



LIGHTBOT

An Adaptive Traffic Light Control Solution

USER MANUAL



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1 INTRODUCTION

Everyone is familiar with traffic, as well as the frustrations, fits of rage and inconvenience that accompany it. As the world's population exponentially grows, it seems that traffic is not only here to stay, but unlike a fine wine, it is going to get worse with time. LightBot aims to minimize traffic with the use of 21st century technologies, namely, a Reinforcement Learning algorithm which dynamically changes the traffic lights to maximise traffic flow.

This manual provides the user with everything they need to use the LightBot system effectively. Please read this manual carefully.

2 SYSTEM OVERVIEW

LightBot provides simulations to demonstrate the effectiveness in the case of the implementation of a Reinforcement Learning algorithm for the traffic lights of an intersection.

The system currently provides a simulation of current time based traffic controllers to show their effectiveness in regulating traffic flow at different times of the day. The simulations are run on a remote server. LightBot uses a web based application to interface with all of the functionality that it provides.

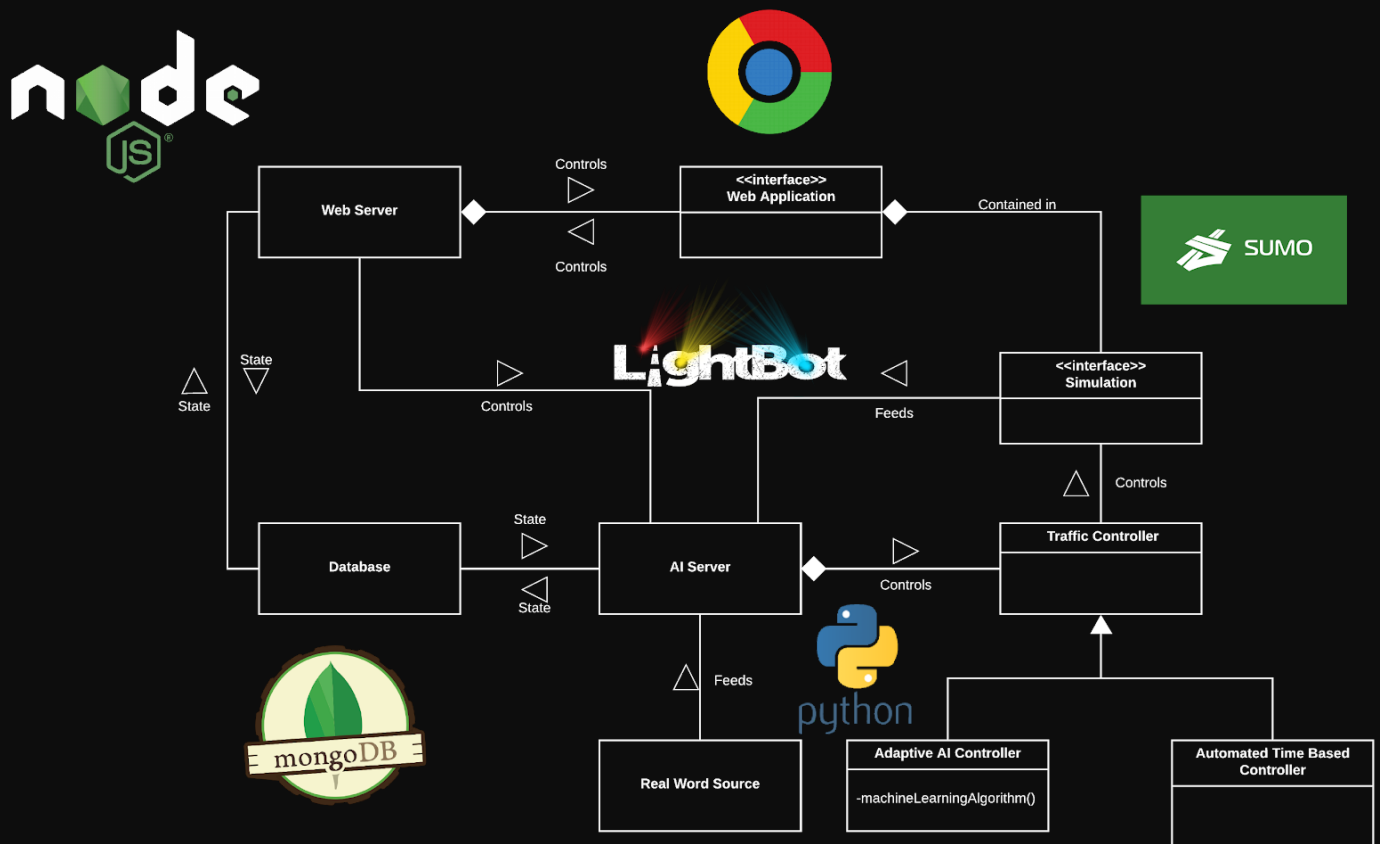


Figure 1: Domain Model of LightBot

3 INSTALLATION

The interaction with LightBot is completely web based, therefore the user does not need to install any software other than a modern web browser. Most modern browsers should be able to run LightBot. However using Firefox, Chrome or Safari is recommended. Please do not use Internet Explorer.

