tokens" data requiring real payment in the link and account creation mentioned. See Figure 20 for an example.
2. A recommendation factor for the administrator or city traffic manager in order to find ways to improve the traffic accident rates/statistics through conventional methods that the OpenAI API can suggest, providing possible statistics as well. See Figure 21 or an example.

It is important to note that with the structure of the frontend of POST(ing) values to the OpenAI API, the prompt also considers the administrator inputs on the budget_value as well as the gadget restrictions (See Project Breakdown Frontend Code Description section for more information).

Figure 19 - Submitting/Receiving Admin Form Output

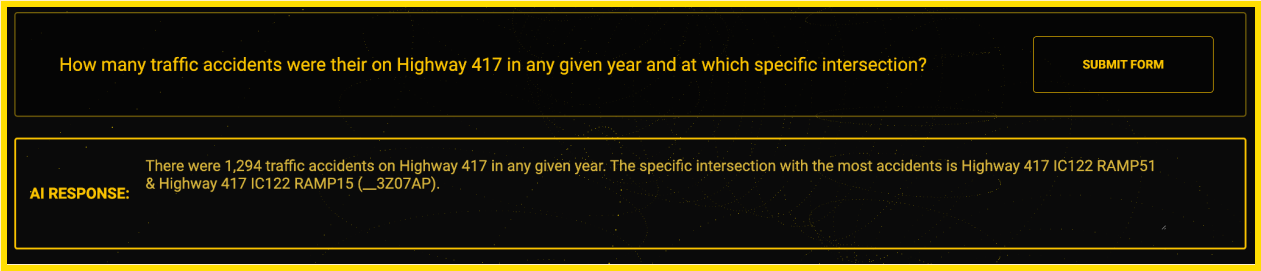

Figure 20 - Submitting/Receiving Admin Form Output

Figure 21 - Example Prompt: Recommendations

2.6 Information Generalities

In addition to all of these functionalities, the user can find the following in the navigation bar (both regular users and admins): A page that lets the user contact the creators (with the subtitle: Contact), a page that lets the user read upon the creators (subtitle: About me), and a page that gives the user a guide to the software and its functionalities (subtitle: Guide).

Find more information about the project at the Software Development Documentation (SDD).
Contributors: Matthew Zhou, Rohan Bahl.
Appendices also at SDD.