

DRIVER User Manual

Web Application

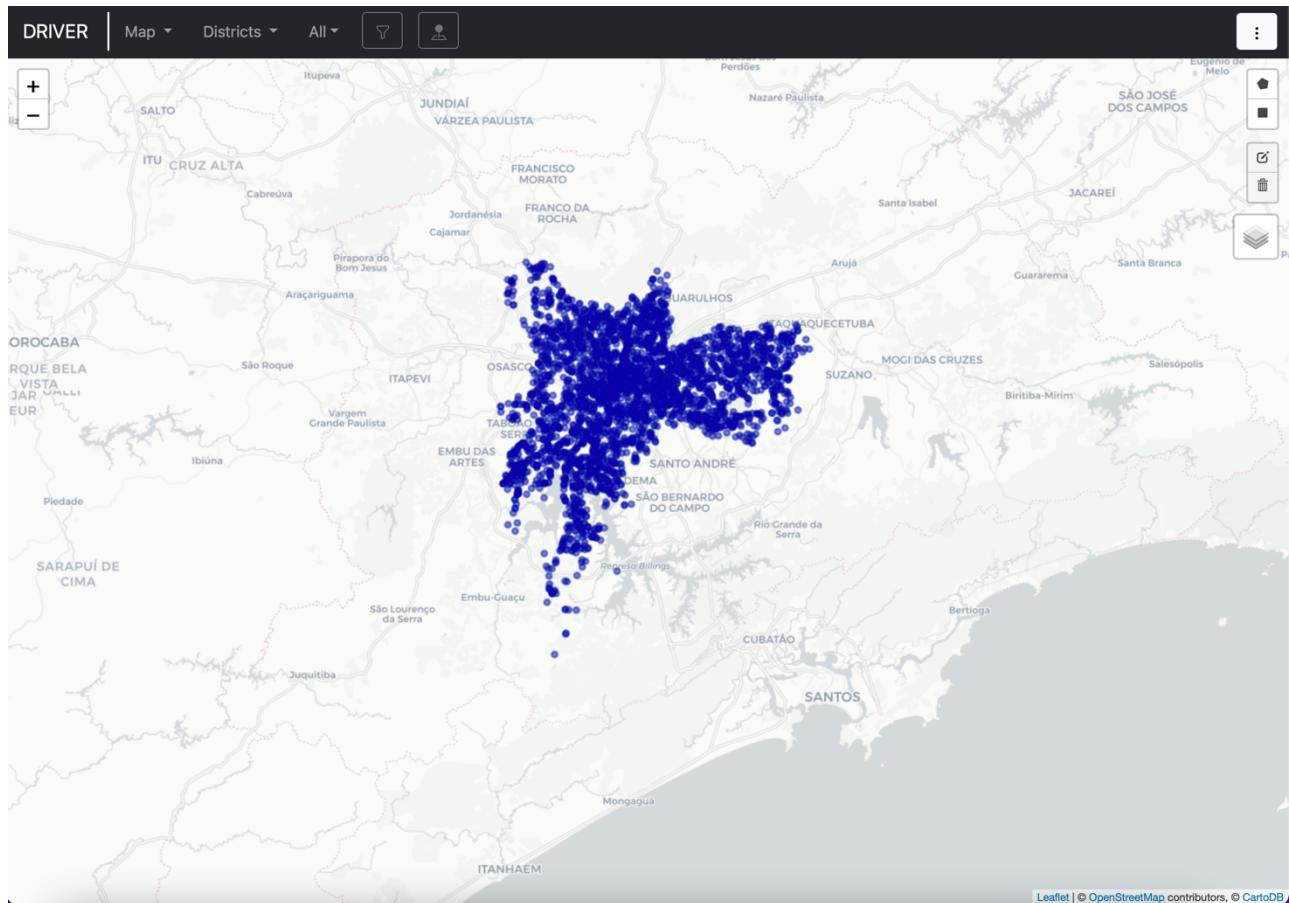


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Introduction

This document provides usage instructions for the DRIVER application. DRIVER is designed to collect and analyze data about traffic crashes that occur at a particular place. The application provides data entry tools, graph and map interfaces, custom report and filter tools, multiple concurrent user editing, and data exports.

This is a draft document and is subject to revisions.

Authentication and User Management

DRIVER provides two options for logging in to the application: a username and password pair, or single sign-on (SSO). Multiple SSO providers may be configured in the software, and it comes by default with Google account integration. Along with this, if some new user wants to login without using the Google account, they can create an account into the system.

The form consists of a header 'DRIVER', followed by two text input fields for 'Username' and 'Password'. Below the first input field is a red button labeled 'Login with Google'. At the bottom right is a blue button labeled 'Log in'.

Figure 1: DRIVER Login Page

Single Sign-On

If users have a Google account, they can click on the “Login with Google” button. This process redirects the user to the Google authentication page wherein they have to enter their valid email address and password, and after a successful login, redirects back to DRIVER with the user’s credentials.

Username and Password

Administrators may create username and password pairs for users to log in. This approach requires an administrator to be available for user registration support.

User Roles and Permissions

There are three roles with differing permissions in DRIVER. Roles and permissions were defined in order to provide different levels of functionality to different types of users. A country can anytime design its own access policy and permission. The user roles and permissions are created by the Administrator through the Ashlar Editor. By default, DRIVER has six roles with differing permissions as defined below:

Admin

The Admin role has access to all the functionality in the application, including login capability to the database design editor software. An admin can modify the structure of the database, add new fields, make

fields required, upload geographic boundaries, and manage users. The database design editor software will be covered in a separate user manual. In DRIVER, an admin may export user access logs for analysis.

Analyst

The analyst role includes permissions to view and edit all data in DRIVER. Analysts may add, edit, and delete incidents and interventions, and have access to all event information, including details associated with an incident such as people and vehicle information.

Public

Public users may register to view basic incident data. They may not edit any data, and can not view a person or vehicle information.

View Interfaces

There are four primary interfaces in DRIVER, each of which provides different ways to analyze and view incident data. The four interfaces are linked in different ways and rely on options chosen in the header that is visible on every interface. The map and record view interfaces rely on options shown in the filter bar, which is immediately beneath the header.

Map

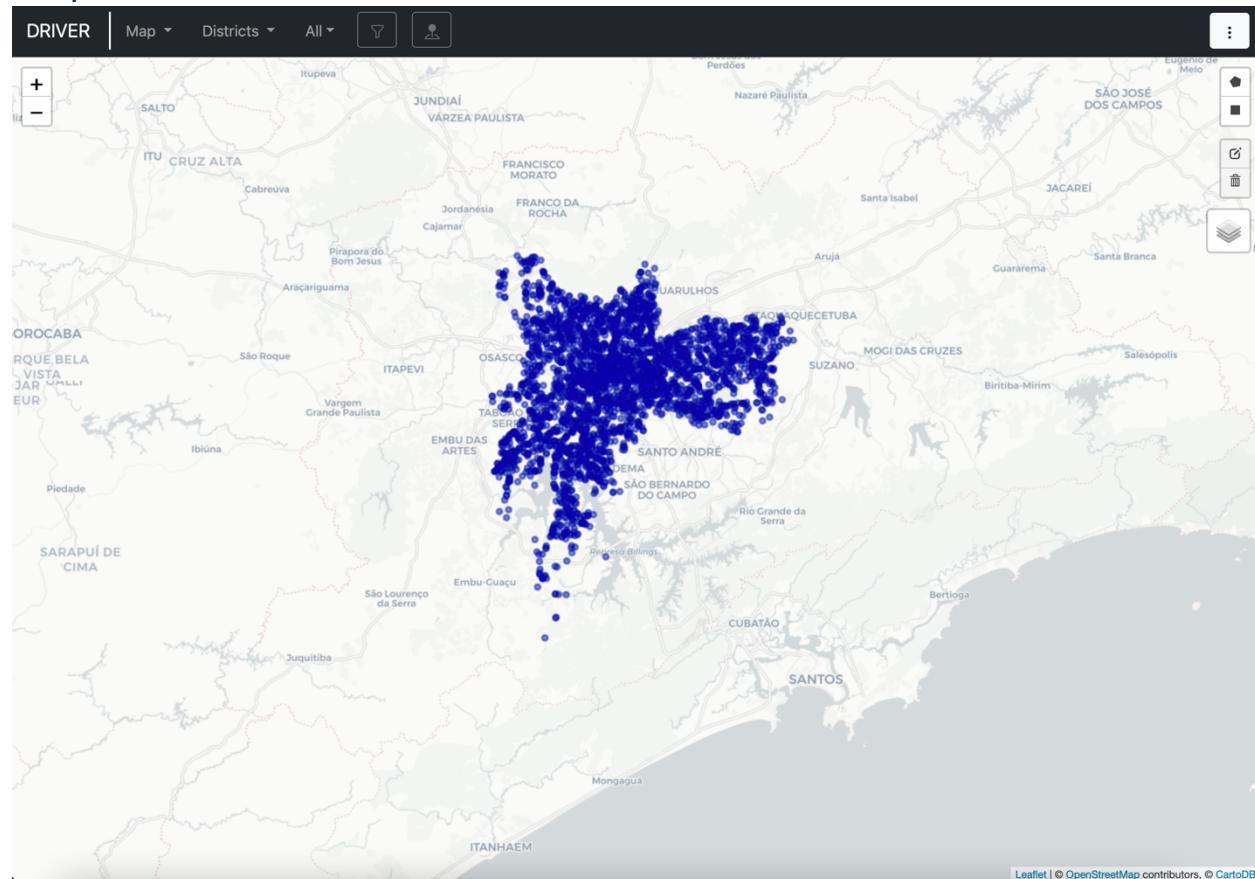


Figure 2: Map Page

The map interface is one of the most data-rich views in the application. Users can easily navigate to this page by clicking on the name “Map” which appears in the dropdown when clicked on the top Menu bar. The Map page contains a variety of layers, a full set of available filter tools, and access to interventions, additional graphs, custom report builder tools, and data exports.

This interface allows the user to zoom in and zoom out using the “+” and “-” buttons shown on the top left-hand side of the page. The user just has to click on these buttons and the map will be either zoomed in or zoomed out based on the selection of buttons. The zoom in and zoom out feature allows the user to

see the map with more details. Along with this, the Map page also provides the users with a set of polygonal tools (i.e. polygon and square) which are located on the left-hand side of the page. Using these tools, users can draw a square or polygon in the required area and can take necessary actions accordingly. These tools get activated when the user clicks on them and starts drawing square/polygon on the Map. To edit or delete the drawn square/polygon, the user can click on the edit/delete options just below the polygonal tool and the same will reflect on the Map.

In the Map page, individual crash records are represented by blue points overlayed on the map. One blue point corresponds to a single crash incident. Users can click on these blue points to view more information on individual crash incidents such as date and time of the crash. The popup also has a *view* button which, when clicked, will display more details on the crash.