If the reader happens to be an individual who seeks to install the core of LightBot (i.e. run the web server from their system), we instead refer you to the LightBot Technical Installation Manual.



4 TROUBLESHOOTING

All errors will be handled by Team Gradient. If you encounter an error, please email us at teamgradient301@gmail.com. On the rare occasion that LightBot is experiencing technical difficulties, we will inform users through our forum.

5 GETTING STARTED

5.1 The Login Page

When accessing the LightBot Web App in your browser (<https://lightbot.co.za>), you will be greeted by a login page. (Fig. 2)

- Existing users have two options on this page:
 1. They can login by filling in the email and password field and clicking the "Login" button. They will then be taken to the System Overview page. For more information of the System Overview page, see Section 5.6.
 2. They can reset their password using the "Forgot password?" link. For more information on the Password recovery page, see section 5.2.
- New Users must use the "Create Account" link. For more information of the Sign Up page, see section 5.3.

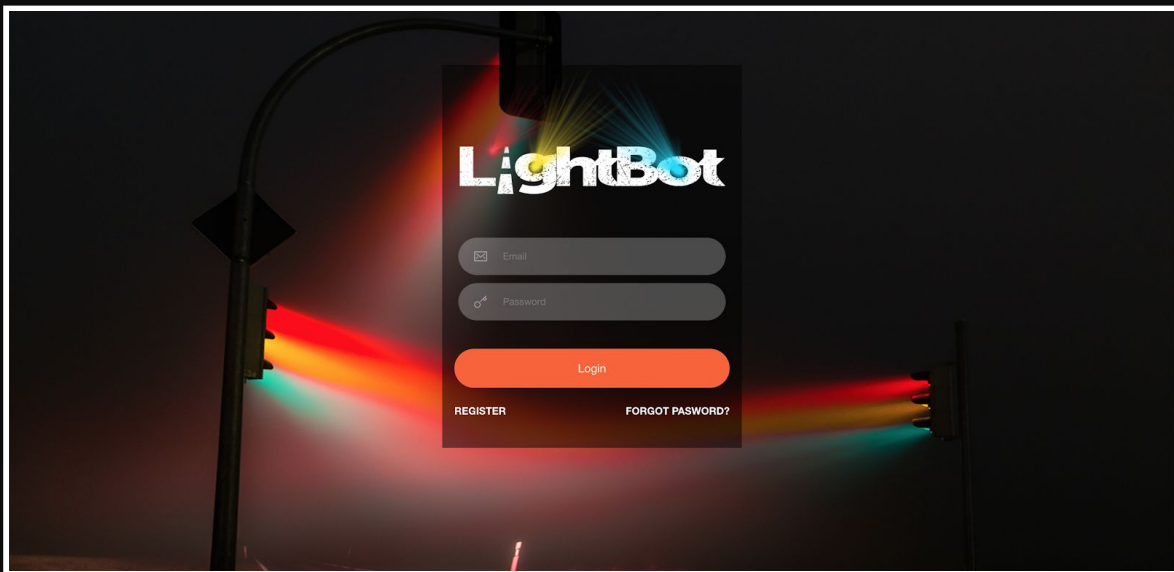


Figure 2: Login screen

5.2 Password recovery page

Figure 3 below shows the password recovery page.. It provides users with 2 options:

- Enter your email address in the “Email” field and click the “Submit” button. LightBot will send you an email containing password recovery instructions. Please note this feature is only available to registered users.
- The user can also use the “Back to Login” link if they do not wish to recover their password. For more information of the Sign Up page, see Section 5.3.

