Test Strategy Document

Quantifying carbon footprinting for logistic hubs

Team 38

Scope

- The Aim of the document is to design the testing procedure and strategy for our project in order to verify the use cases.
- This document is reviewed by the team members when testing the app that is developed so far and also by the client to know if the app is tested and the components are working. It is also reviewed by the team mentor.
- The Client has to approve the document. He reviews and suggests the changes and once the changes are incorporated, it should be accepted by the client.
- The Results of the tests carried out will be mentioned in another Document.
- Testing activities are done in the following order
    -> **Unit test** to test the individual components.
    -> **Integration test** to test their integration.
    -> **System test** that includes the testing of the entire app.

Test Approach

- Web App is run (front end and back end) and different responses for different inputs are checked , i.e the testing is done manually.
- Different use cases are tested and error handling is also tested manually.
- The Database is checked whenever necessary during testing.
- **Test Levels:**
    -> Unit testing - each developed module and use case is tested separately.
    -> Integrated testing - different modules are tested together incrementally testing all the modules.
    -> System testing - At the end, the whole system is tested.

- **Roles and Responsibilities**

  -> Kushagra Agarwal (Environment 1)- All the tests that involve CFP calculations and spatial queries (pgrouting)
  -> Shreeya Pahune (Environment 2)- All the tests that involve displaying maps and database queries.
  -> Sravani Dama (Environment 3)- Integrated tests and tests related to the database and back-end testing.
  -> Sriharshitha Bondugula (Environment 4)- Login, register module and error handling of the front end part is tested.

- **Types of Testing**

  -> Performance Testing
  -> Load Testing
  -> Security Testing
  -> Stress Testing
  -> Compatibility testing

- **Testing approach**

  We have tested all the units independently first.
  We then worked on integration. Then tested the modules that we integrated.
  Once we are done with the integration and integration testing, we have done system testing.
  We haven't used any automated tools.

Test Environment

Environments: (same for all of us)

OS   - Ubuntu 18.04 or Windows x86
Browser   - Firefox or Chrome

Network   -   Wifi or LAN or Mobile data
Web server -   Local host

Setup

<u>For Environment 3,4,1</u>

Start the frontend (react app) and the flask server.

<u>For Environment 2</u>

Start the frontend (react app) and the flask server.
Start the Openlayers ports for the map functionalities.

<u>Testing Tools</u>

We haven't used test management tools. The web page should be run and the expected outcomes should be tested for corresponding inputs.

1. **QGIS** - Visualise map and cross check OL output on UI. (Environment 2)
2. **pgAdminIV**- Verify pgrouting queries and output. (Environment 1)
3. Testing for the frontend is done manually.
4. Backend testing done via console,terminal and databases (postgres terminal)
5. DB testing done via **pgAdminIV**. (Environment 2)

<u>Use Cases and features</u>

1. **User Registration** - Users should be able to register specifying their usertype.
2. **Login** - Registered users should be able to login to make use of the app.
3. **Upload Data** - Users should be able to Upload the data necessary to make the calculations.
4. **Shortest path between nodes** - Given source and destination as input,find the shortest path between these two and display in the map
5. **Path with least CFP** - Given the number of trucks , source and destination as input,find the path with least CFP and display in the map.

6. **Route-wise CFP calculation** - Based on input provided (Number of trucks) and path chosen, net CFP for that path is printed.
7. **Net CFP of the company** - To calculate the net carbon footprint of the company in order to take the necessary measures.
8. **Preemptive CFP calculation** - Display the CFP along the path before making a choice in order to make the right decision.
9. **Choose nodes from a Map** - Allow the user to choose nodes from the map.
10.   **Log or history** - Storing all the paths chosen and printing the log.
11.   **Identifying hotspots with high carbon emission** - Based on the input data, display the hotspots with respect to the selected parameters.

Test Cases

The following are the test cases and the expected outputs are in the document test plan.

