CSCI 5308
Advance Topics in Software Development

FINAL PROJECT REPORT ON

Phoenix

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1. EXECUTIVE SUMMARY

The main idea of the project Phoenix is to develop a web application where users can have a hassle-free experience of booking slots for parking with one tap payment system. This application has two portals User portal and an Admin portal. Admin is responsible for adding and removing the parking spots in the portal. User will be able to search for the nearest parking spots and based on the availability they will be able to book the slots for the required time. After successfully booking the slot, user will be redirected to the payment page. A confirmation email will be sent to the user that a particular slot has been booked with the Transaction ID and the slot details. The main aim of this application is that users can grow with phoenix. They can add their private spots for parking and earn from it. This means that a user can be either an end-customer who is using this application and an admin who can add the slots for other users. Hence, a user will be able to book a public or a private spot based on his choice. This unique feature in the application makes more impact on the end users. The user-friendly registration, viewing the location on maps, finding more spots for parking and the secure payment system allows the user for guaranteed parking for the upcoming trips and save time on rush days.

2. BACKGROUND RESEARCH

Before we directly jumping to the project, we first gave time in understanding what we need to achieve and how are we going to achieve. Our main focus was to build an efficient project satisfying the client requirements. For this, we referred some documentations available online on how this booking a parking spot feature can be done. We dedicated more time in collecting resources required for this project. After we got everything in our hand, we divided the work among ourselves that each person will contribute to the one feature and will collect all the required resources to complete that feature. For every feature that we did, we put some short-term goals and helped each other with gathering inputs for the task. We figured it out that a parking system can be implemented in several ways. The approach we opted for is using Java and Spring Boot framework. Spring Boot allows us to create standalone applications without fuss that runs on their own without relying on any external webservers. It also reduces the overall development time of the application. We used Thymeleaf, which is a java-based library that provides a good support for serving an XML and HTML in web applications. It will directly reference the model that we produce in the controller during template rendering. We have taken the inspiration from SB Admin2 and Bootstrap which has default templates for the front-end. We learned how the deployment of standalone applications can be done instead of using the localhost. We used Heroku which is a Container-based cloud platform for deploying our application. Heroku uses dynos for running apps which is nothing but a virtual system.

3. TECHNOLOGIES USED

Back End: Java, Spring Boot
Front End: Thymeleaf, Bootstrap, HTML, CSS, Java Script
Database: MySQL

4. BUILD AND DEPLOYMENT INSTRUCTIONS:

There are three stages:

```
stages:          # List of
  - build
  - quality
  - deploy
```

- **Build:**
  1. "mvn clean install" will check if the test cases and dependencies are passed or not.
  2. Maven is taken as base for build stage.

```
build:       # This job runs in the build stage, which runs first.
  image: maven:3-jdk-11
  stage: build
  script:
    - cd /builds/courses/2022-winter/csci-5308/group14/PH
    - mvn clean install
```

Commands

- cd /builds/courses/2022-winter/csci-5308/group14/PH
- mvn clean install

- **Quality:** We are taking Ubuntu as base image and with the help of Designite tool the code quality will be checked and smells will be analyzed. Below is the screenshot of code quality analysis that we did for our project using Designite.

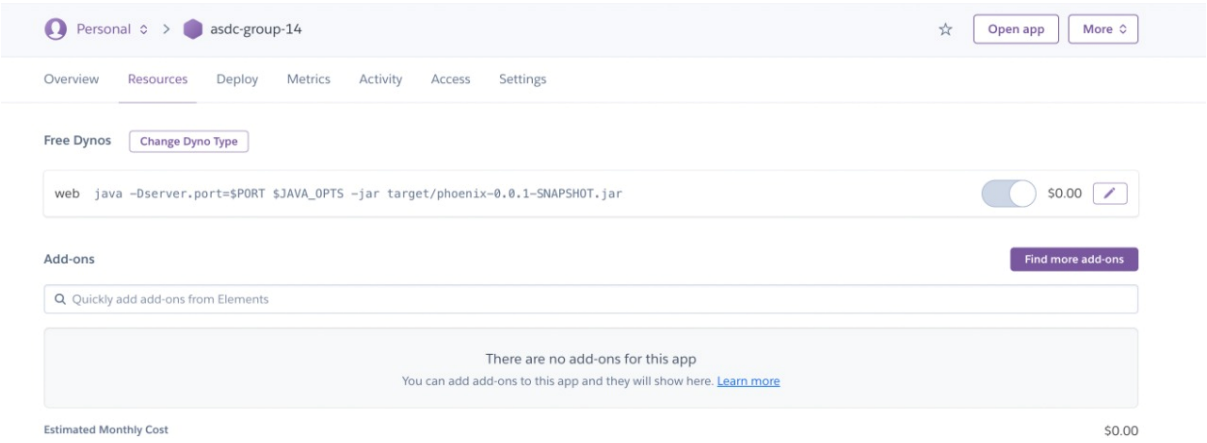
```
Searching classpath folders ...
DesigniteJava Enterprise. Version 2.0.2
Copyright (C) 2022 Designite. All rights reserved.
Parsing the source code ...
Resolving symbols...
Computing metrics...
Detecting code smells...
Exporting analysis results...
wrapping up ...
--Analysis summary--
        Total LOC analyzed: 1340        Number of packages: 14
        Number of classes: 37   Number of methods: 243
-Total architecture smell instances detected-
        Cyclic dependency: 2    God component: 0
        Ambiguous interface: 0  Feature concentration: 0
        Unstable dependency: 1  Scattered functionality: 0
        Dense structure: 0
-Total design smell instances detected-
        Imperative abstraction: 0       Multifaceted abstraction: 0
        Unnecessary abstraction: 0      Unutilized abstraction: 14
        Feature envy: 0 Deficient encapsulation: 2
        Unexploited encapsulation: 0    Broken modularization: 0
        Cyclically-dependent modularization: 0  Hub-like modularization: 0
        Insufficient modularization: 3  Broken hierarchy: 0
        Cyclic hierarchy: 0     Deep hierarchy: 0
        Missing hierarchy: 0    Multipath hierarchy: 0
        Rebellious hierarchy: 0 Wide hierarchy: 0
-Total testability smell instances detected-
        Hard-wired dependency: 5        Global state: 2
        Excessive dependency: 0 Law of Demeter violation: 0
-Total implementation smell instances detected-
        Abstract function call from constructor: 0      Complex conditional: 0
        Complex method: 0       Empty catch clause: 0
        Long identifier: 0      Long method: 0
        Long parameter list: 6  Long statement: 11
        Magic number: 32        Missing default: 0
----
Done.
```

```
quality:       # This job runs in the build stage, which runs first.
  image: ubuntu:18.04
  stage: quality
  script:
    - apt-get update
    - apt-get clean
    - apt install default-jre -y
    - apt install default-jdk -y
    - apt install maven -y
    - apt install wget -y
    - apt-get install curl -y
    - apt install git -y
    - cd /builds/courses/2022-winter/csci-5308/group14/PH
    - wget https://www.designite-tools.com/static/download/DJC/DesigniteJava.jar
    - java -jar DesigniteJava.jar -i ./ -o code-quality/ -f XML
```

Commands

- apt-get update
- apt-get clean
- apt install default-jre -y
- apt install default-jdk -y
- apt install maven -y
- apt install wget -y
- apt-get install curl -y
- apt install git -y
- cd /builds/courses/2022-winter/csci-5308/group14/PH
- wget https://www.designite-tools.com/static/download/DJC/DesigniteJava.jar
- java -jar DesigniteJava.jar -i ./ -o code-quality/ -f XML

- **Deploy**: We are using Ubuntu as base image and with the help of Ruby we are deploying it to Heroku.



```
deploy:      # This job runs in the build stage, which runs first.
  image: ubuntu:18.04
  stage: deploy
  script:
    - apt-get update
    - apt-get clean
    - apt install default-jre -y
    - apt install default-jdk -y
    - apt install maven -y
    - apt install wget -y
    - apt-get install curl -y
    - apt install git -y
    - cd /builds/courses/2022-winter/csci-5308/group14/PH
    - mvn clean install
    - apt-get install -y ruby-dev
    - gem install faraday -v 1.10.0
    - apt-get install -y ruby-dev
    - gem install dpl
    - dpl --provider=heroku --app=asdc-group-14 --api-key="818f1242-336d-4db1-896d-94fff45e033f"
```