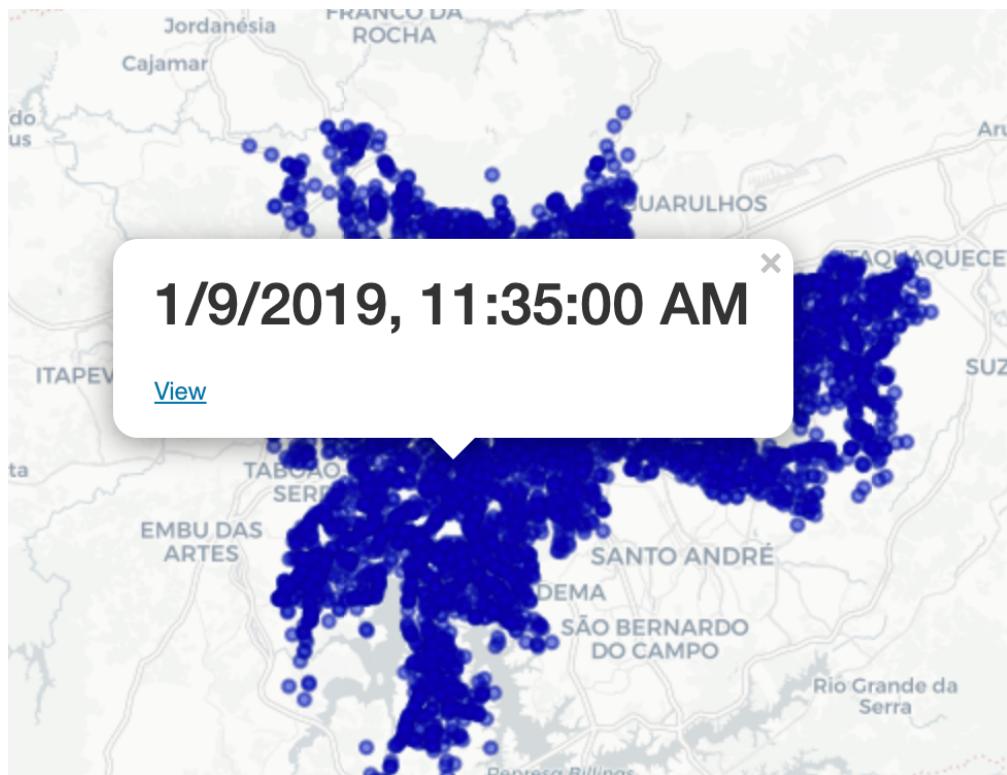


Figure 3: Incident details

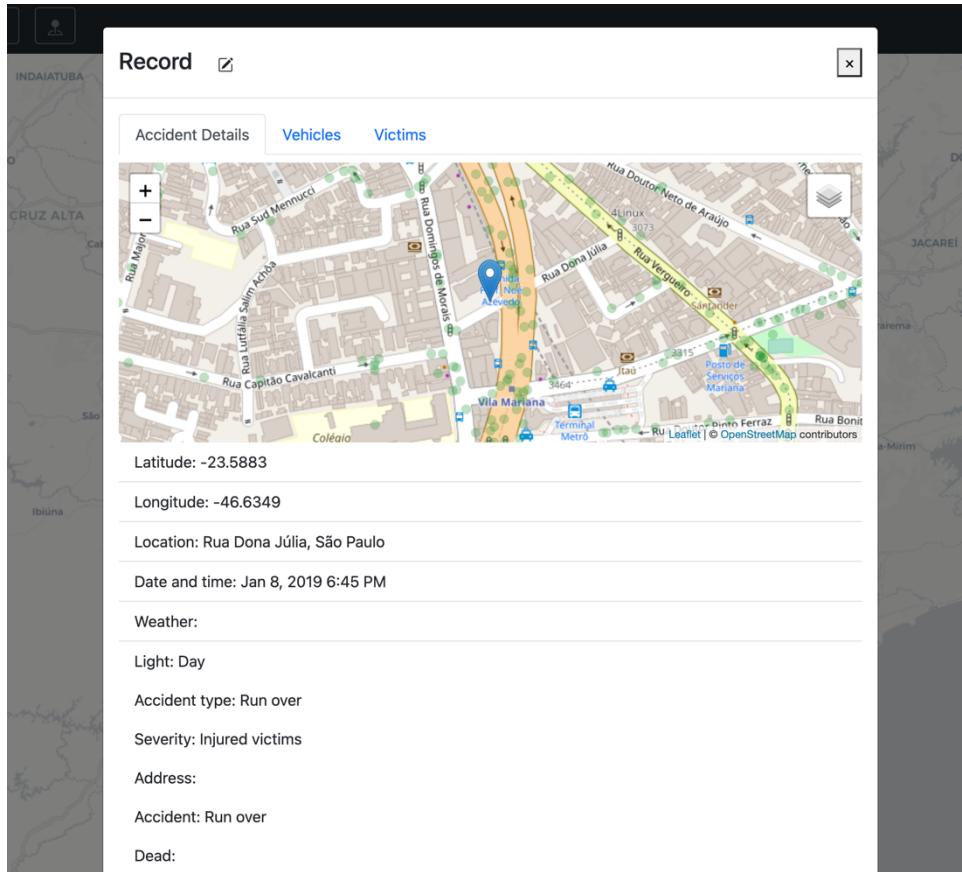


Figure 6: Incident details

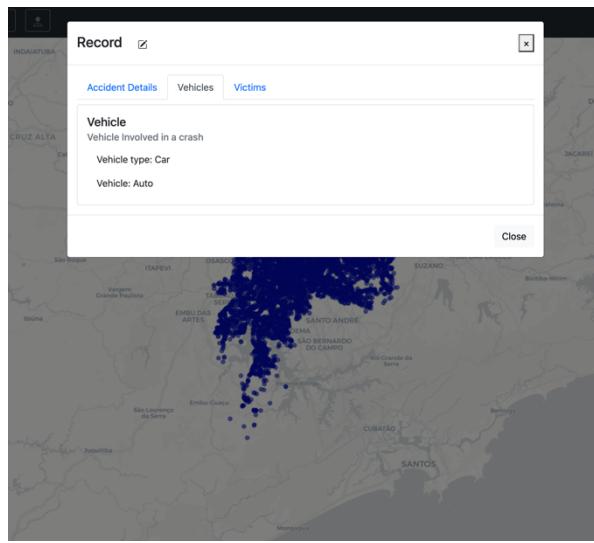


Figure 5: Incident details

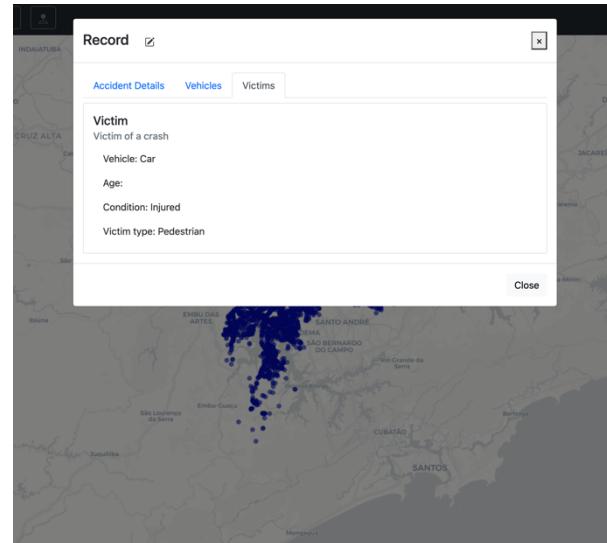


Figure 4: Incident details

Layers

Toward the top right of the map panel, there is a layer switcher tool. DRIVER 2.0 shows a default list of native layers (i.e. street and satellite layers) and includes additional geographic boundary layers as they are loaded into the application. The default base map is drawn from OpenStreetMap data. There are both point and heat map style layers to represent incidents.

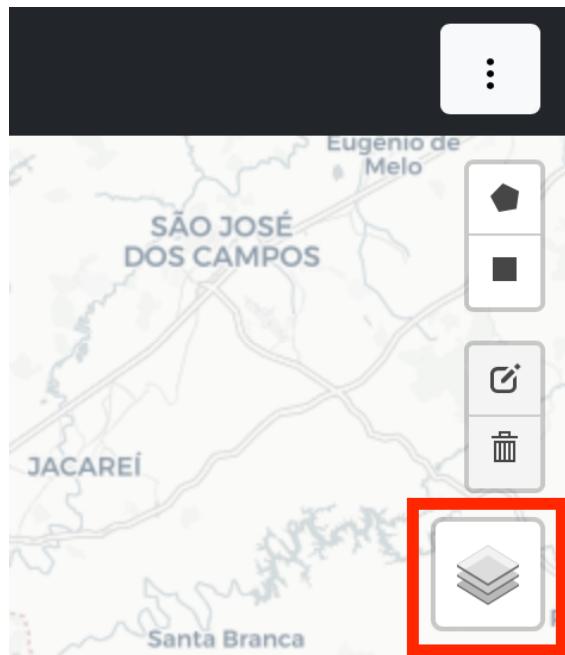


Figure 7: Layers

Incidents

To view the Incidents, the user has to select “Incidents” from the layer on the Map page. By default, when the page load incidents will be selected and will appear as blue dots on the Map.

