

# LightBot

Artificially enhanced adaptive traffic  
control

## USER MANUAL

Compiled by the Gradient Team for 5DT



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# 1. Introduction

Everyone is familiar with traffic, with 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, such as a swarm reinforcement learning algorithm.

## 2. System Overview

Lightbot provides simulations to demonstrate the effectiveness in the case of the implementation of a swarm reinforcement learning algorithm for the traffic lights of an intersection modelled after Jan Shoba Street and South Street.

It currently provides various simulations of current time based traffic controllers to show their effectiveness/ineffectiveness 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 Lightbot provides.

Lightbot is currently still in development...

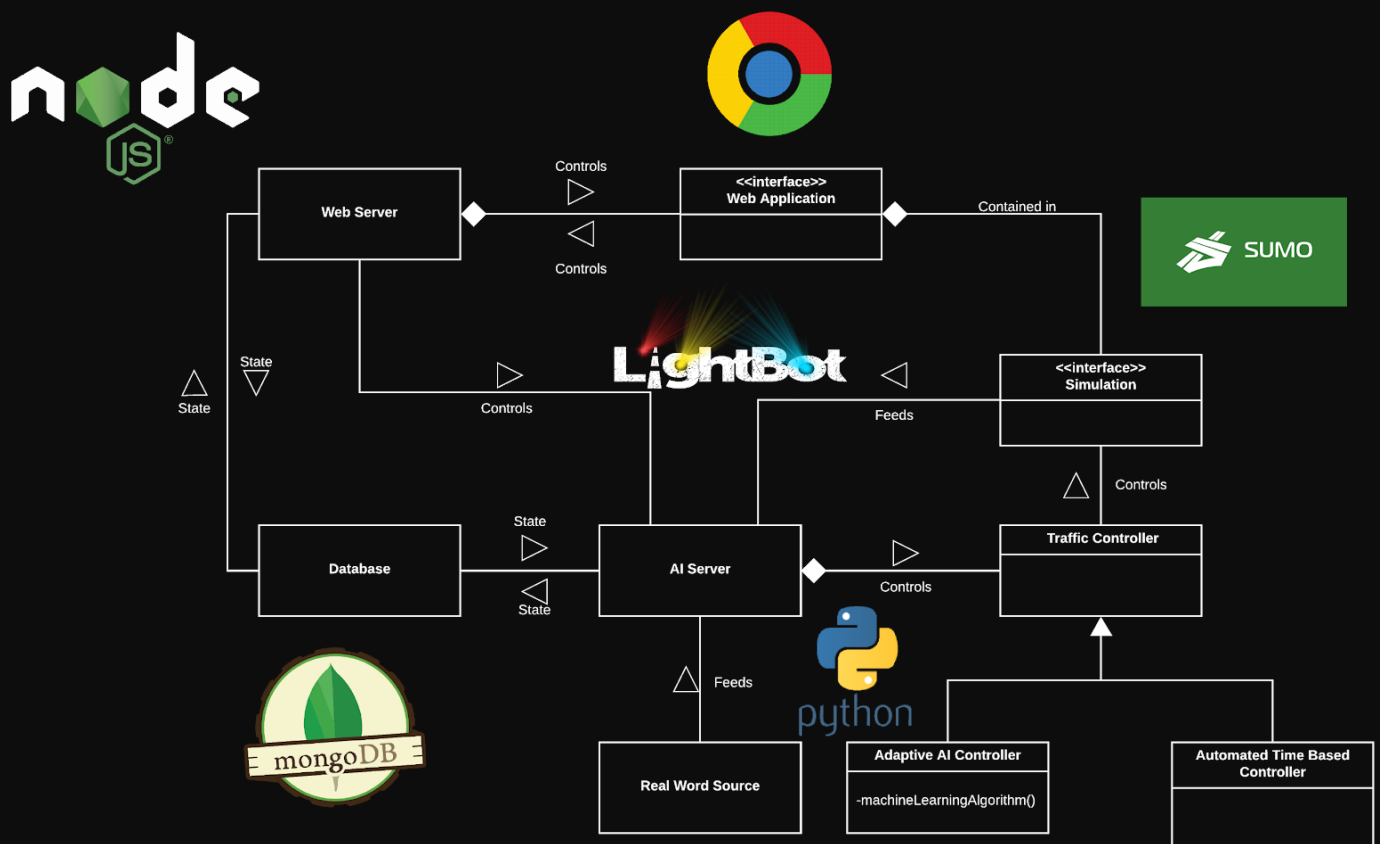


Figure 1: Deployment picture of Lightbot

### 3. Installation

The interaction with Lightbot and all of the functionality is completely web based, therefore the user does not need to install any software other than a modern browser.