Commands

- apt-get update
- apt-get clean
- apt install default-jre -y
- apt install default-jdk -y
- apt install maven -y
- apt install wget -y
- apt-get install curl -y
- apt install git -y
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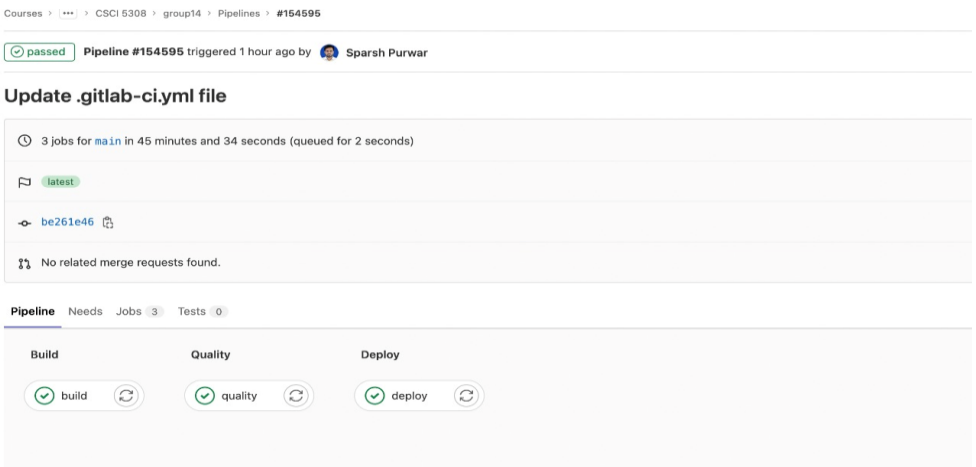
- gem install dpl
- dpl --provider=heroku --app=asdc-group-14 --api-key="818f1242-336d-4db1-896d-94fff45e033f"

Command for deploying on Heroku:

web java -Dserver.port=$PORT $JAVA_OPTS -jar target/phoenix-0.0.1-SNAPSHOT.jar

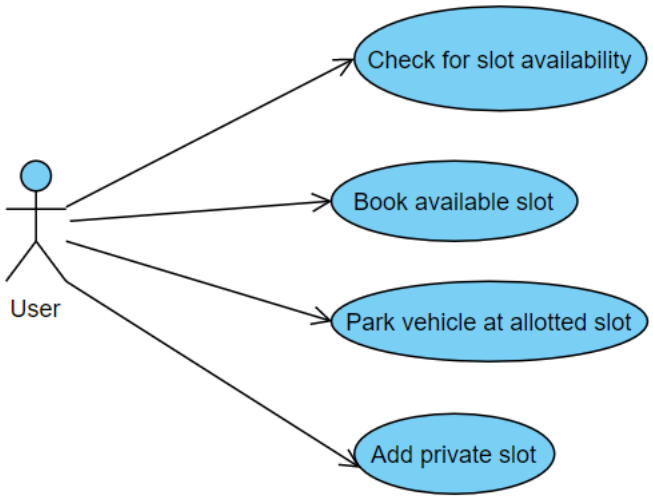
Screenshot showing three stages running on Gitlab:



5. USE CASE SCENARIOS

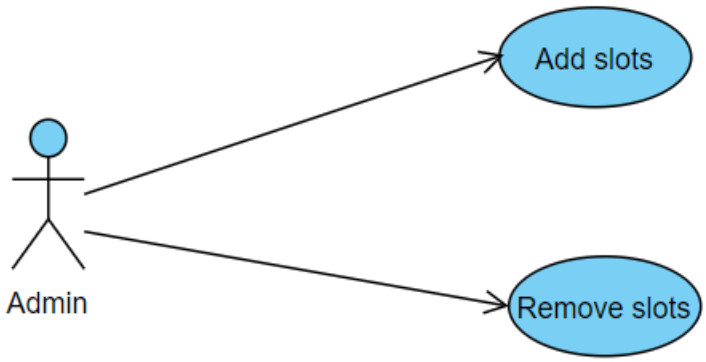
High level Use case diagram from User perspective:

In the user management system, a user can check for the available slots, book the slot, park the vehicle at the slot and user can also add his/her private slots for parking.

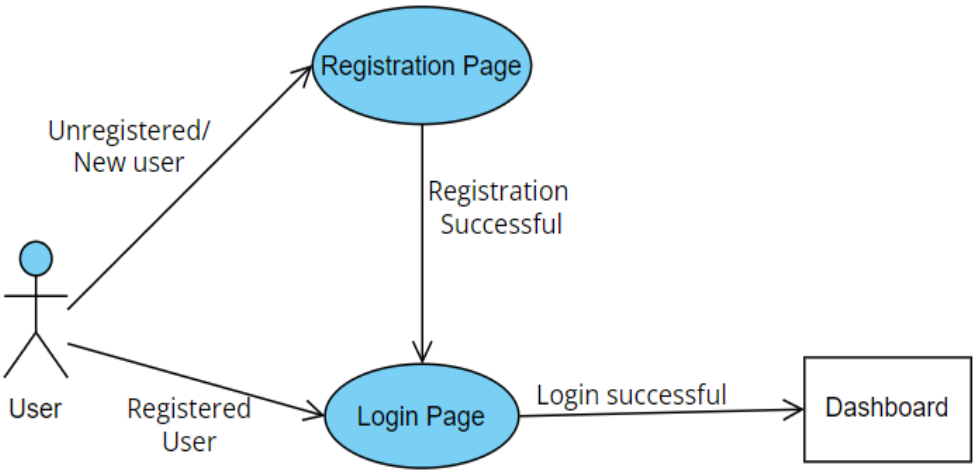


High level Use case diagram from Admin perspective:

For the admin portal, Admin is responsible for adding and removing the slots from the portal which will be reflected to the users.