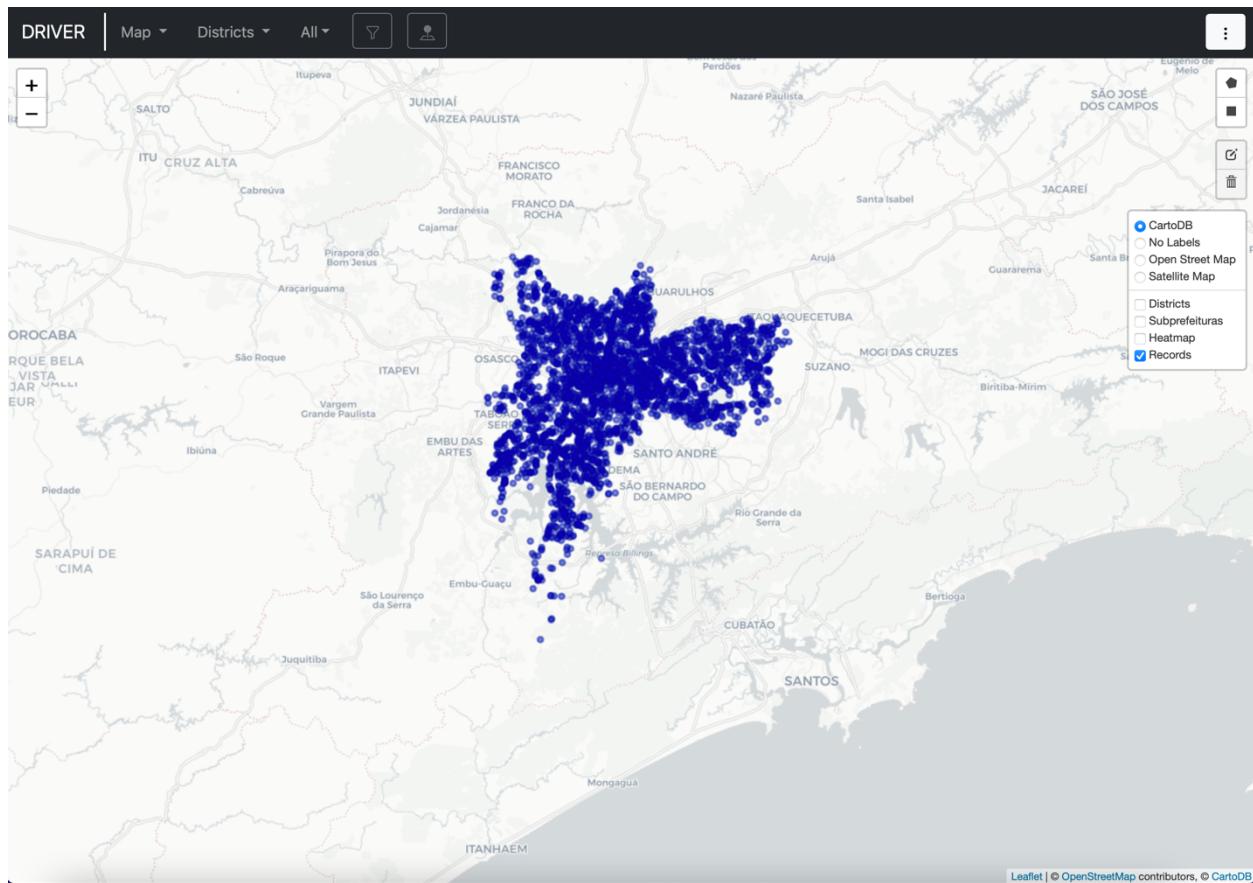


Figure 8: Incidents layer

Heatmap

Heatmap is a phenomenon used to show the intensity of crashes occurring at a particular spot. The higher the intensity of crashes, darker will be the color shown on the map. To see the heatmap, the user has to click on “Heatmap” from the layer.

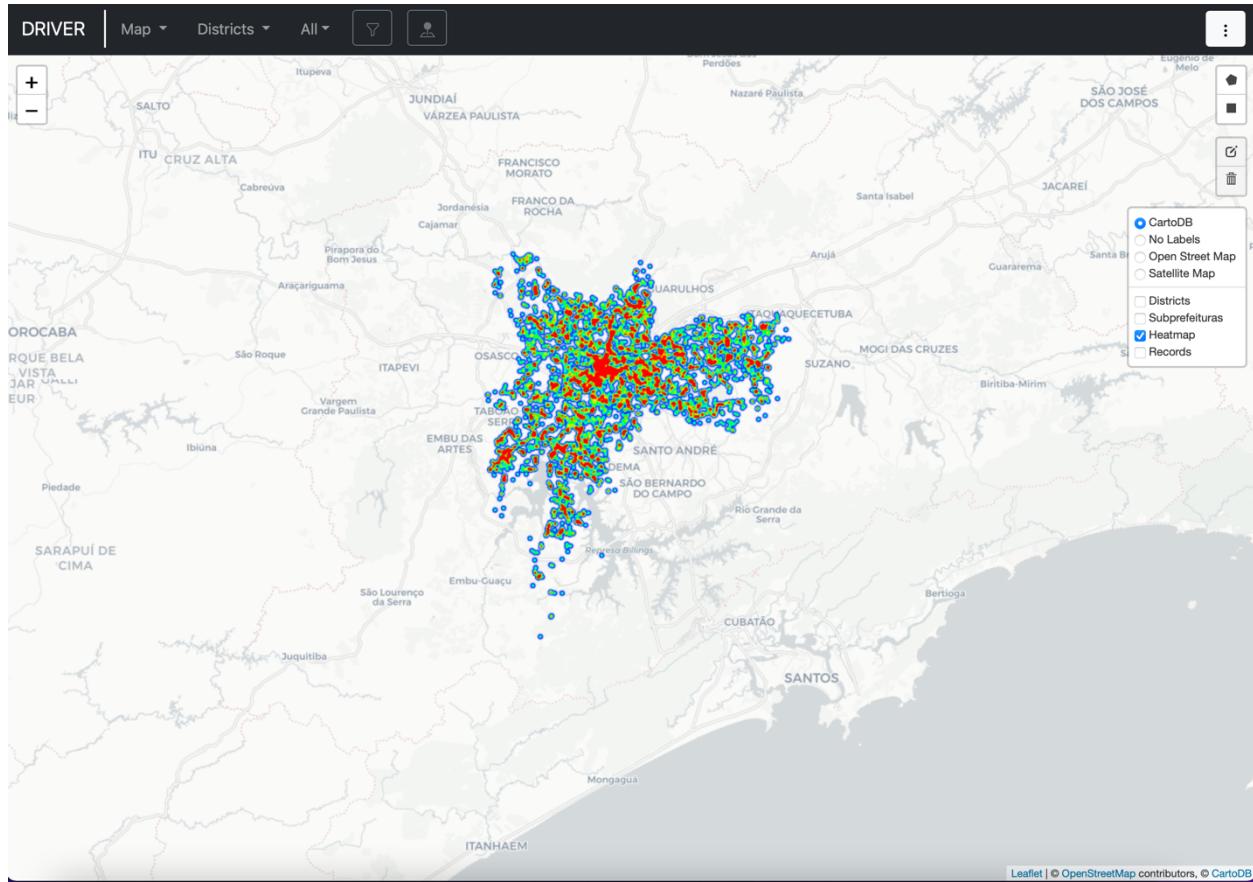


Figure 9: Heatmap layer

Administrative Boundaries

This can be seen as per the geography added by the Administrator in the Django Admin Interface.

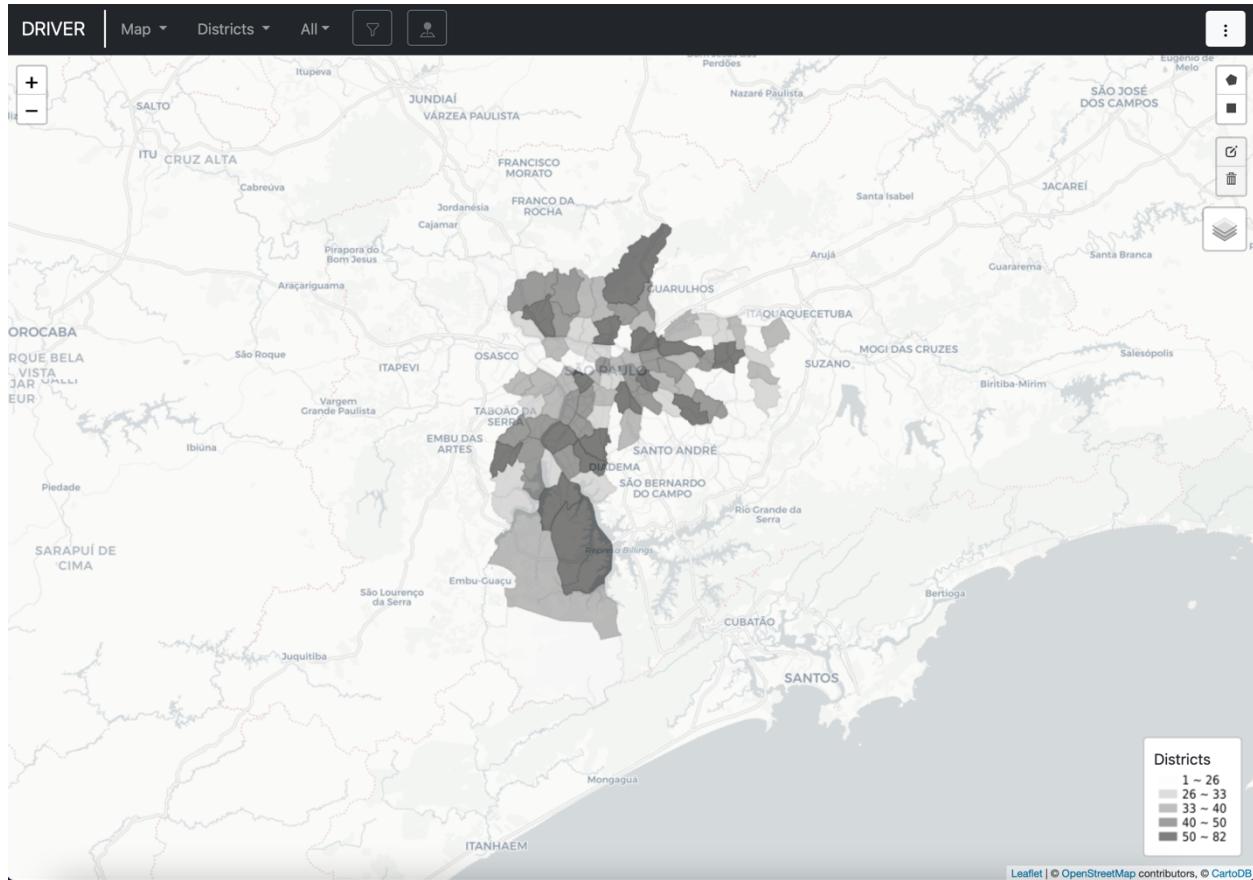


Figure 10: Administrative boundaries (Districts)