All browsers should be able to run lightbot, however we recommend using Firefox, Chrome or Safari, as Lightbot has been tested using these popular browsers.



### 4. Troubleshooting

All errors will be handled by Team Gradient. If you have an error please email us at [teamgradient301@gmail.com](mailto: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. Login Page

When opening the Lightbot Web App in your browser, you will be greeted by a striking login page, see Figure 2.

- Existing users have two options on this page:
  1. They can login by filling in the email and password field and clicking Log in 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.

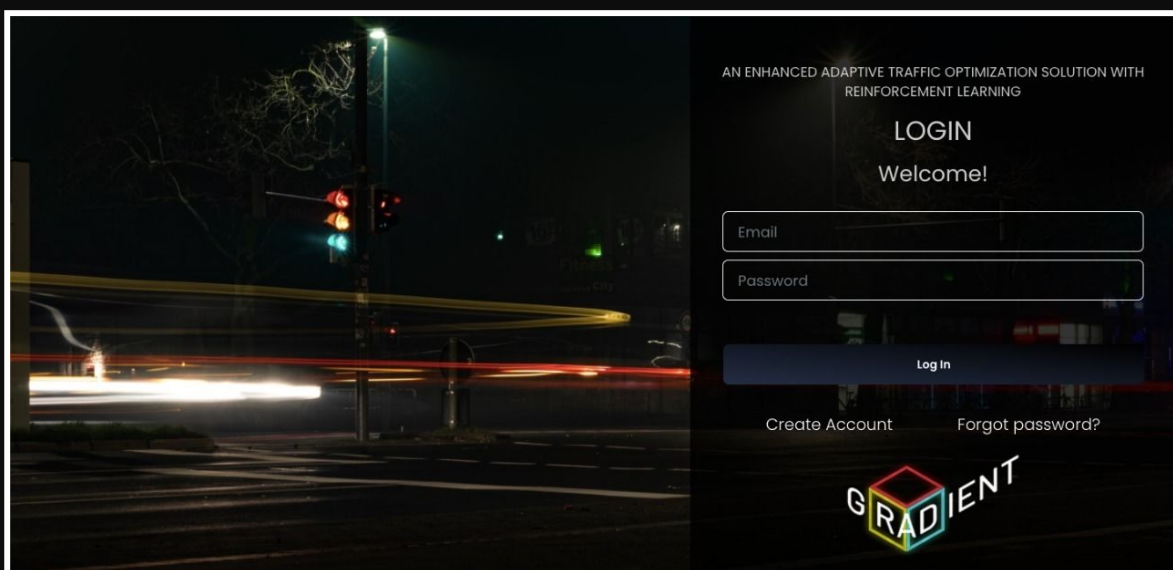


Figure 2: Log in screen

## 5.2. Password recovery page

The password recovery page, see figure 3. It provides users with 2 options:

- Enter your email address in the Email field and click the Send Password Request button and 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 page” if they do not wish to recover their password. For more information of the Sign Up page, see section 5.3.