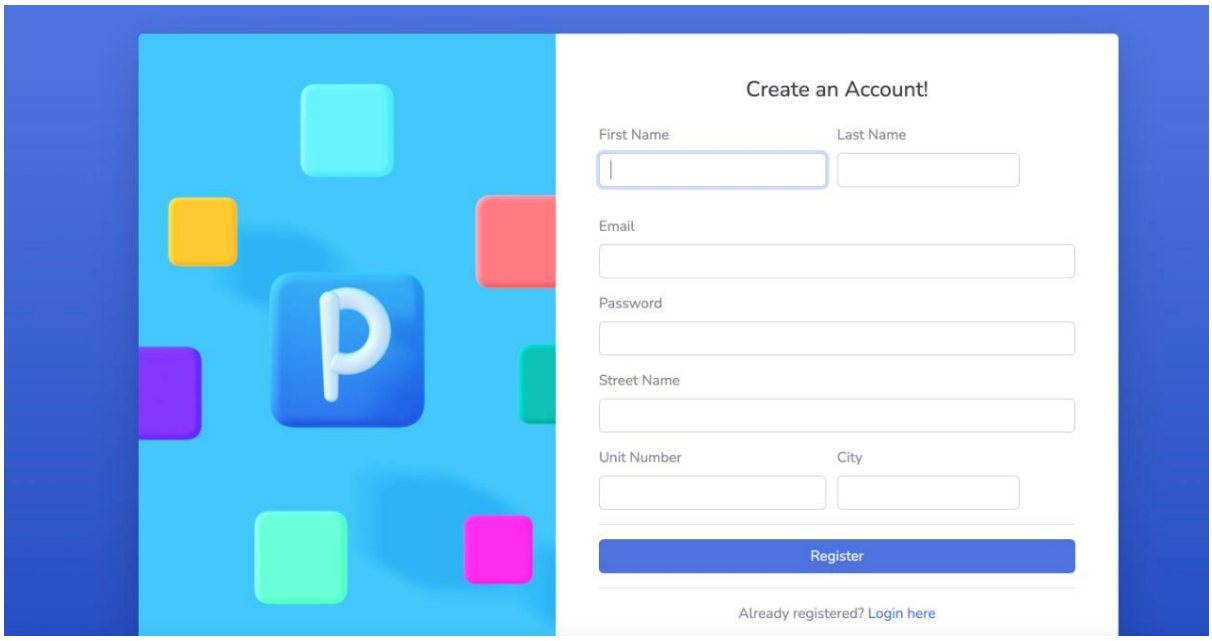


5.1 User Management



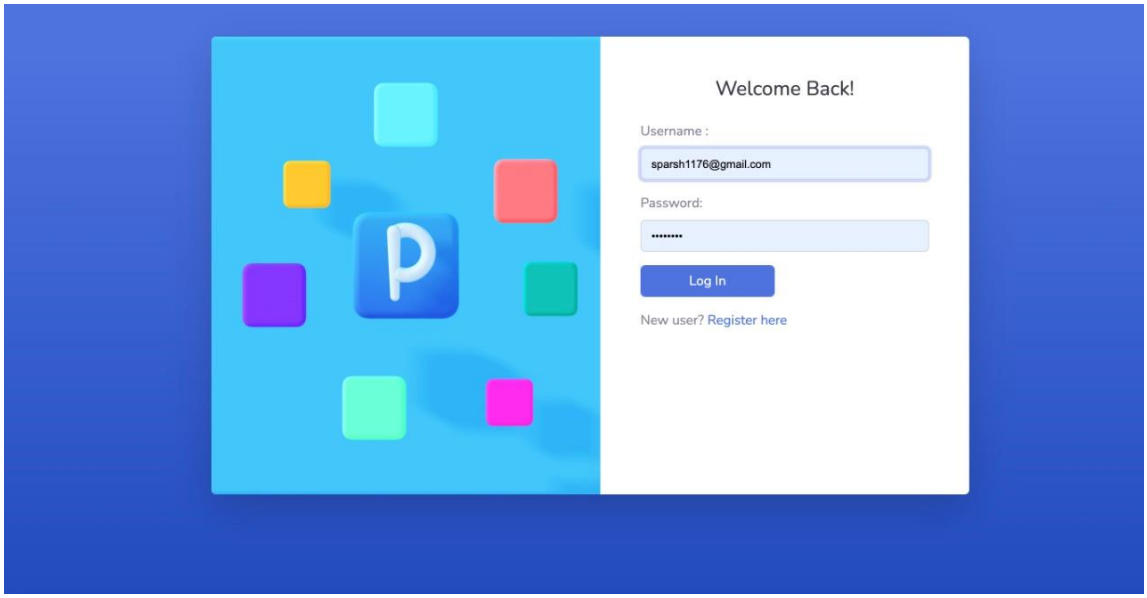
a. User Registration:

Registration to phoenix is free. So, to use this application, a new user has to first register by filling out the details like First name, Last name, Email ID, create password for the application, Street name, Unit number and city which are the inputs for registration. Once the user is successfully registered with Phoenix, he/she will be redirected to the login page where they can login using the registered credentials i.e., Email ID, Password.

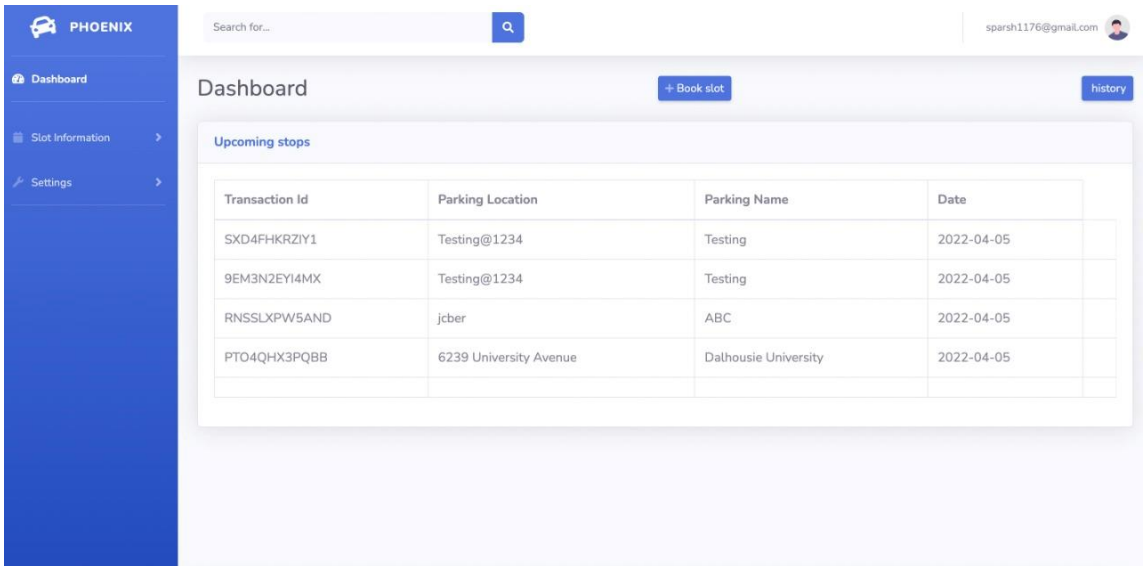


b. User Login:

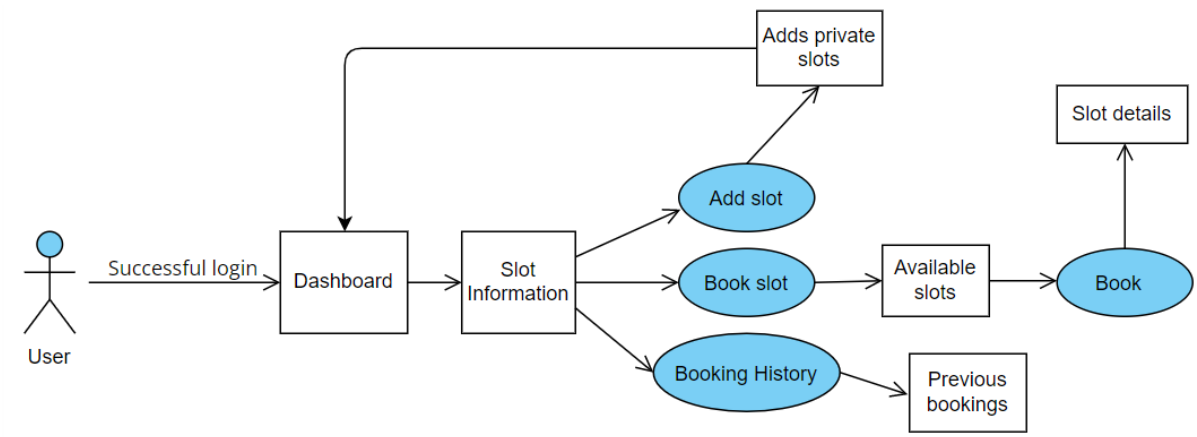
In the user login page, user has to enter email id and password which is the input for login. After successful login, user will see a Dashboard with his profile which has current trips i.e., current day slot bookings along with Slot information and Slot booking option. The output of user login is that a user should be able to successfully login and should see the dashboard.