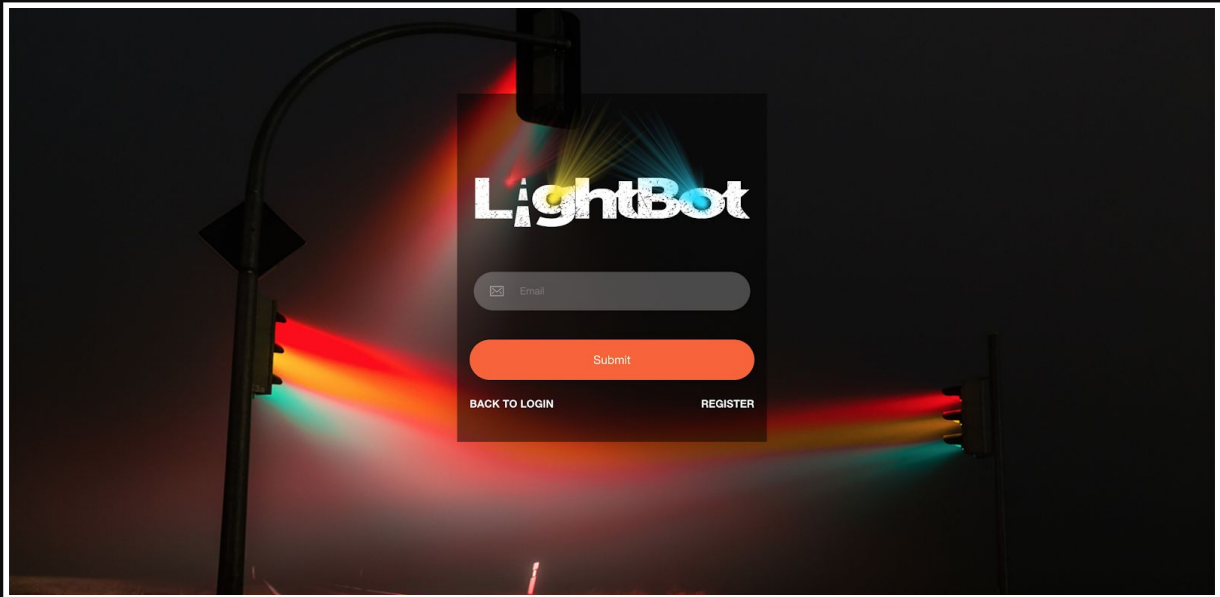


Figure 3: Password recovery page

5.3 Sign Up Page

The sign up page, as shown in figure 4 below, allows new users to create an account so that they can make use of the LightBot system.

- Users have to fill in all 5 of the required fields, and then click the “Sign Up” button. They will then be taken to the Overview page, see Section 5.6 for more information
- Users also have the option to go back to the login page using the “Back To Login” link.



Figure 4: Sign Up Page

5.5 The Sidebar

The sidebar facilitates navigation on all pages that the user has access to once they have logged in. (See figure 5)

The Sidebar allows the user to access 6 different pages on LightBot:

- "Overview" page: See section 5.6 for more information.
- "Profile" page: See section 5.7 for more information
- "Users" Page: See section 5.8 for more information
- "Notification Forum" page: See section 5.9 for more information.
- "Scenario Runner" page: See section 5.10 for more information
- "Visualizer" page: See section 5.11 for more information.
- A "Logout" button for the user to log out of their account.

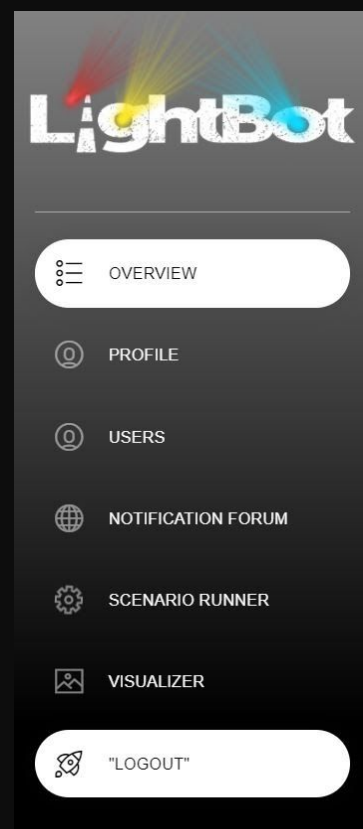


Figure 5: The Sidebar

5.6 The Overview Page

The Overview page (see figure 6 below) is the default page users are directed to once they successfully log in. On this page the users may use the Sidebar to navigate between different pages and views. The overview page will display statistics of the traffic simulation, as well as some of the most recent posts on the forum.