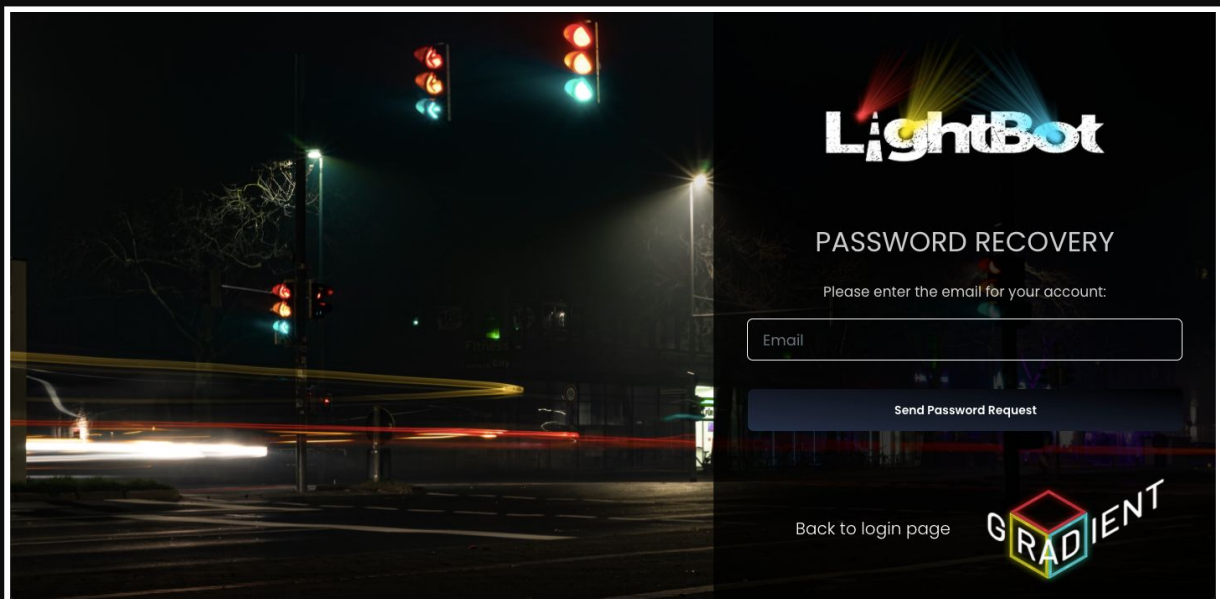


Figure 3: Password recovery page

## 5.3. Sign Up Page

The sign up page, see figure 4, allows new users to create an account so that they can use Lightbot.

- Users have to fill in all 5 of the required fields. Then click the sign up button. They will then be taken to the system 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 page” link. For more information of the Login page, see section 5.1.

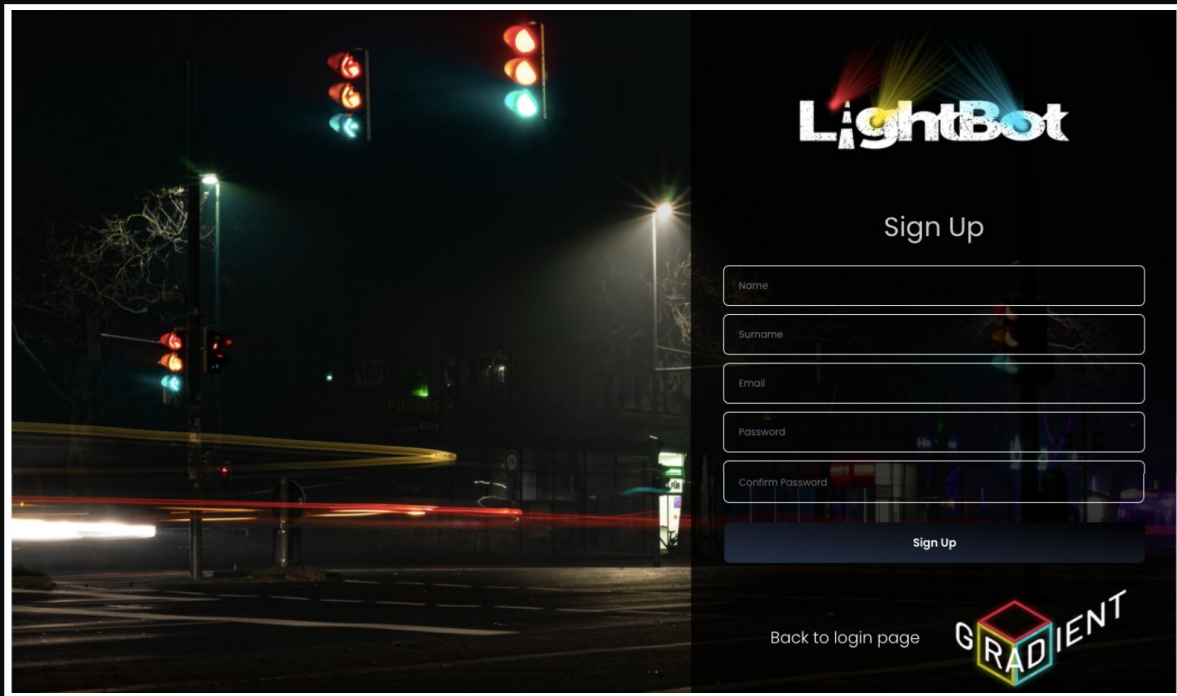


Figure 4: Sign Up Page

#### 5.4. Log out menu

Once the user is logged in, all pages will have a user icon image in the top right hand corner, which when clicked provides the user with a log out button, see figure 5. When this button is clicked the user is taken to the login page. For more information on the login page see section 5.1.