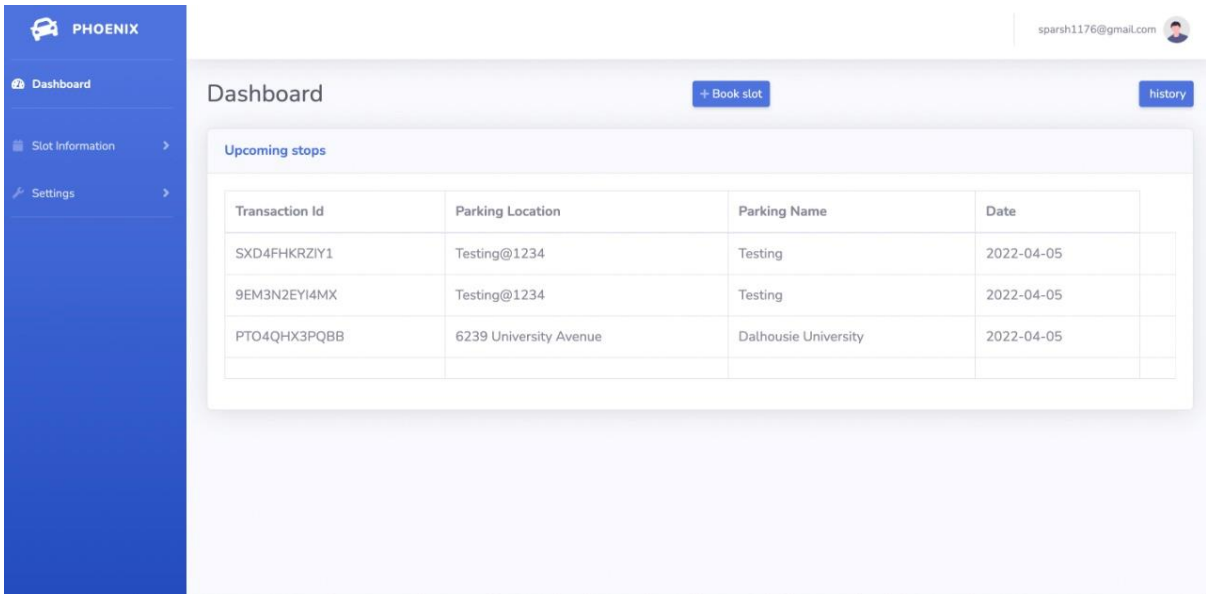
Screenshot of the Dashboards:

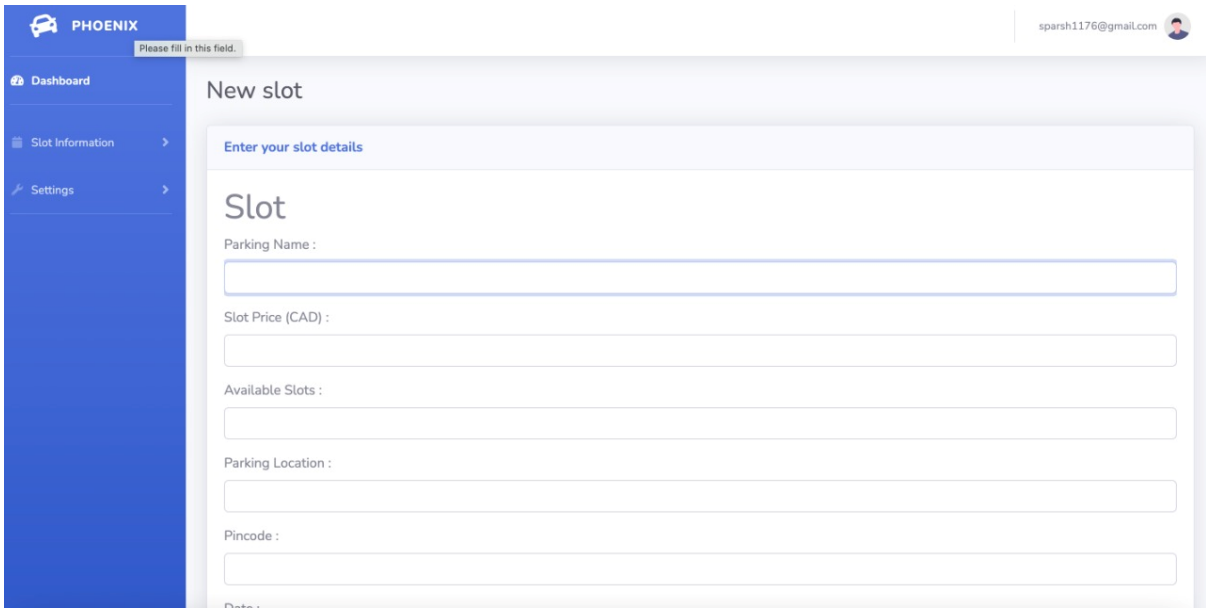


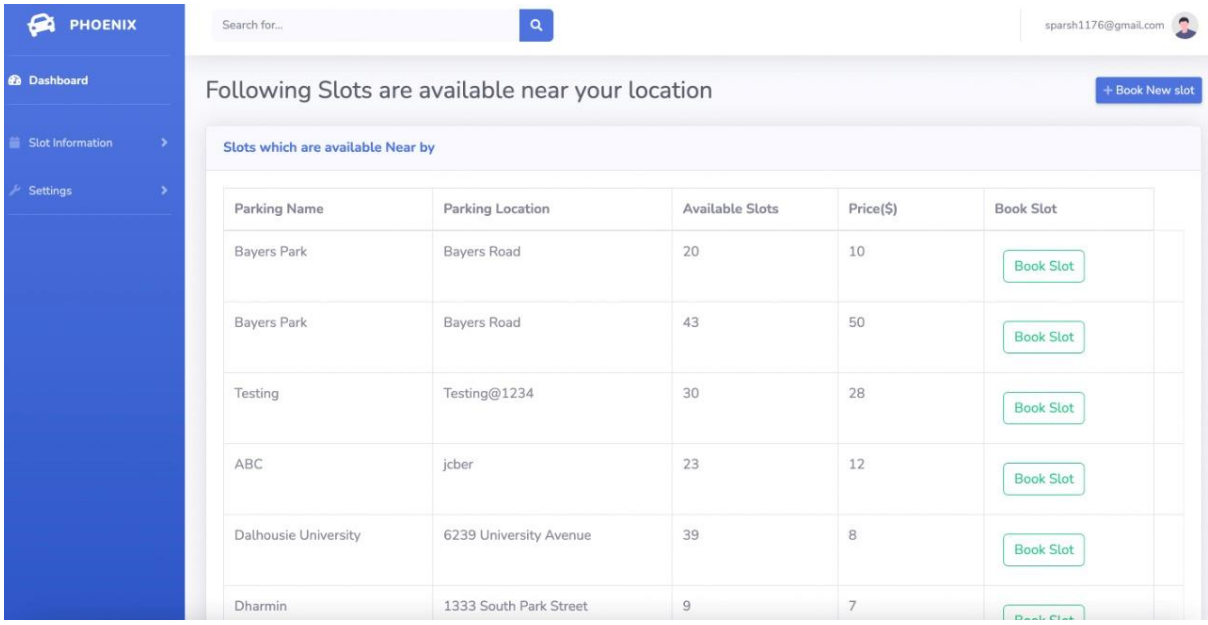
5.2 Slot booking

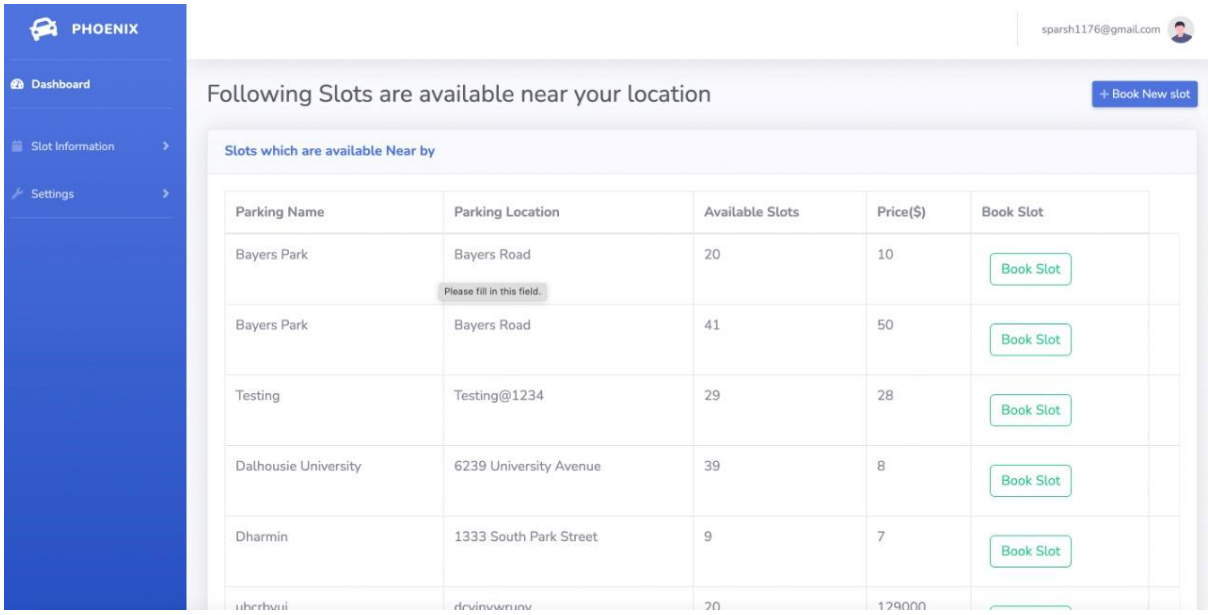


This is one of the main features of this application where user will be able to book a parking spot, add his/her private slot for other users, see the booking history. By adding the slot for users, a user can earn from it. After a user adds the slots for other users, it will reflect to other users in the dashboard. In the booking history, user will be able to see all the previous bookings he made along with the details like booking date, Transaction ID, Parking location and Parking Name. For booking a new slot user has to enter all the details like slot date, email, time for which they need the Parking name, Postal code, location and price. If a user wants to select a slot from the available slots, they can choose a spot of their choice and proceed for the booking. The output of this module is that a user should be able to book a parking spot and should see the booked parking details.

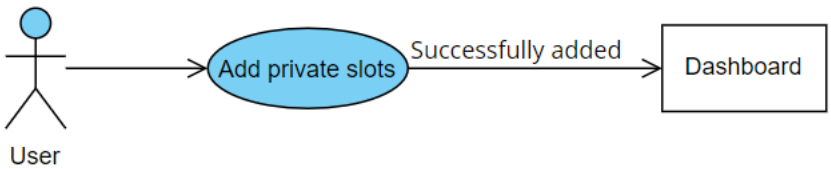






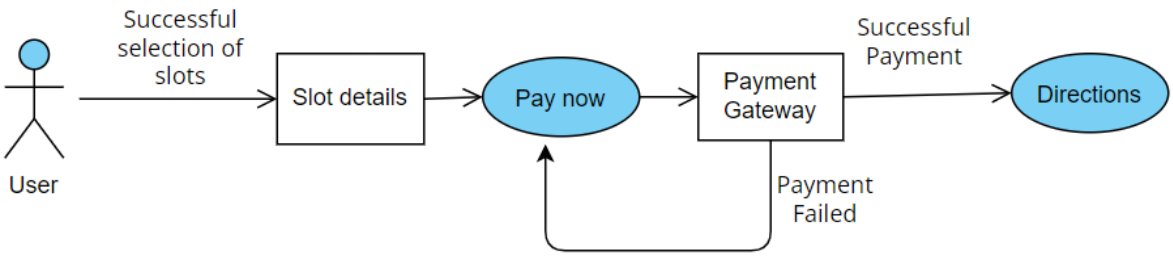


5.3 User slot addition

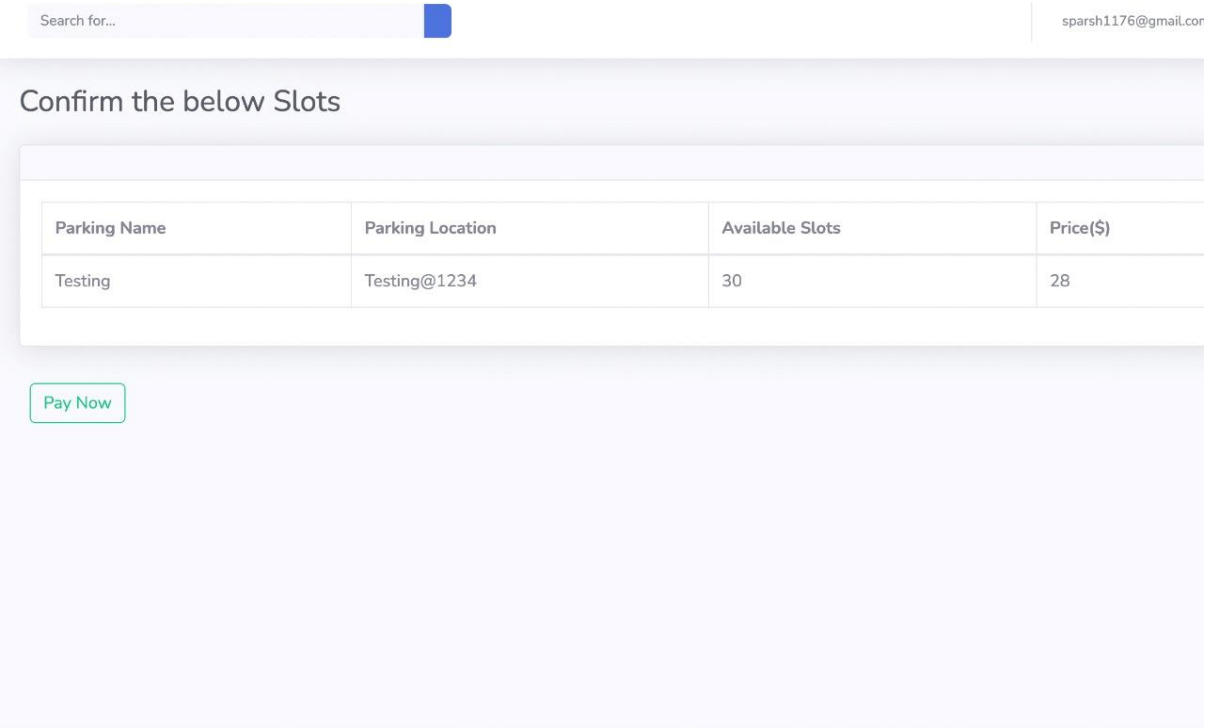


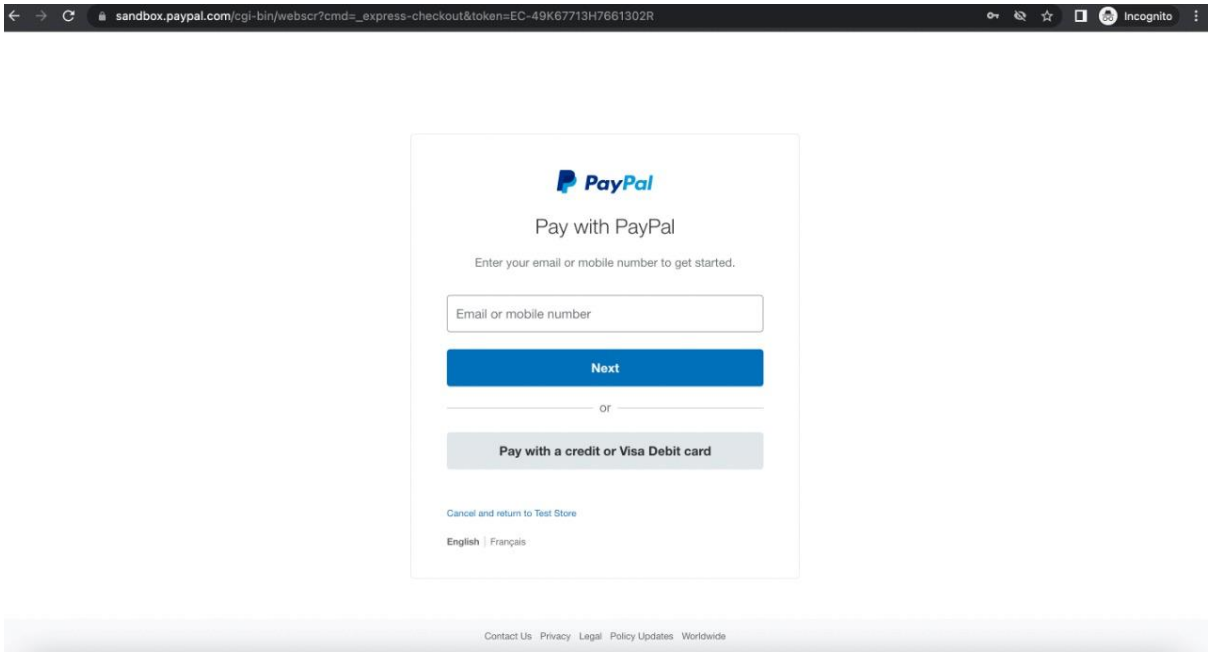
This is the unique feature of the application where a user can behave as an admin as well as the customer who will be able to book the parking spot. It is kind of role-based scenario in which if a user has any private spot, he/she can rent that spot and earn from it. So, at first a user has to add his parking details same as how admin does, and this addition will be visible to the users. By doing this a user not only earns from it which will eventually reduce admins efforts in some cases but also, gives more slot options to other users.