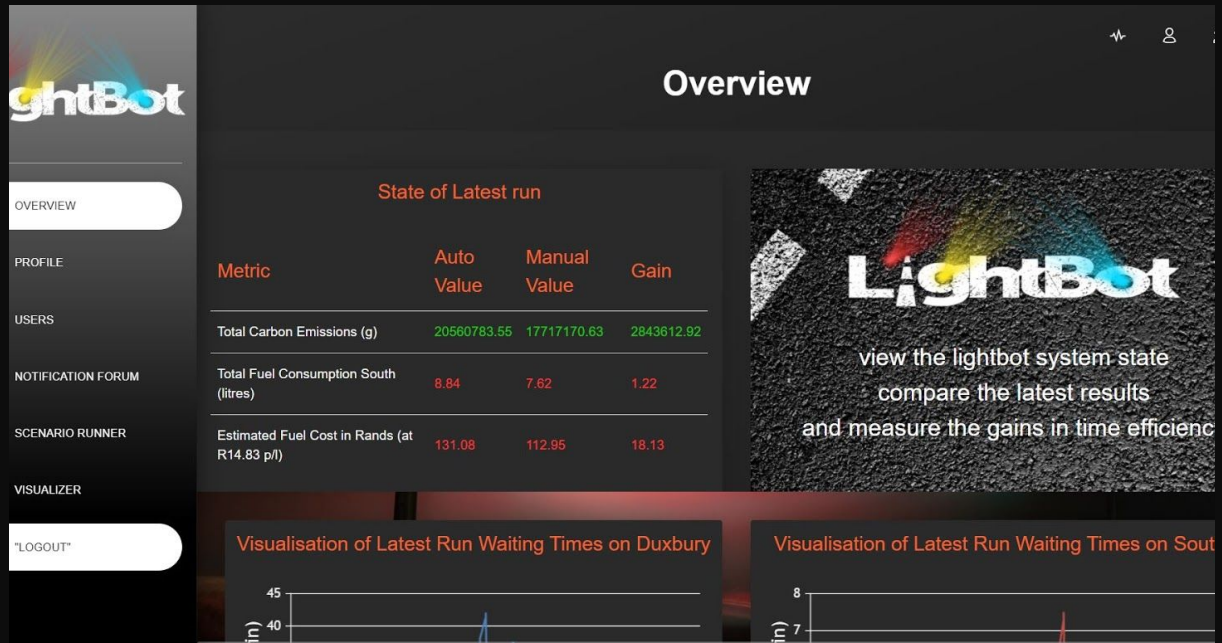


Figure 6: Overview page

5.7 The Profile Page

The Profile page, as shown in figure 7 below, will allow the user to view their details. They are able to edit certain details such as their First Name, Last Name and Email Address.