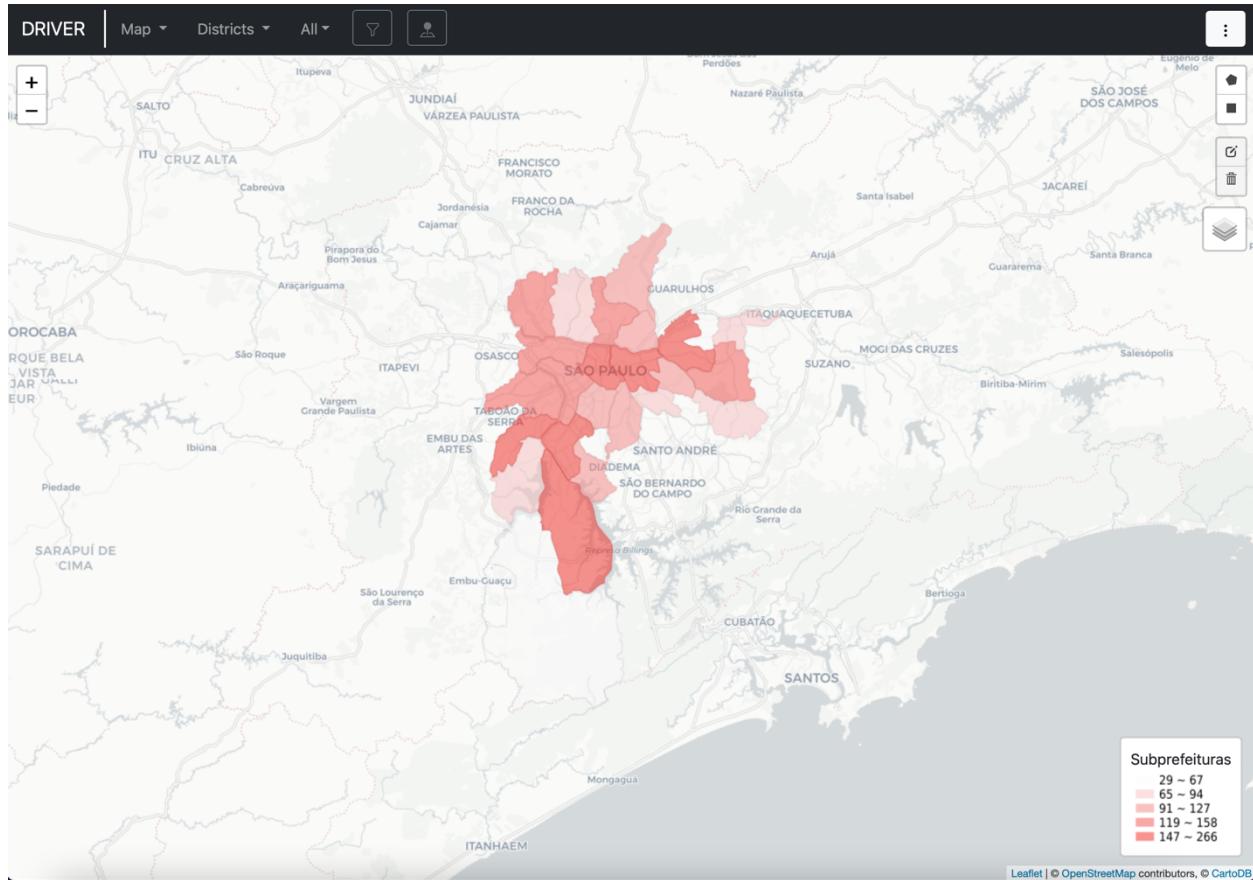


Figure 11: Administrative boundaries (Subprefectures)

Record List

The record list page is simply a tabular view of what data is shown in the map interface. The filter bar persists across both views, and its state is maintained when switching between the map and record views. As users update filters i.e. data filters (eg. Severity, Main cause, etc) and geographic filters (eg. City/Province or Regions), the records will update accordingly. From the record view, users can view more details about an incident, or edit the incident data by clicking on the blue link.

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DRIVER	List	Districts	All	Y	⋮
Date and time	Location				Severity
Jul 1, 2019, 10:00:00 AM					Injured victims
Jul 1, 2019, 8:45:00 AM					Fatal victims
Jul 1, 2019, 7:35:00 AM					Injured victims
Jul 1, 2019, 7:00:00 AM					Injured victims
Jul 1, 2019, 6:30:00 AM					Injured victims
Jul 1, 2019, 6:00:00 AM					Injured victims
Jul 1, 2019, 5:42:00 AM					Injured victims
Jul 1, 2019, 4:30:00 AM					Injured victims
Jul 1, 2019, 4:20:00 AM					Injured victims
Jul 1, 2019, 4:16:00 AM					Injured victims
Jul 1, 2019, 4:00:00 AM					Injured victims
Jul 1, 2019, 3:00:00 AM					Injured victims
Jul 1, 2019, 2:45:00 AM					Injured victims
Jul 1, 2019, 12:15:00 AM					Injured victims
Jul 1, 2019, 12:00:00 AM					Injured victims
Jun 30, 2019, 11:30:00 PM					Injured victims
Jun 30, 2019, 11:00:00 PM					Injured victims
Jun 30, 2019, 10:30:00 PM					Injured victims
Jun 30, 2019, 9:00:00 PM					Injured victims

Figure 12: Record list page

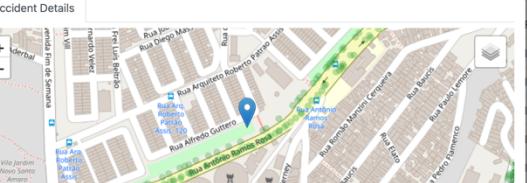
Driver	Districts	All
Date and time		
Jul 1, 2019, 10:00:00 AM		
Jul 1, 2019, 8:45:00 AM		
Jul 1, 2019, 7:35:00 AM		
Jul 1, 2019, 7:00:00 AM		
Jul 1, 2019, 6:30:00 AM		
Jul 1, 2019, 6:00:00 AM		
Jul 1, 2019, 5:42:00 AM		
Jul 1, 2019, 4:30:00 AM		
Jul 1, 2019, 4:20:00 AM		
Jul 1, 2019, 4:16:00 AM		
Jul 1, 2019, 4:00:00 AM		
Jul 1, 2019, 3:00:00 AM		
Jul 1, 2019, 2:45:00 AM		
Jul 1, 2019, 12:15:00 AM		
Jul 1, 2019, 12:00:00 AM		
Jun 30, 2019, 11:30:00 PM		
Jun 30, 2019, 11:00:00 PM		
Jun 30, 2019, 10:30:00 PM		
Jun 30, 2019, 9:00:00 PM		
Jun 30, 2019, 8:30:00 PM		
Record		
Accident Details		
		
Latitude:	23.6591	Severity
Longitude:	-46.7439	Injured victims
Location:	Rua Alfredo Guttero, São Paulo	Fatal victims
Date and time:	Jul 1, 2019 10:00 AM	Injured victims
Weather:		Injured victims
Light:	Night	Injured victims
Accident type:	Run over	Injured victims
Severity:	Injured victims	Injured victims
Address:		Injured victims
Accident:	Run over	Injured victims
Dead:		Injured victims

Figure 13: Record list page

Reports

Data on the map may be exported as a set of CSV files. DRIVER data is stored in a relational database that supports many-to-one relationships. This means that for a given incident, there may be many people and vehicles involved. The export CSV zip file contains a CSV for each type of related object, linked to the primary accident table via a unique ID. The CSV files also contain the latitude and longitude for the incident location. These files may be further analyzed using a Geographic Information Systems (GIS) platform, spreadsheet, or database software.

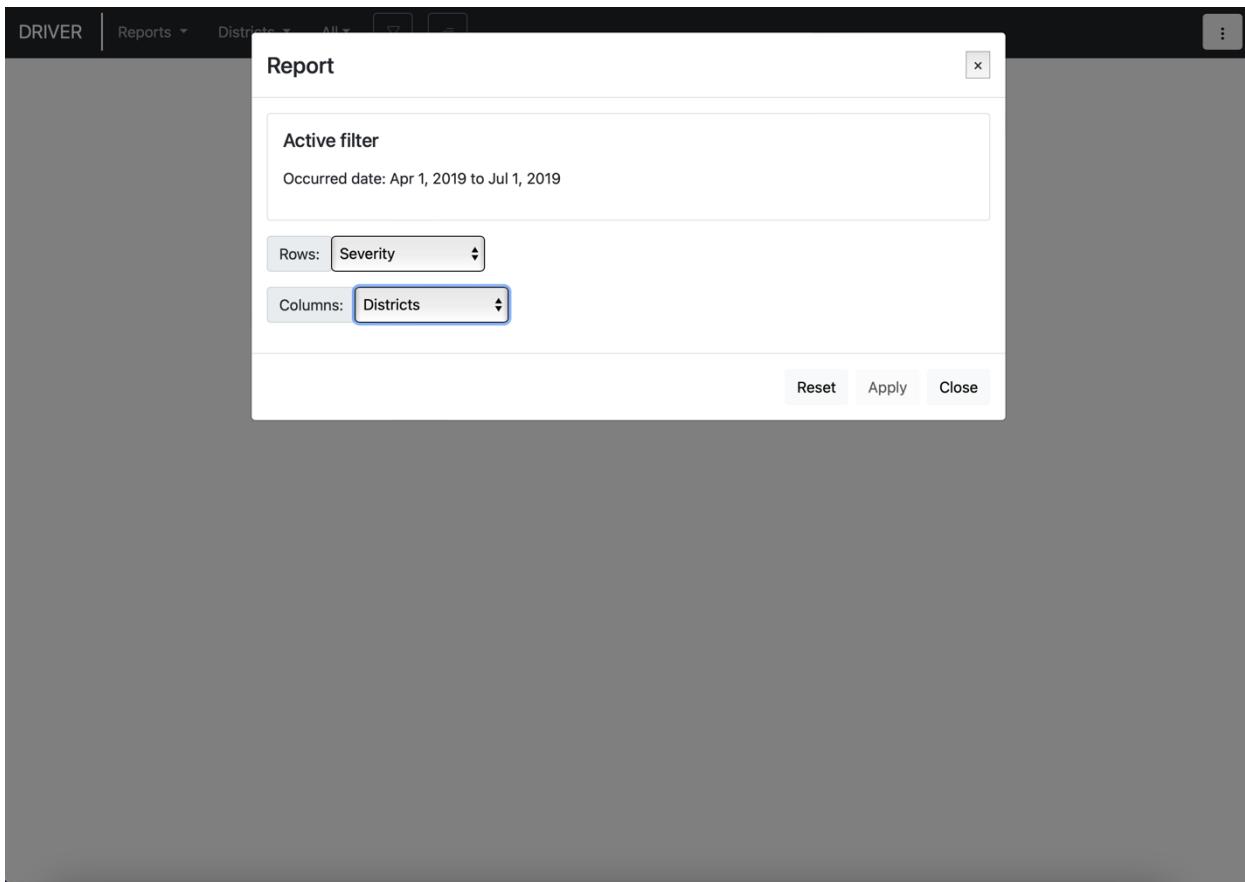


Figure 14: Reports Page

Along with the CSV, DRIVER also provides the option to view the details using a custom report. Custom Report allows the user to filter out and view the data. The filtering is done based on the options added in the Incident Input Form. The below image shows the popup to generate the custom report.