5.4 Payment



After successfully selecting a parking spot, user has to see the slot details and he should be able to proceed to the payment. We have implemented a secure payment gateway where a user will be able to pay using PayPal for the booked slot based on the price mentioned. After the payment is successful, user will be redirected to the location page where they should be able to see the slot address with an option to view the address on Google maps.

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Pay with PayPal
Enter your email or mobile number to get started.
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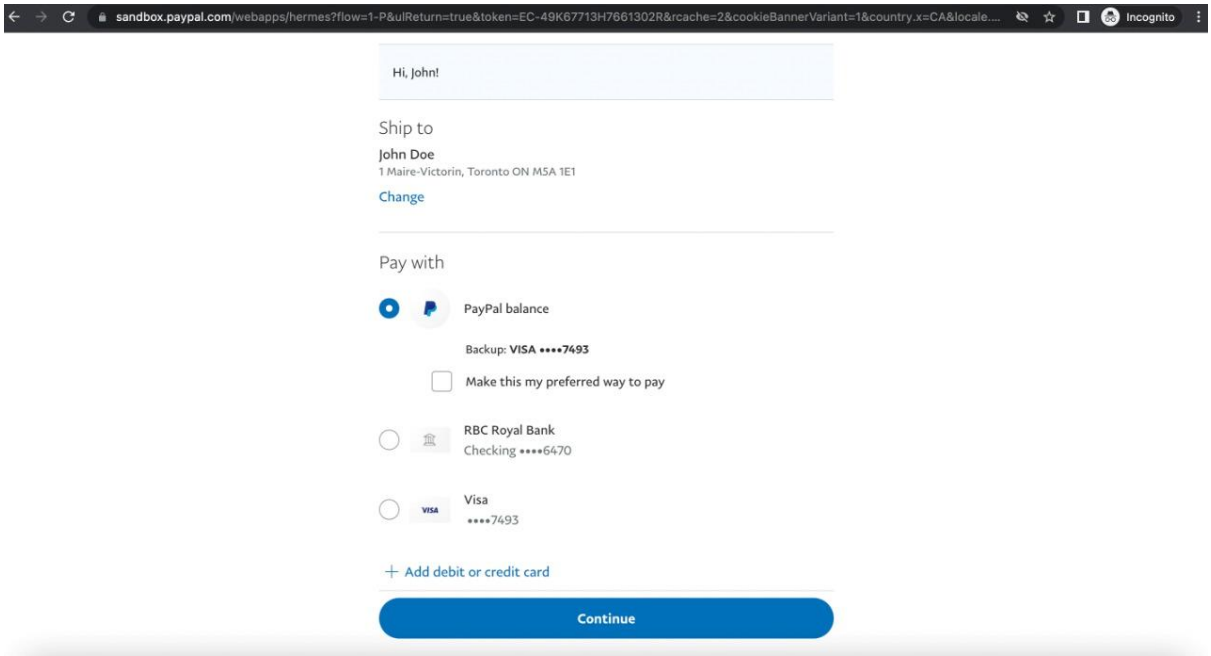
or
Pay with a credit or Visa Debit card
Cancel and return to Test Store
English | Français
Contact Us Privacy Legal Policy Updates Worldwide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Incognito
Hi, John!
Ship to
John Doe
1 Maire-Victorin, Toronto ON M5A 1E1
Change
Pay with
PayPal balance
Backup: VISA ••••7493
Make this my preferred way to pay
RBC Royal Bank
Checking ••••6470
Visa
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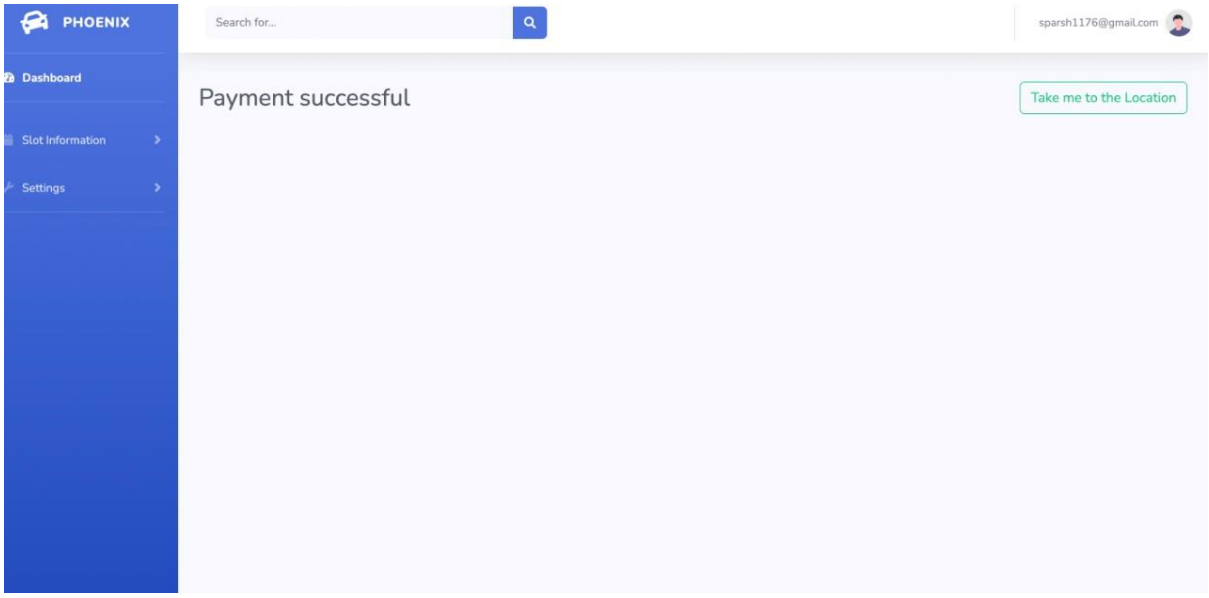
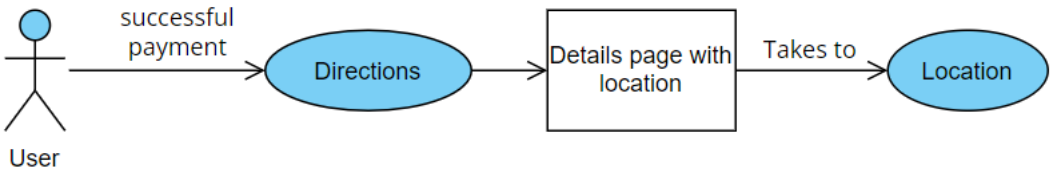
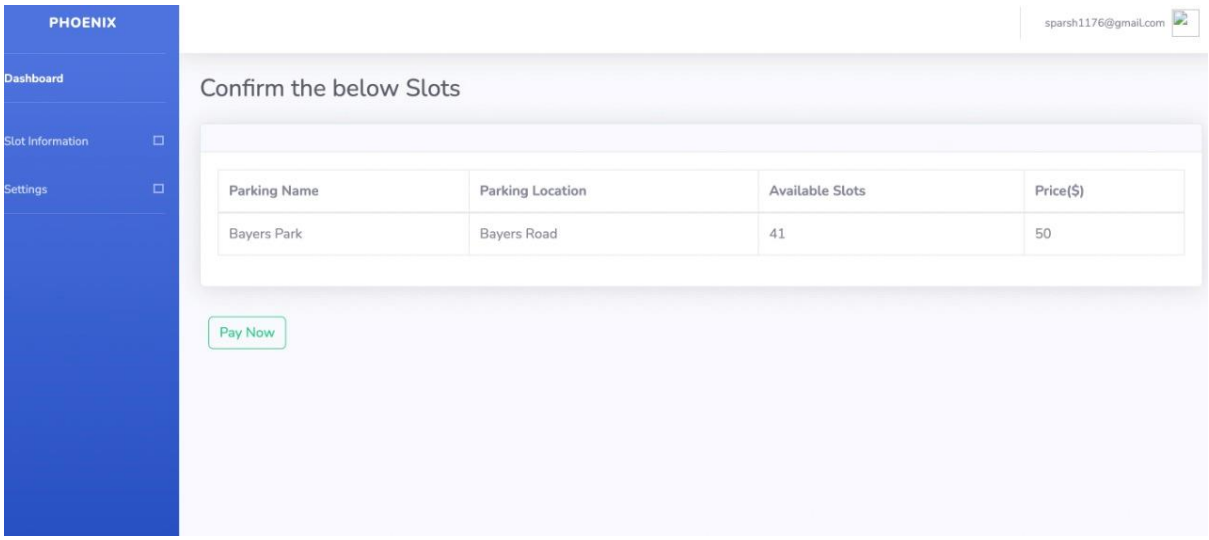
+ Add debit or credit card
Continue