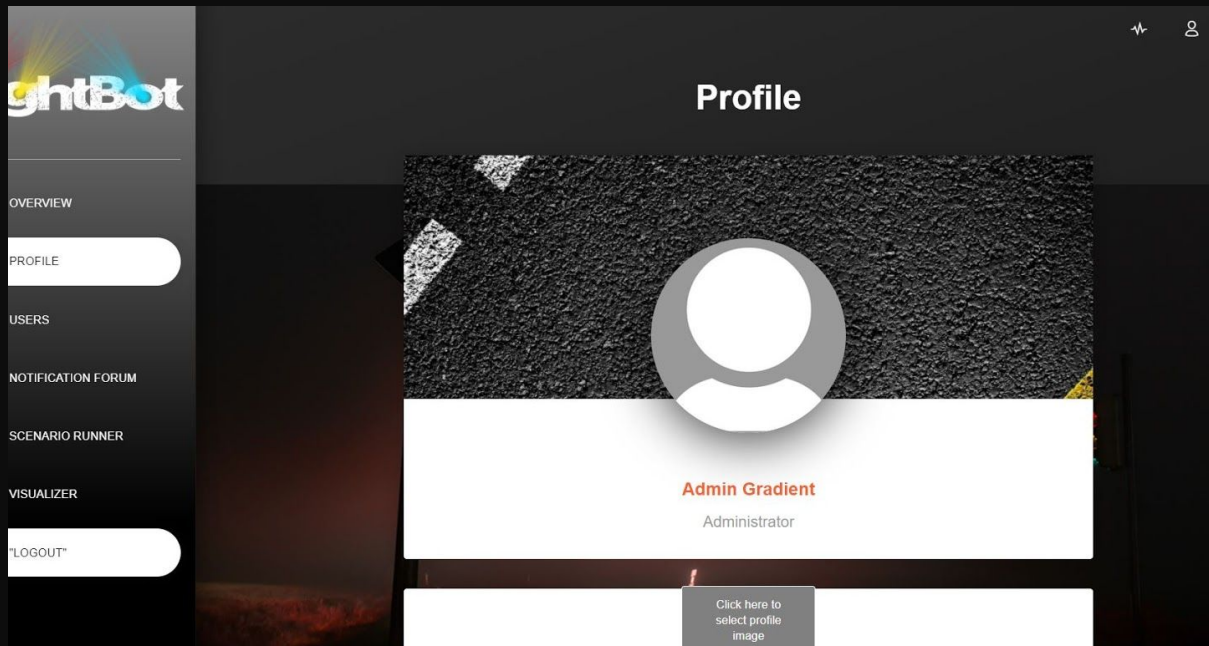


Figure 7: Profile page

5.8 The Users Page

The Users page displays a list of all the users of the system (Fig 8). Admins are allowed to assign roles to other users in this page.

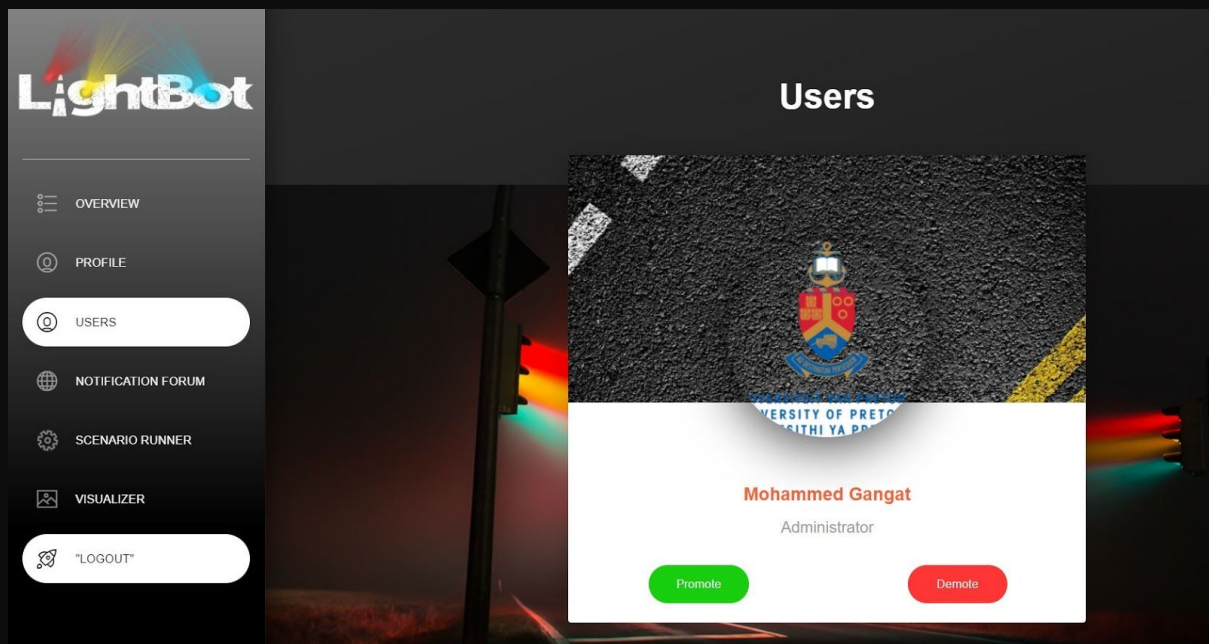


Figure 8: Users page

5.9 The Notification Forum Page

The Notification Forum page, see figure 8 below, will allow users and developers of LightBot to communicate with each other. Bug reports and bug fixes will also be communicated on this page.