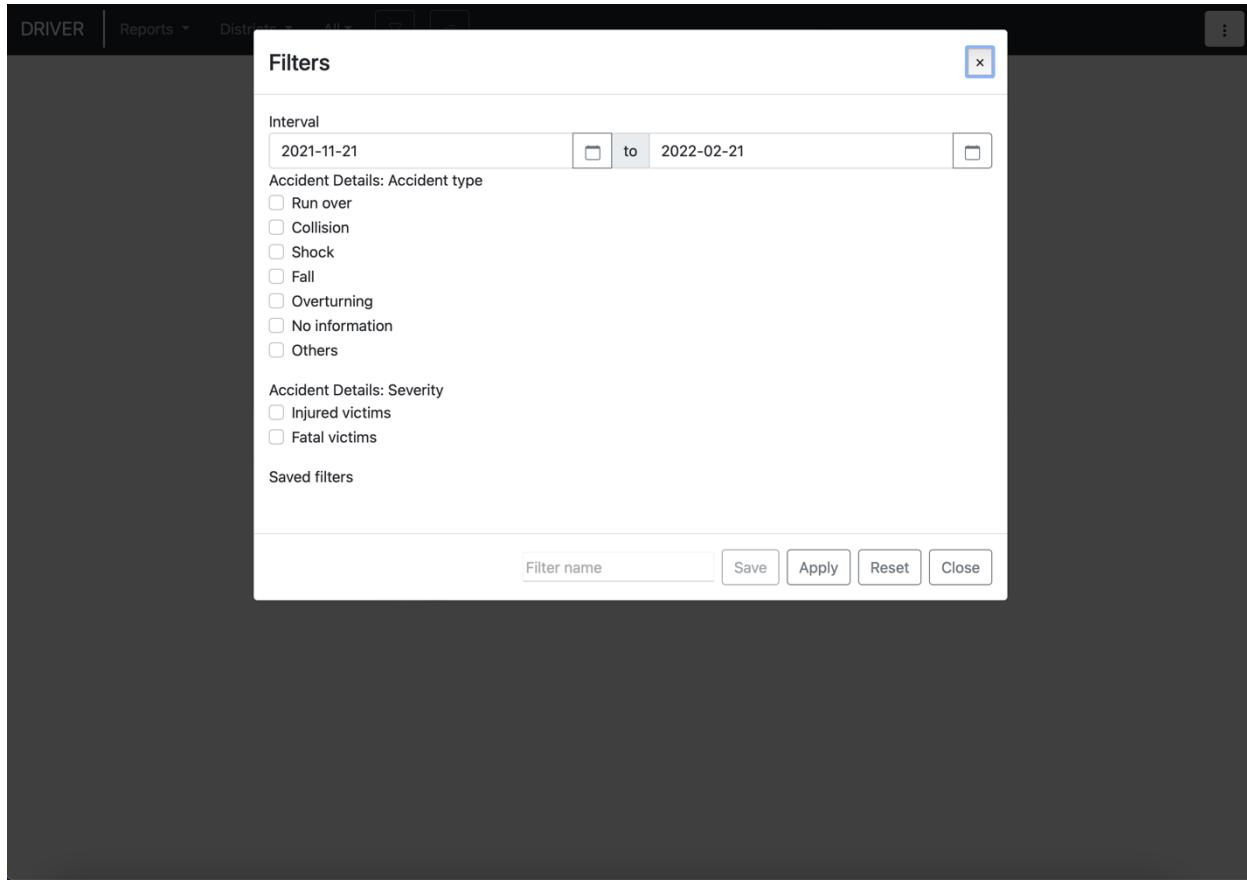


Figure 15: Custom report

Upon selecting the values in the filter, a custom report (based on the selected values) is generated in a new window.

Charts

Users may select the Graphs option in the dropdown menu. The data loaded into the graphs is controlled by the currently applied date range and filter set, including geographic filters.

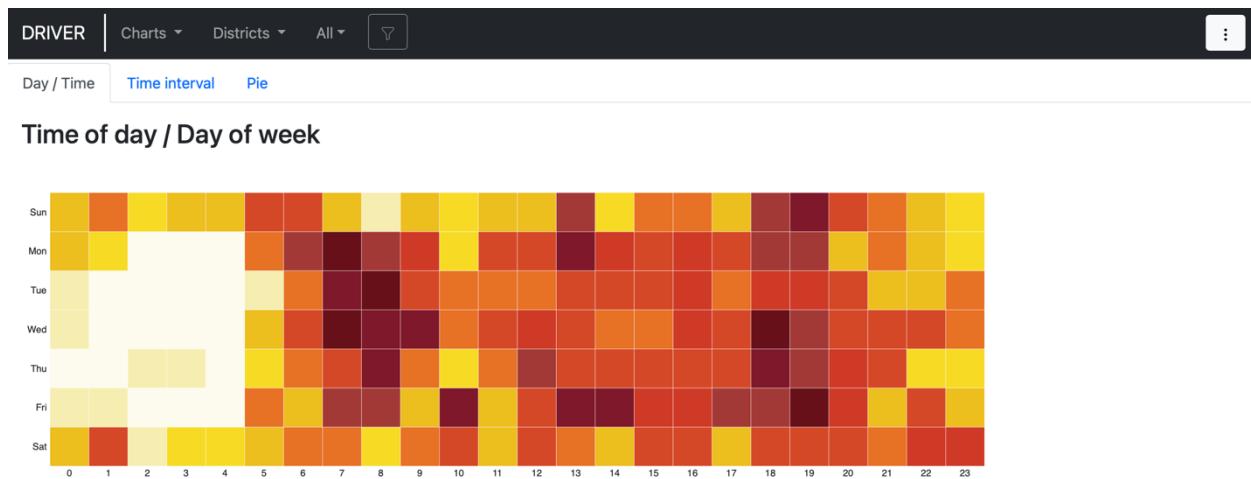


Figure 16: Charts page (Time of Day – Day of Week Chart)

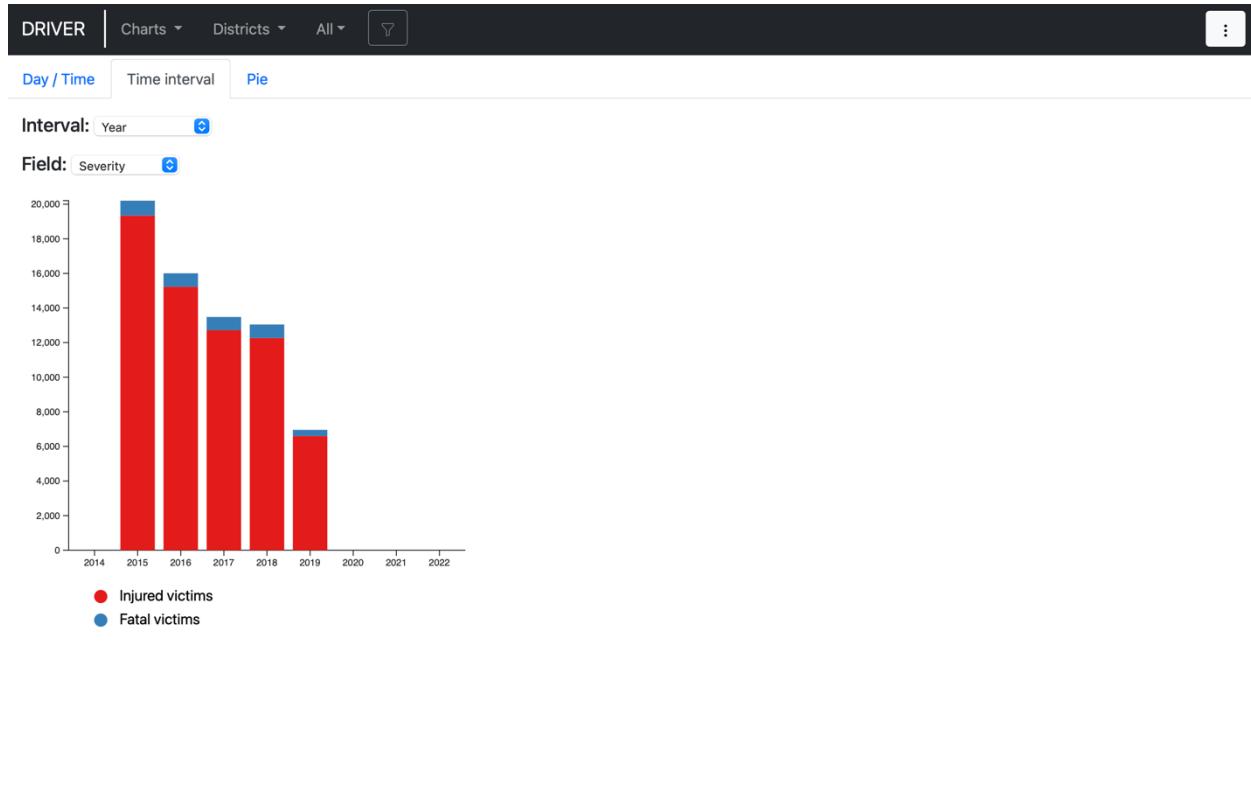


Figure 17: Charts page (Bar graph)

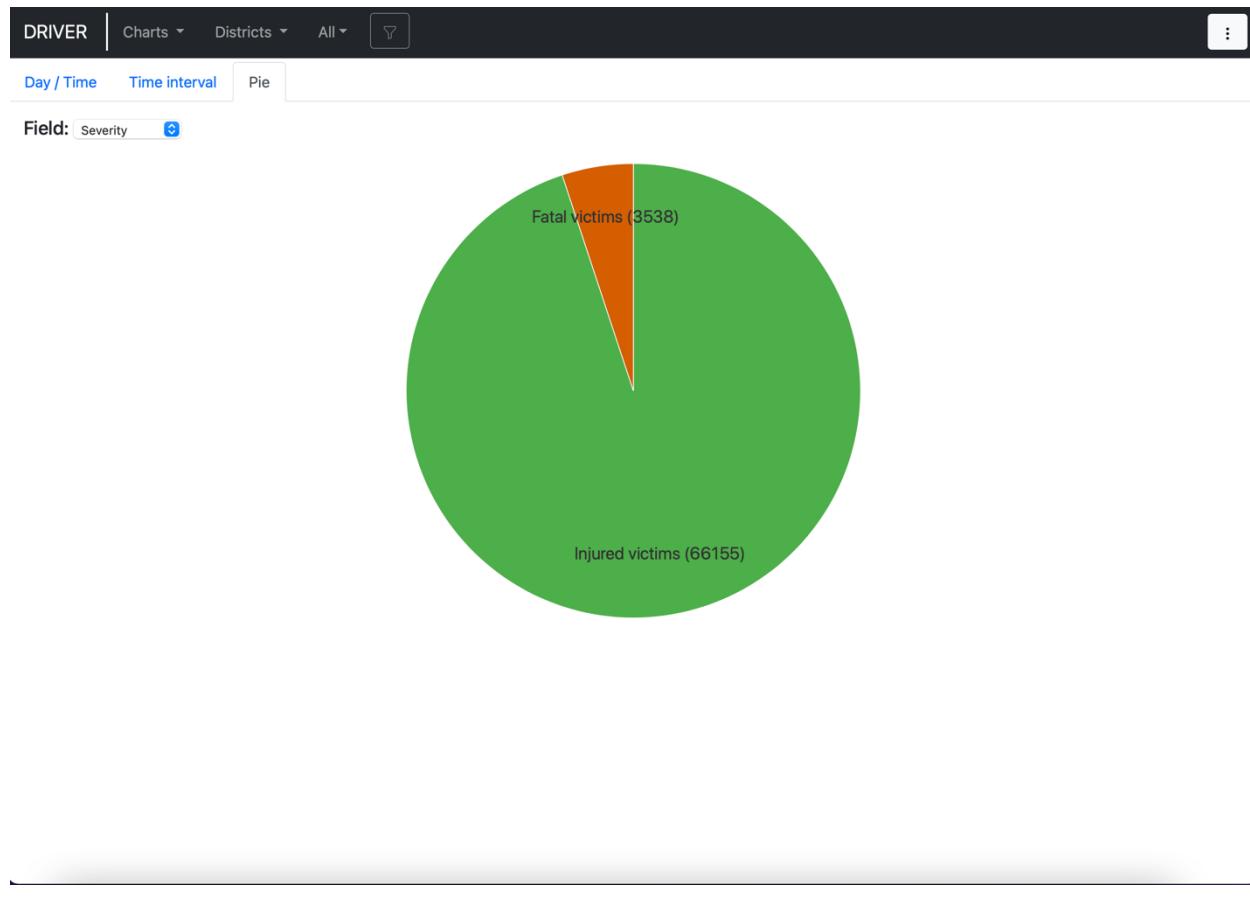


Figure 18: Charts page (Pie chart)

Filtering and Searching

DRIVER provides a variety of ways to interact with the map and list view by using filter and search tools to analyze subsets of the incident data.