Figure 5: Log out functionality

#### 5.5. Side bar

The side bar facilitates navigation on all pages that the user has access to once they have logged in, see sections 5.5 onwards.

The side bar allows the user to access 5 different pages on Lightbot:

- System Overview page: See section 5.6 for more information.
- Manual Override page: See section 5.7 for more information.
- Simulation page: See section 5.8 for more information.
- Forum page: See section 5.9 for more information.
- User profile page: See section 5.10 for more information



Figure 5: Side bar on System Overview page

## 5.6. System Overview Page

The System Overview page, see figure 5, is the default page users are directed to once they successfully log in. On this page the users can use the side bar, see section 5.5, to navigate between different pages and views. The system overview page will display statistics about the simulation.

The system overview page currently contains mock data, and is still in development.



Figure 6: System Overview page

## 5.7. Manual Override Page

The manual override page is still in development...

## 5.8. Simulation Page

The simulation page allows the user to view and interact with different scenarios and how traffic is flowing in these scenarios, see figure 7. If the user clicks on the drop down box, outlined by a red rectangle in figure 7, they can choose different scenarios which will be loaded into the simulation. The user can also slow down, or speed up the simulation.

For more information on the side bar, see section 5.5.

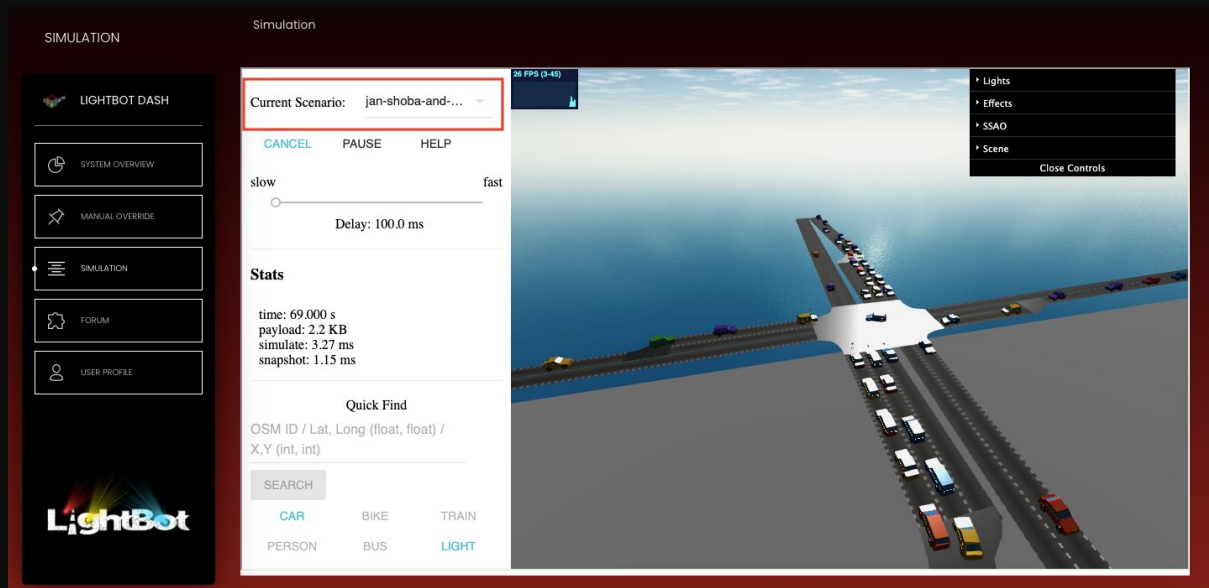


Figure 7: Simulation Page

## 5.9. Forum page

The forum page, see figure 8, will allow users and developers of lightbot to communicate. Bug reports and bug fixes will be communicated on this page.

For more information on the side bar, see section 5.5.

This page is still in development...