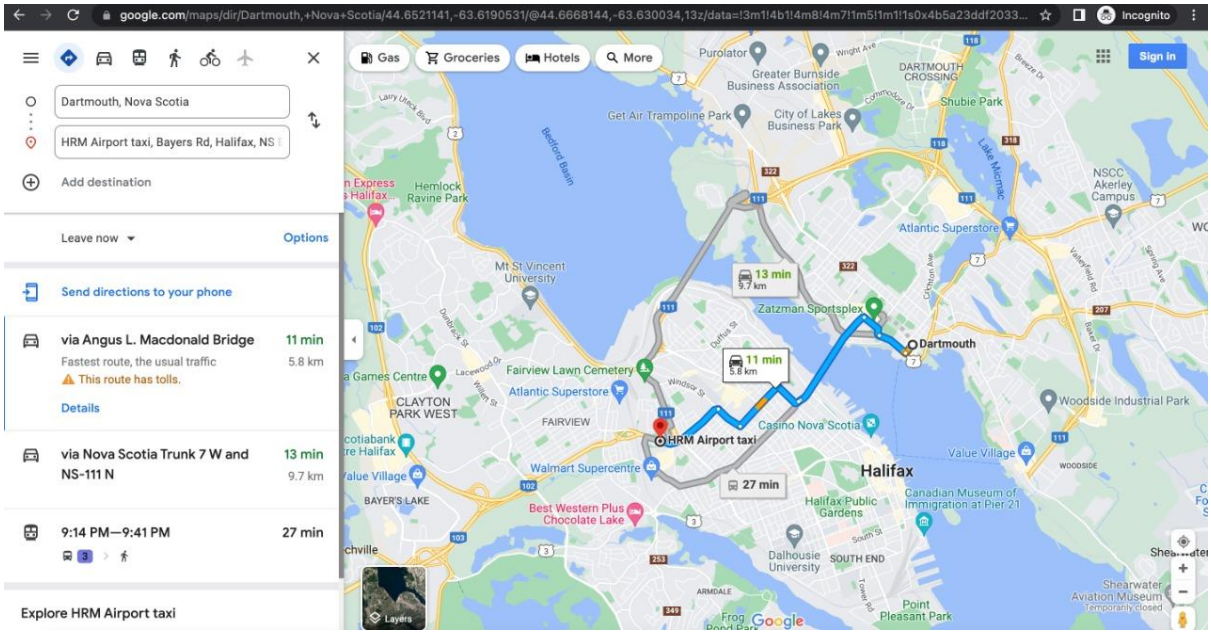


5.5 Map Integration



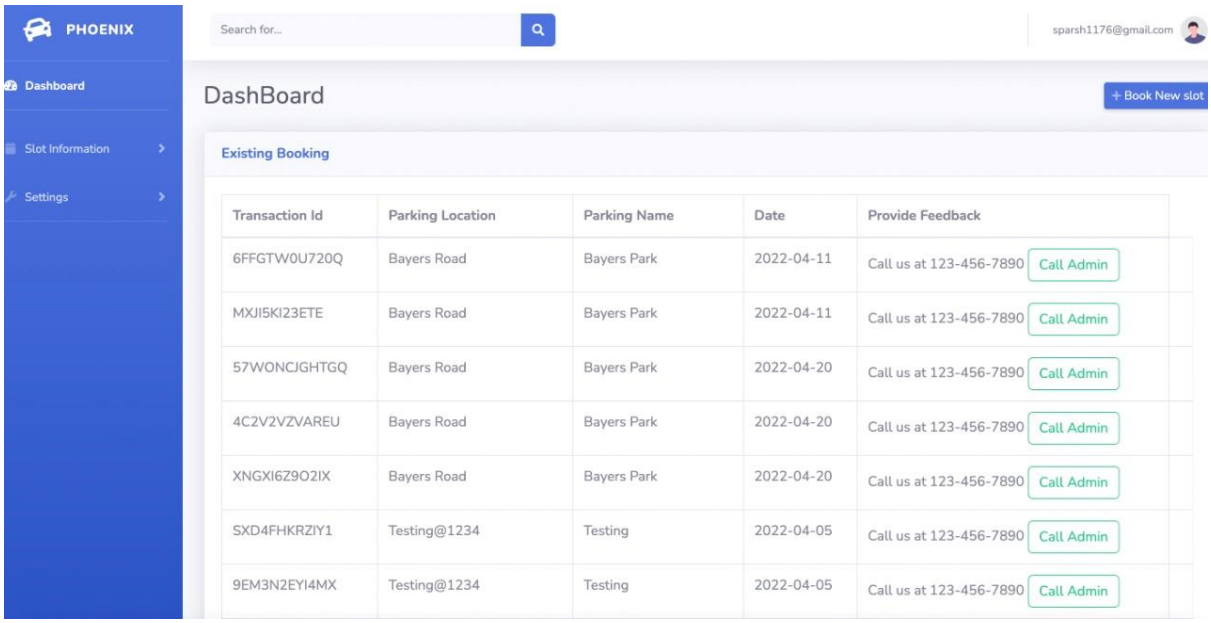
We have integrated a map in or application where a user after successful payment can check the location on Google maps. We have first fetched latitude and longitude from google and this data is passed to the google





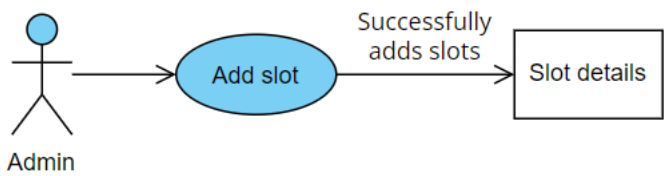
5.6 Feedback

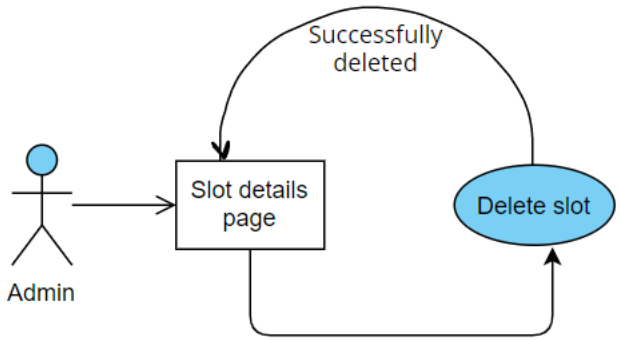
Users can provide feedback on the whole experience of Phoenix by calling admin. This feature can be found when a user goes to the booking history and in the provide feedback section where call will be directed to the admin of previous bookings.