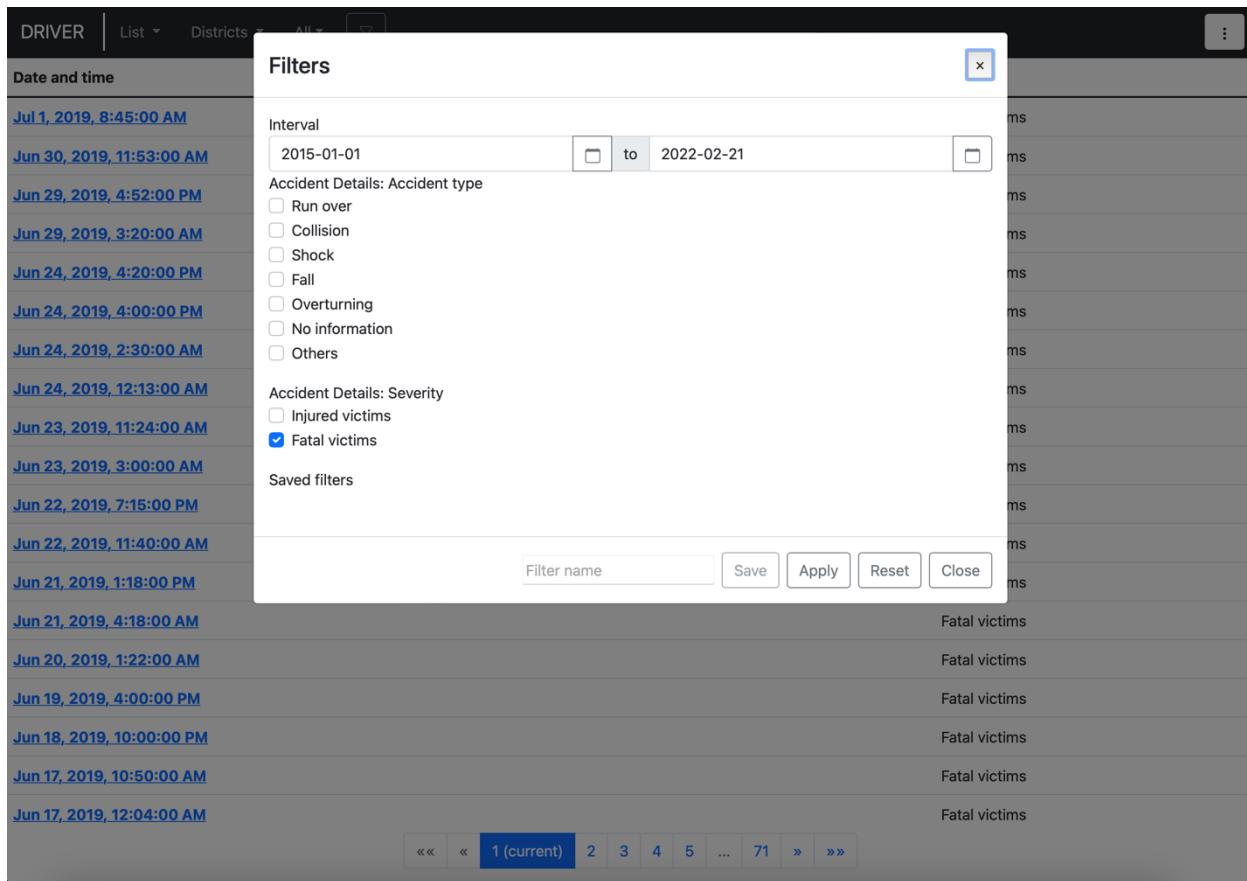


Figure 19: Filters

Attribute Filters

DRIVER syncs with the database designer schema to make filterable fields available to users. Fields marked as filterable/searchable are included in the filter bar. Along with the filters from the schema.

Date Time Filter

The date-time filter has a clickable interface to choose the minimum and maximum dates and time for display and analysis. The default range is the previous ninety days.

Option Filter

Enumeration fields (select lists, checkboxes) are included as attribute filter dropdown buttons. Selecting an option applies that filter to the data. Multiple options may be selected for any filter. Active filters are highlighted in light blue in the interface.

Numeric Filter

Fields containing numbers may be filtered using a minimum/maximum range in the numeric filter.

Spatial Filters

DRIVER employs two levels of spatial filtering. The first is a geographic boundary filter, which is chosen in the page header, and the second is a custom boundary drawn by the user.

Geographic Boundary Filter

When a geographic boundary is selected in the header, the map zooms to the extent of that boundary. Additionally, data is filtered to what is contained in that boundary. This filter is applied to the map, record, report and chart pages.

Custom Area Filter

Users may draw a custom boundary to filter down to incidents that occurred in that area. The boundary drawing tools are on the left side of the map, and include draw (rectangle or polygon), edit, and delete buttons. A tooltip provides instructions while interacting with the tools. To use this tool, the user just has to click on either rectangle or polygon and drag the cursor to draw the rectangle or click on the part of the map which needs to be covered under the polygon. This way, the custom area can be selected.

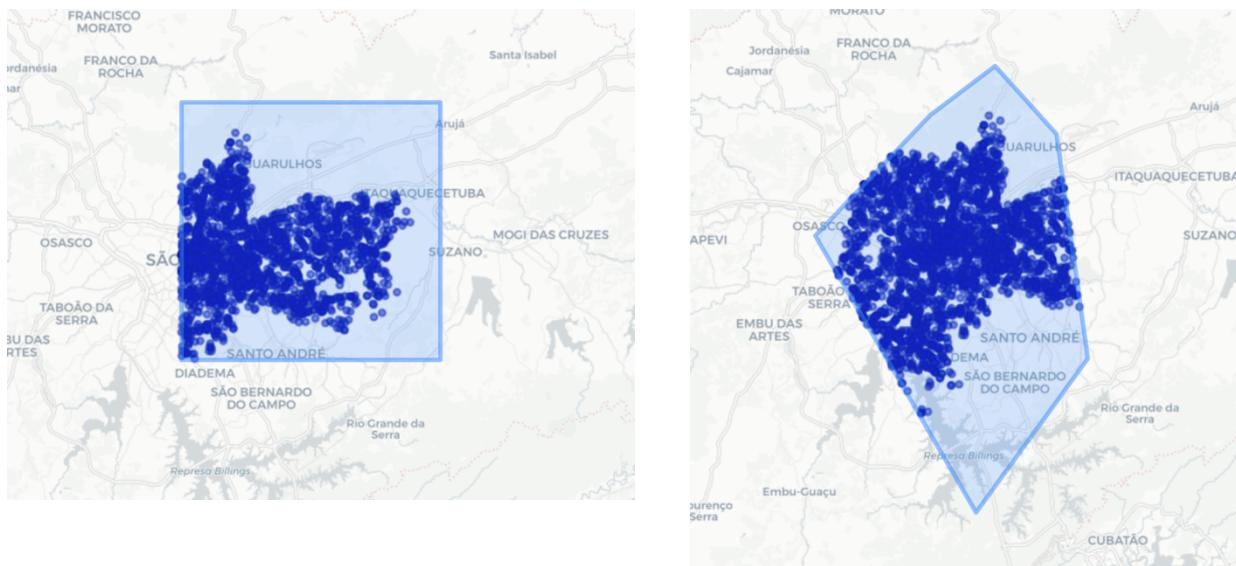


Figure 20: Custom Area Filter (Rectangle and Polygon Tools)

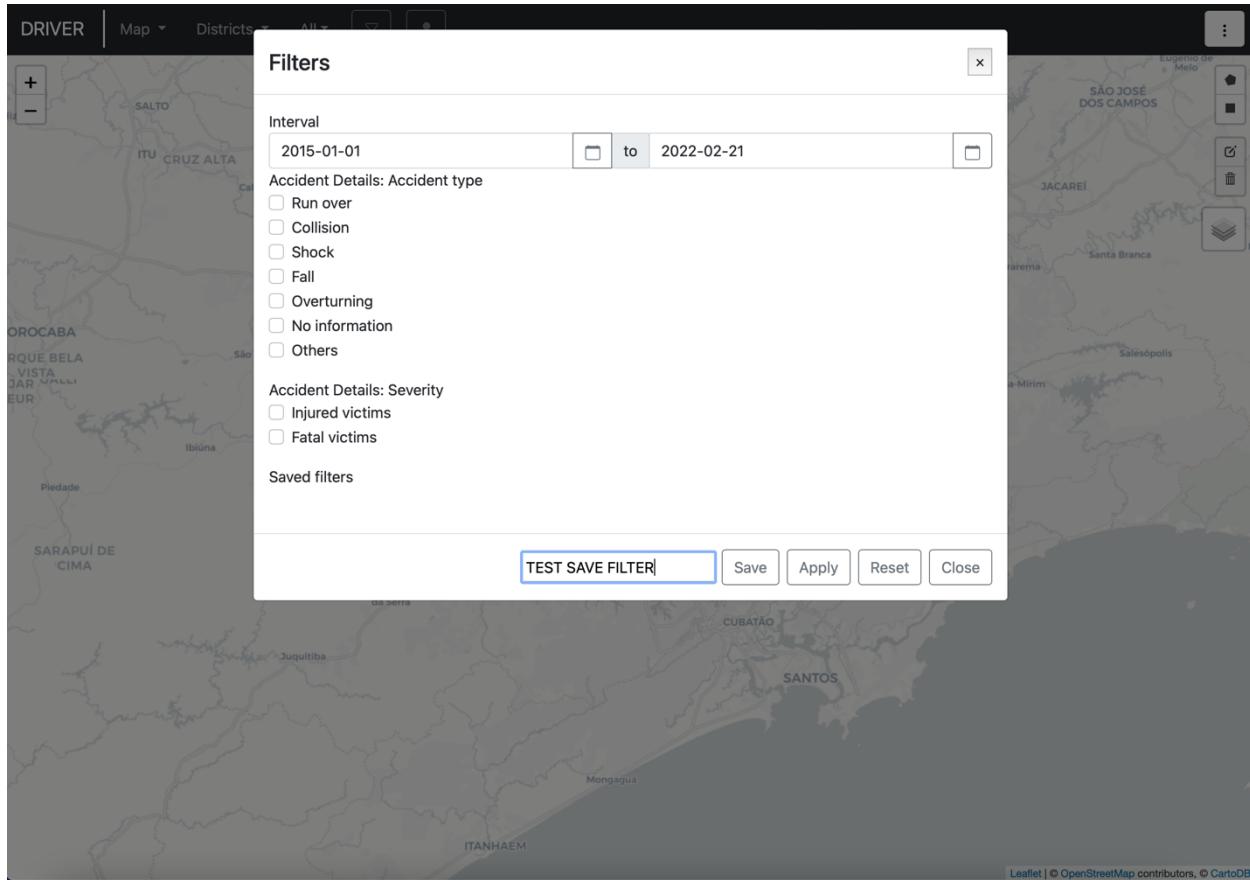


Figure 21: Saving filters

Saving Filters

Applied filter sets can be saved for later use. The saved filters interface allows users to save and name the currently applied filters and lists previously saved filters. This can be useful for defining a combination of filters used to create reports, exports, or other analysis tasks. Saved filters do not apply to geographic boundary selections or date ranges, but act on search, option, and spatial filters.