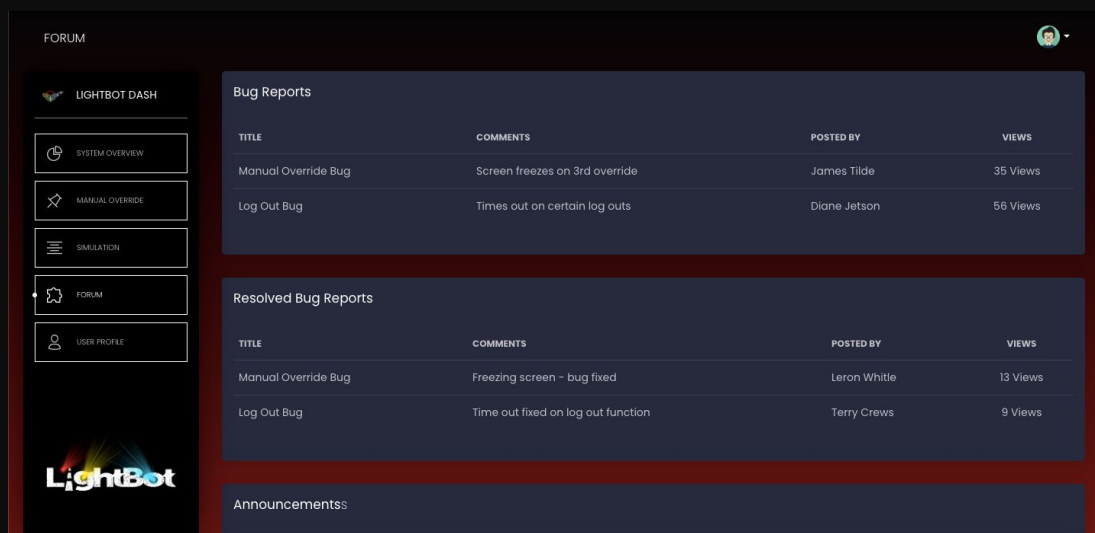


Figure 8: Forum page



## 5.10 User profile page

The user profile page, see figure 9, will allow the user to view their details. They will be able to edit certain details such as First Name, LastName and email address.

For more information on the side bar, see section 5.5.

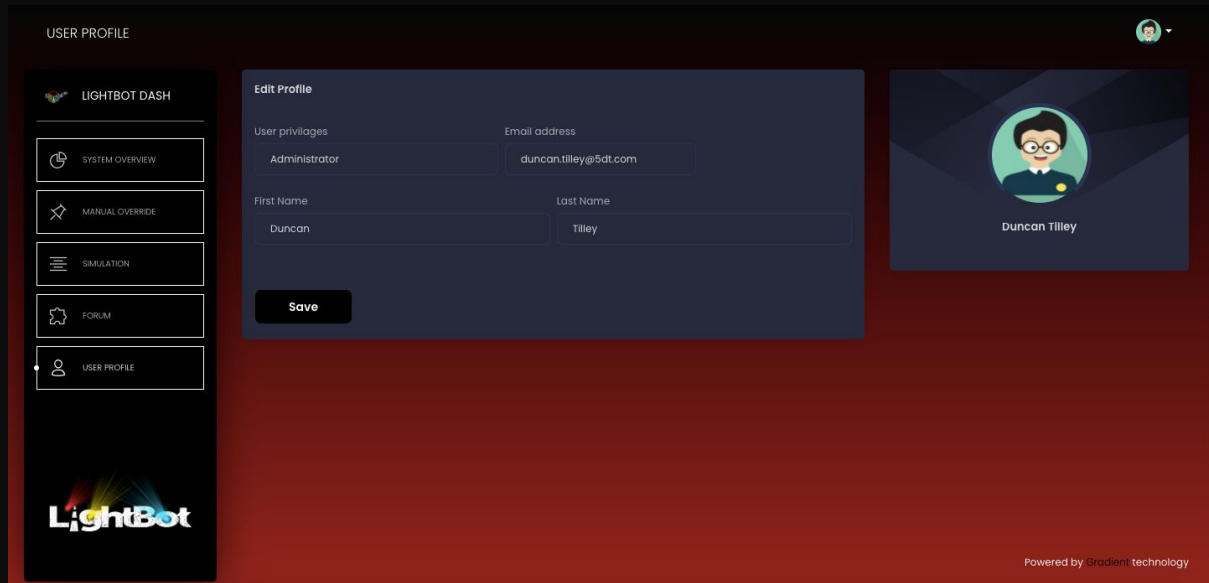


Figure 9: User profile page