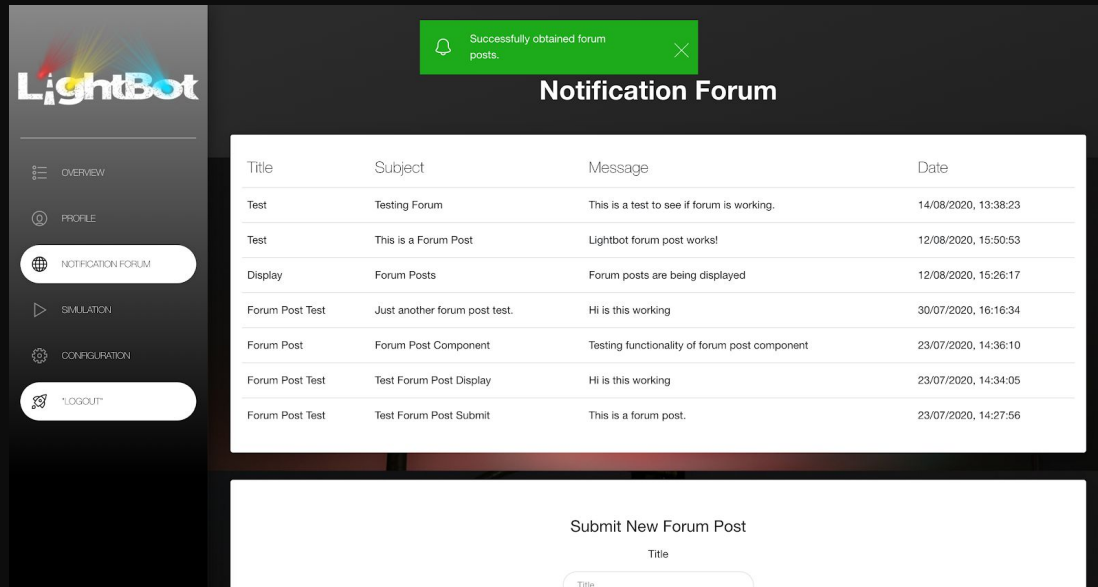


Figure 9: Notification Forum page

5.10 The Scenario Runner Page

The scenario runner page allows a user to compare the various data metrics from a manual and automatic run of the simulation. (See fig. 10)

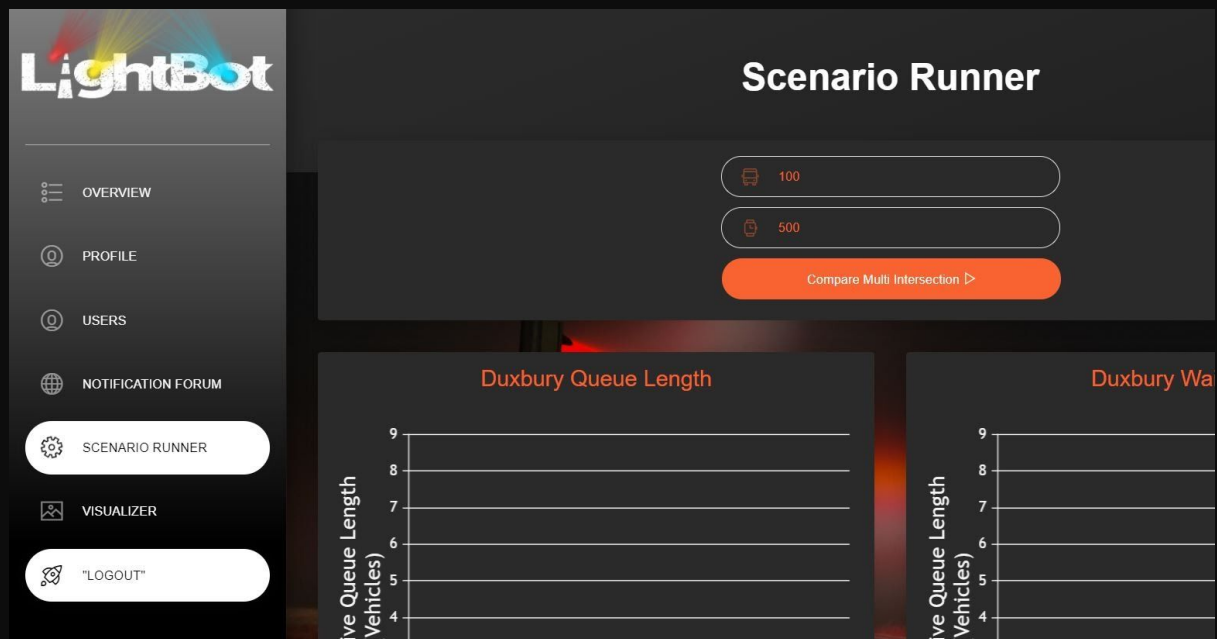


Figure 10: Scenario Runner Page

The visualizer page allows for a graphical view of the simulation. The map along with the vehicles along their respective routes can be seen on this page. (See fig. 11)

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Figure 11: Visualizer Page