Clearing Filters

Filters may be reset to the default state by clicking the Reset button.

Data Entry

A fundamental aspect of DRIVER is to collect and store incident data, and the application provides a simple data entry interface, both on desktop and mobile (Android and iOS) devices.

Saving Original Records

Keeping in mind the concern and security of data, DRIVER creates two copies of a record as soon as any incident is logged into the system. One of these two copies viz. the original copy is stored and cannot be

changed by any user group accessing the DRIVER application. While the other copy can be any time changed by a user group having specific permission.

Incident Input Form

To add or edit incident data, a user must have analyst or admin privileges. Begin by toggling the ‘Create Record’ button on the top the Map page and then clicking on the map. A popup for the Incident Input Form will then be displayed.

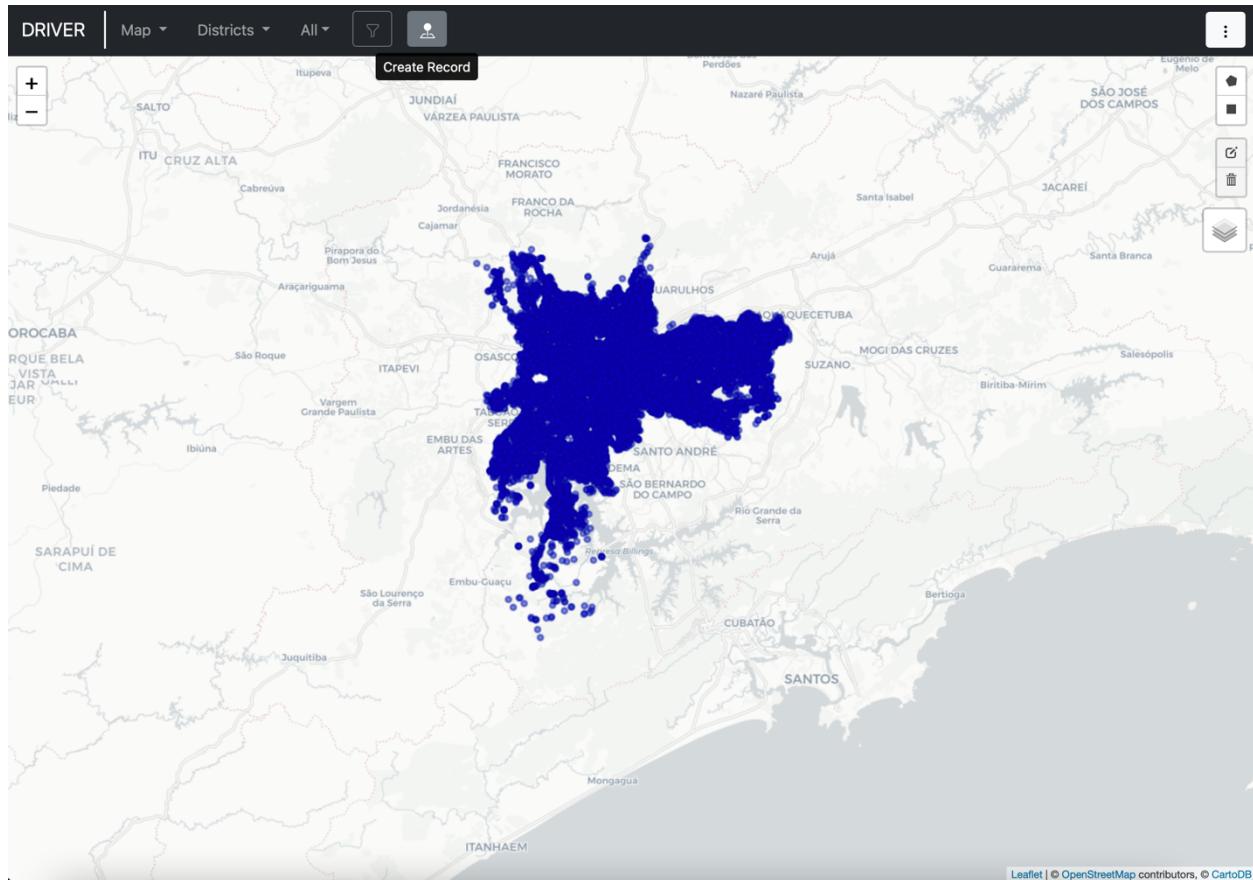


Figure 22: Create record

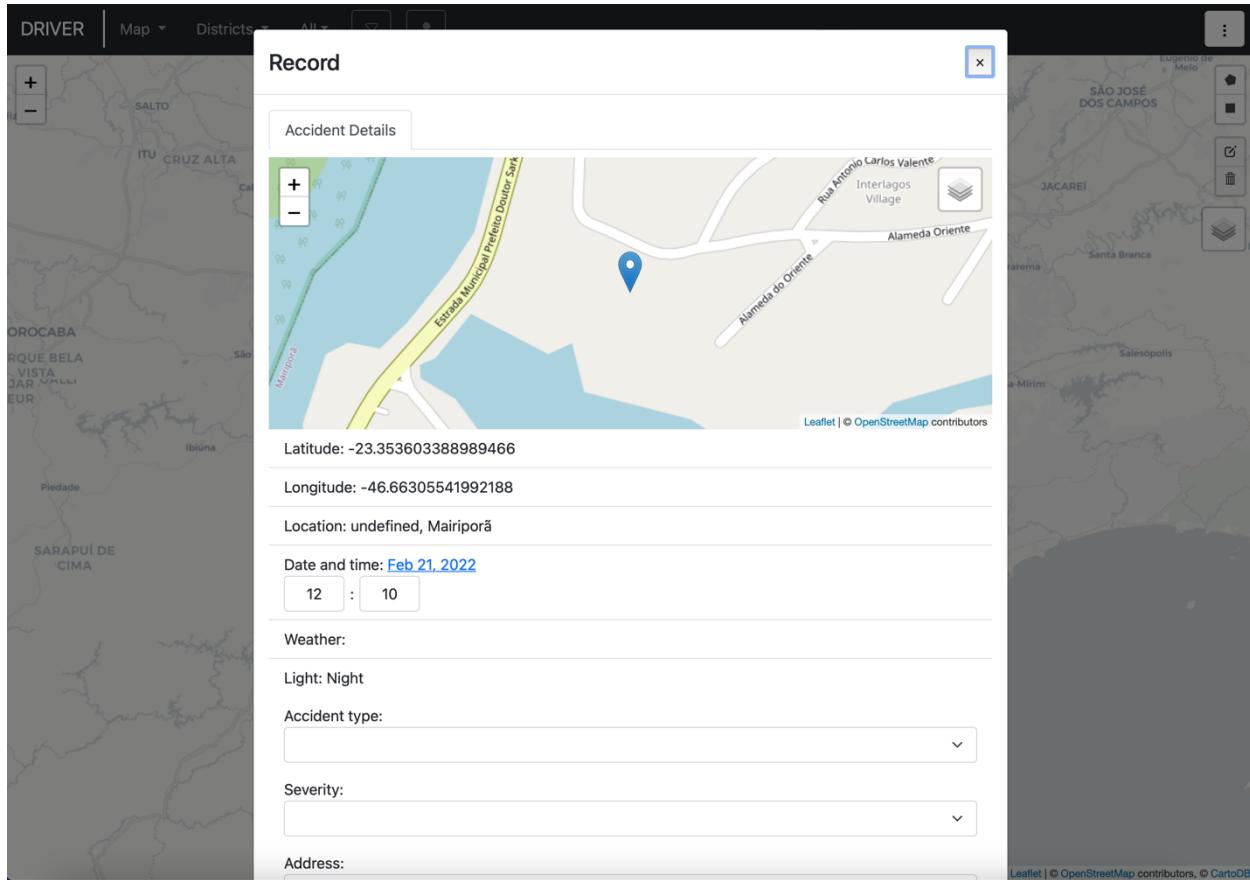


Figure 23: Incident input form 1

The location search at the top of the form autocompletes street addresses and place names from OpenStreetMap. Users may also select a location by clicking on the map. Alternatively, users may also manually input the Latitude, Longitude, and Location values in the Incident Input Form.

Required fields will be highlighted in red if they are not completed before saving the data. Once all the details are filled up, users can either choose to Save the data or delete the data.