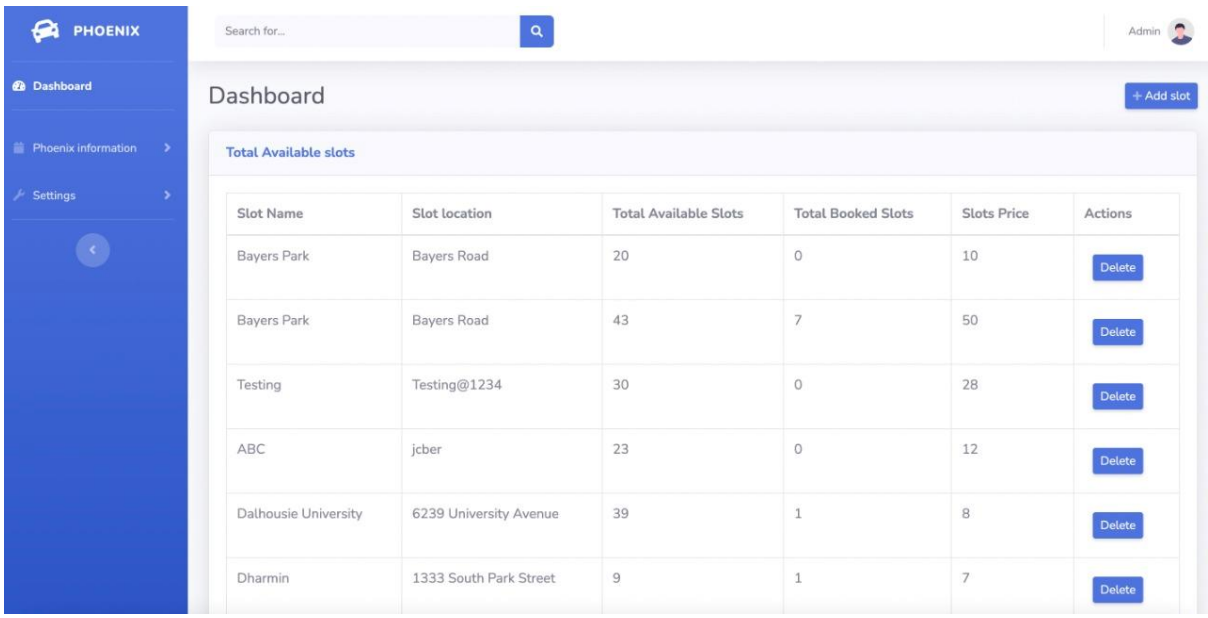
Transaction Id	Parking Location	Parking Name	Date	Provide Feedback
6FFGTW0U720Q	Bayers Road	Bayers Park	2022-04-11	Call us at 123-456-7890 Call Admin
MXJI5KI23ETE	Bayers Road	Bayers Park	2022-04-11	Call us at 123-456-7890 Call Admin
57WONCJGHTGQ	Bayers Road	Bayers Park	2022-04-20	Call us at 123-456-7890 Call Admin
4C2V2VZVAREU	Bayers Road	Bayers Park	2022-04-20	Call us at 123-456-7890 Call Admin
XNGXI6Z9O2IX	Bayers Road	Bayers Park	2022-04-20	Call us at 123-456-7890 Call Admin
SXD4FHKRZIY1	Testing@1234	Testing	2022-04-05	Call us at 123-456-7890 Call Admin
9EM3N2EYI4MX	Testing@1234	Testing	2022-04-05	Call us at 123-456-7890 Call Admin

5.7 Admin portal management

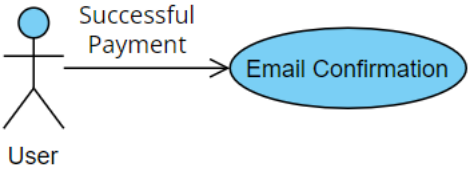




In the admin portal, admin has the authority to add the slots and remove the slots. Here admins can be a parking spot owner or a user who will be providing the spots and earn through it. First admin has to login using his profile and he gets all the access for the application.

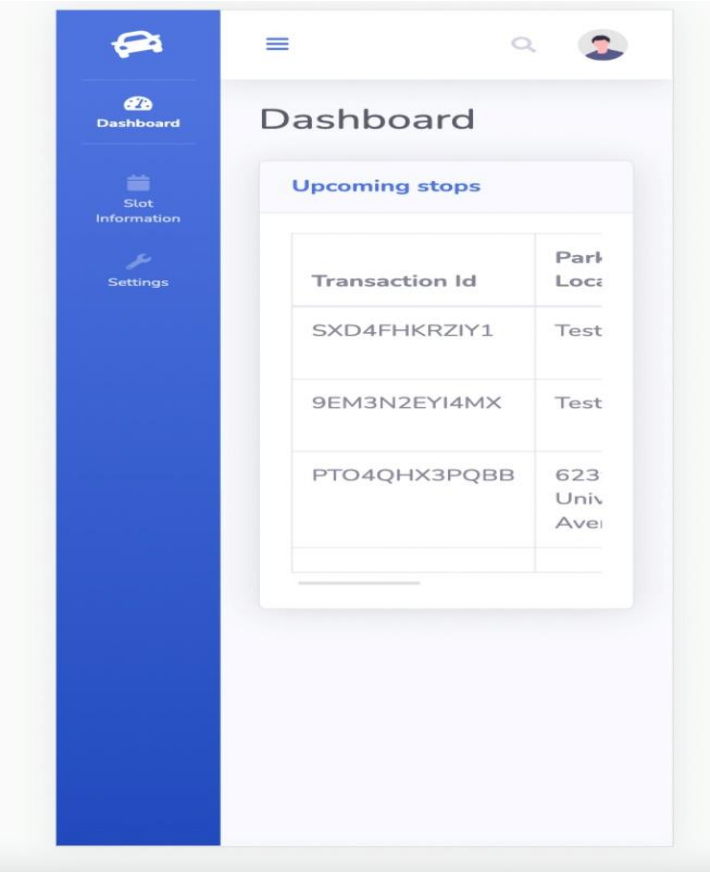


5.8 Confirmation Email



This is the extra feature we implemented in the project where the user gets a confirmation email after successfully booking the parking spot. Confirmation email contains Transaction ID, and slot details.

Below is the mobile view of the Dashboard



6. SCOPE OF THE PROJECT

This project can be used by every vehicle owner including car, bike or even a bicycle and reserve a spot beforehand when it is a peak or on a holiday. The end users are the vehicle owners who will be benefitted and the parking spot providers who can be public property owners such as Halifax shopping center owners. Its user-friendly interface and secure payment system makes the application create more impact on the people. User will experience a hassle-free experience by booking a parking spot for the upcoming trips which will eventually reduce the time to get a parking spot without ending up returning home sometimes without a parking spot. Multiple users can use this application and book the slots for the parking who will eventually earn by adding private slots for parking. With map feature, a user can search for the nearest parking spots which reduces the tedious process of checking at the time of parking.

7. FUTURE IMPROVEMENTS

For the future improvements of this project,

1. This application can be built on Android and iOS platforms.
2. Various other payment options can be included which makes the payment gateway more feasible giving more options to the user.
3. Using IOT sensors in the project will automatically detect the available parking slots.

8. Gitlab URL : https://git.cs.dal.ca/courses/2022-winter/csci-5308/group14/-/tree/master

9. Heroku Link: https://asdc-group-14.herokuapp.com/

10. REFERENCES

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