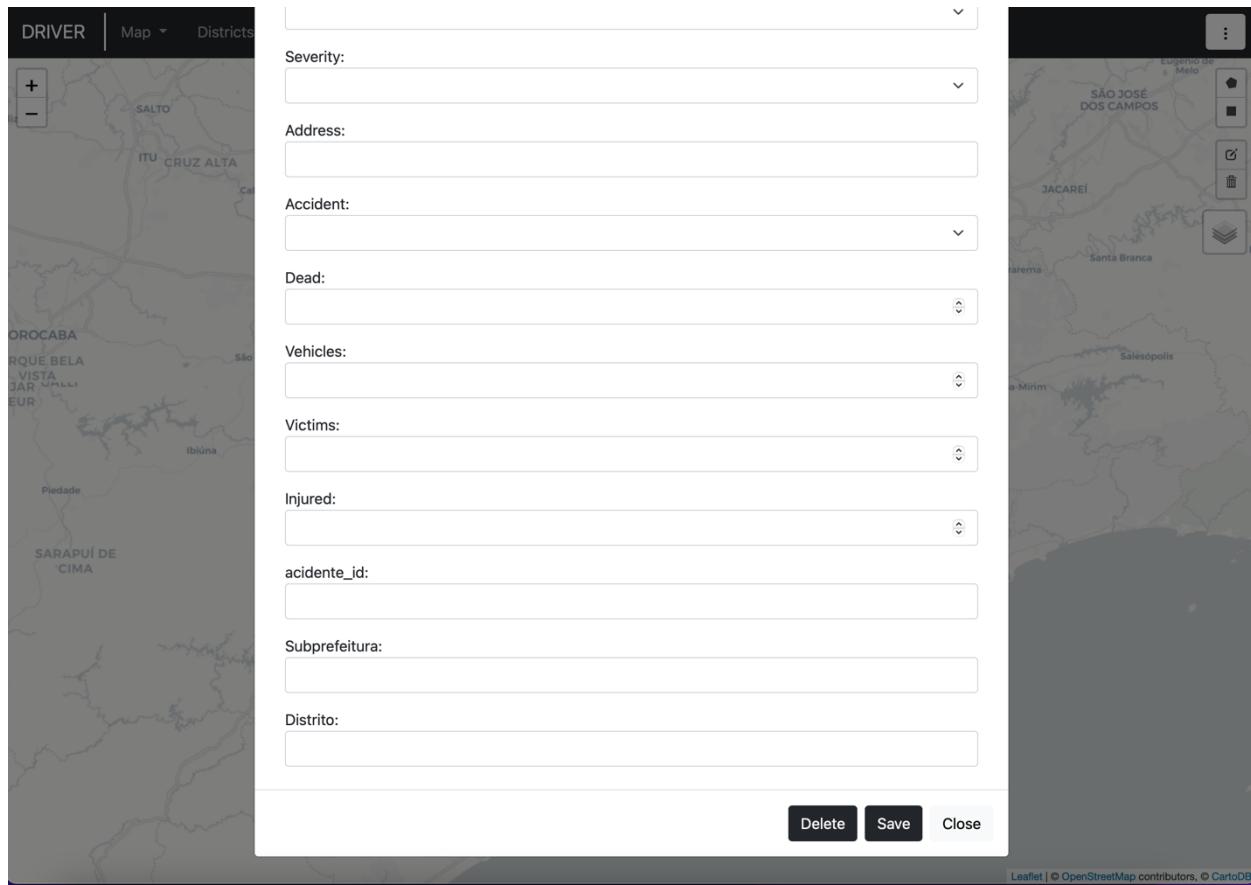


Figure 24: Incident input form 2

Duplicate Record Management

Occasionally, two users may input the same incident. DRIVER has a process that runs on record creation to identify potential duplicate incidents. The first step to prevent a duplicate entry is the record/incident input form itself. When incidents time, date and location matches with an already existing incident a popup window will be shown to the user. Below is the screenshot of the same.

Date and time	Location	Date and time	Location
Jan 7, 2015, 10:16:00 AM		Jan 6, 2015, 11:00:00 PM	
Jan 15, 2015, 8:45:00 PM		Jan 15, 2015, 8:30:00 PM	
Jan 17, 2015, 10:15:00 AM		Jan 17, 2015, 10:00:00 AM	
Jan 18, 2015, 4:10:00 AM		Jan 18, 2015, 4:00:00 AM	
Jan 19, 2015, 6:00:00 PM		Jan 19, 2015, 5:02:00 PM	
Jan 24, 2015, 4:15:00 AM		Jan 23, 2015, 5:30:00 PM	
Jan 24, 2015, 4:40:00 PM		Jan 24, 2015, 4:40:00 AM	
Jan 25, 2015, 5:06:00 PM		Jan 25, 2015, 11:00:00 PM	
Jan 26, 2015, 6:30:00 PM		Jan 26, 2015, 7:20:00 PM	
Jan 26, 2015, 10:08:00 PM		Jan 26, 2015, 6:30:00 PM	
Jan 26, 2015, 10:08:00 PM		Jan 26, 2015, 7:20:00 PM	
Jan 28, 2015, 9:00:00 PM		Jan 28, 2015, 9:30:00 PM	
Feb 2, 2015, 11:30:00 AM		Feb 2, 2015, 5:31:00 PM	
Feb 2, 2015, 6:40:00 PM		Feb 2, 2015, 6:00:00 PM	
Feb 3, 2015, 2:45:00 AM		Feb 3, 2015, 3:15:00 AM	
Feb 3, 2015, 12:30:00 PM		Feb 3, 2015, 7:00:00 AM	
Feb 6, 2015, 1:00:00 AM		Feb 6, 2015, 8:00:00 AM	
Feb 12, 2015, 4:15:00 PM		Feb 12, 2015, 3:40:00 PM	
Feb 14, 2015, 4:50:00 AM		Feb 13, 2015, 11:50:00 PM	

Figure 25: Duplicate records management page

In this page, the users can see the details of the already added incidents by clicking the record date and time. After choosing to resolve a potential duplicate, the users are presented with data from each record and may choose "Use this Record" or "Keep both unique records".

Mobile Application

The mobile application is built for data collection in the field. This application allows the user to login using the already registered credentials i.e. username or password or through the Google account. The mobile application is available for Android devices

This application does not require a constant data connection to work and will sync with the central application database when a connection is acquired either on a cellular network or on Wi-Fi.

Downloading the Installer

The installer can be downloaded from the DRIVER web site by selecting the *Android app* dropdown menu. The downloaded installer is in the form of an *apk* file which can then be installed in Android smartphones. When running for the first time, the app will ask for the user's permission to access different features of the smartphone such as the camera, location, and photos/gallery. After this, a QR code scanner will then be displayed. When this happens, the user must scan the QR code located at the DRIVER website (*Android code*). Doing this will automatically initialize the mobile application's default settings.

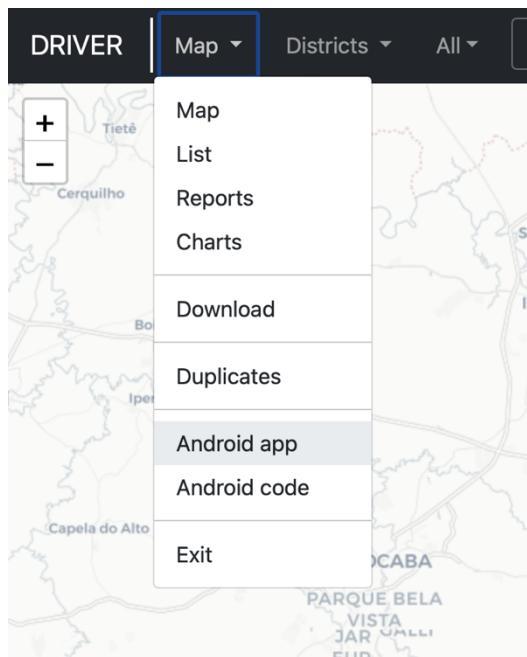
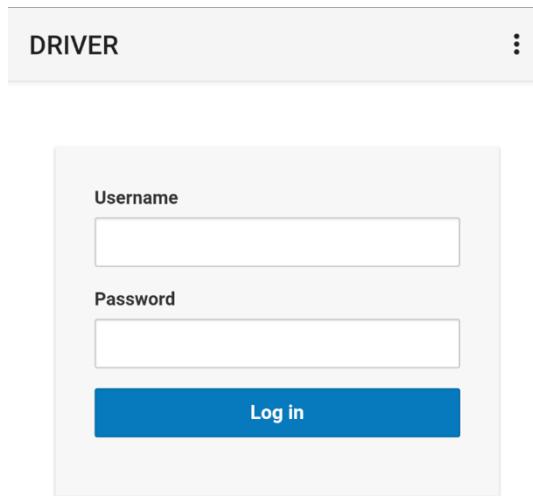


Figure 26: Download link for DRIVER Android app

Login

Upon opening the DRIVER mobile application, the login page will be displayed. The user is then required to enter their username and password before pressing the *Log In* button.

Figure 27: Mobile app login page



Record List

The Record List page is the default page displayed after the user logs into the mobile application. This is where all crash records that have been encoded in the app are shown. From this page, the user can add a new record using the *Add* button or check the menu for the different functionalities of the app.



Figure 28: Record List page

Menu

Pressing the three dots on the top right part of the page will display the menu for the different functionalities of the application:

1. Upload – upload all current contents of the Record List page into the main DRIVER database.
2. Cleanup – clear the Record List page after uploading the records.
3. Settings – view the DRIVER instance in which the backend and frontend settings of the mobile application are connected to
4. QR Code – scan a QR code to select a different DRIVER instance to connect to
5. Logout – Log out of the application and go back to the Login page

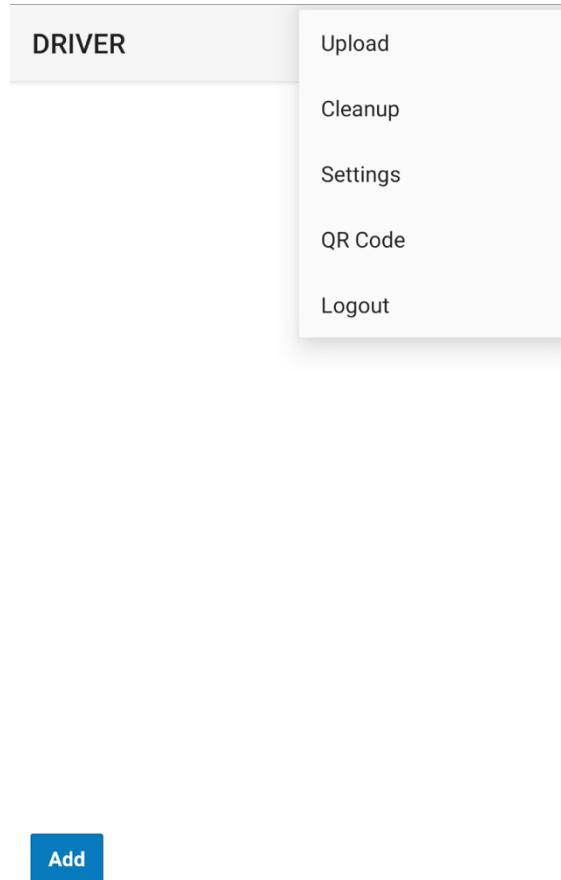


Figure 29: Menu

Creating a New Record

Just like the web interface, the mobile app also allows the user to create and save crash records directly from the smartphone. Clicking the *Add* button will display the Incident Input Form. Press the *locate* button to set the latitude and longitude coordinates of the crash record. Choose the date and time of the crash then select enter the values for the accident details input that follow. Enter the Vehicle and People involved details as shown below. After making sure that all inputs have been filled up, press the *Ok* button to save the crash record. After saving, the newly created crash record will be displayed in the Record List page and is now ready for upload.

DRIVER	⋮
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Edit record

latitude

longitude

locate

Choose a date

3/31/2022



Choose the time

4:06 PM

Accident Details

Accident type

OK

Cancel

DRIVER	⋮
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Vehicles



Vehicle type

Vehicle

Victims



Vehicle

Condition

Victim type