Test No. ID	Related Use case	Pre-conditions	Test Description (steps)
1	Register	Register page should be opened.	1) Open the register page. 2) Leave all the fields empty.
2	Register	Register page should be opened.	1) Open the register page. 2) Try a repeated username. 3) Check the db (should be empty)
3	Register	Register page should be opened.	1) Open the register page. 2) Try a password with less length, i.e a weak password. 3) Check the db (should be empty)
4	Register	Register page should be opened.	1) Open the register page. 2) Email provided in wrong format. 3) Check the db (should be empty)
5	Register	Register page should be opened. All the fields are supposed to be filled in the correct format.	1) Open the register page. 2) Enter the necessary details. 3) Check for the data in the database.

6	Login (Google)	Register page should be opened.	1) Open the register page. 2) Click on Login with Google account 3) Provide the wrong details. 3) Check the db (should be empty)
7	Login (Google)	Register page should be opened. User logging in from google for the first time.	1) Open the register page. 2) Click on Login with Google account 3) Provide correct details. 4) Check for data in the database.
8	Register (Google)	Register page should be opened. User logging in from google for the first time.	1) Open the register page. 2) Click on Login with Google account 3) Provide correct details.
9	Login	Login page should be opened. (User is not registered)	1) Open the Login page 2) Enter the necessary details.
10	Login	Login page should be opened. User should be registered	1) Open the register page and register 2) Open the login page. 3) Do not enter the necessary details.
12	Login	Login page should be opened. User should be registered	1) Open the register page and register 2) Open the login page. 3) Enter the necessary details but enter a wrong password.
11	Login	Login page should be opened. User should be registered	1) Open the register page and register 2) Open the login page. 3) Enter the necessary details.
12	Upload data (Executive Officer)	Open the dashboard of executive officer and click the Upload data tab	1) Register and login as an executive officer. 2) Don't upload any file.
13	Upload data (Executive Officer)	Open the dashboard of executive officer and click the Upload data tab (Shape file)	1) Register and login as an executive officer. 2) Upload some random file which is not in the specified format. (shp,GeoJSON - allowed format) 3) Check the DB (should not contain the file).

14	Upload data (Executive Officer)	Open the dashboard of executive officer and click the Upload data tab (Data file)	1) Register and login as an executive officer. 2) Upload some random file which is not in the specified format. (csv,excel - allowed format) 3) Check the DB (should not contain the file).
15	Upload data (Executive Officer)	Open the dashboard of executive officer and click the Upload data tab (Shape file)	1) Register and login as Executive officer. 2) Choose a file in correct format but a repeated name. 3) Click on the upload file button. 4) Check the DB. It should not contain the file
16	Upload data (Executive Officer)	Open the dashboard of executive officer and click the Upload data tab (Data file)	1) Register and login as Executive officer. 2) Choose a file in correct format but a repeated name. 3) Click on the upload file button. 4) Check the DB. It should not contain the file
17	Upload data (Executive Officer)	Open the dashboard of executive officer and click the Upload data tab (Shape file)	1) Register and login as Executive officer. 2) Choose a file in correct format. 3) Click on the upload file button. 4) Check the DB. File should be there.
18	Upload data (Executive Officer)	Open the dashboard of executive officer and click the Upload data tab (Data file)	1) Register and login as Executive officer. 2) Choose a file in correct format. 3) Click on the upload file button. 4) Check the DB. File should be there.
19	Upload data (Manager)	Open the dashboard of the manager	1) Register and login as a manager. Click CFP calculation -> add nodes manually. 2) Don't fill in the fields.

20	Upload data (Manager)	Open the dashboard of the manager	1) Register and login as a manager and Click CFP calculation -> add nodes manually. 2) Fill invalid source and destination nodes. 3) Check the DB
21	Upload data (Manager)	Open the dashboard of the manager	1) Register and login as a manager. Click CFP calculation -> add nodes manually. 2) Fill valid source and destination nodes. 3) Choose a path. 4) Check the DB for data.
22	Route-wise carbon footprint	Open the dashboard of the manager	1) Register as a manager and login. 2)Click CFP calculation. 3) Give the nodes as inputs. 4) Enter the number of trucks. 5) Get the CFP for that route.
23	Shortest path between nodes	Open the dashboard of the manager	1) Register as a manager and login. 2) Click CFP calculation. 3) Give the nodes as inputs. 4) Enter the number of trucks. 5) Enter 'Get paths'
24	Path with least CFP	Open the dashboard of the manager	1) Register as a manager and login. 2) Click on the CFP calculation tab. 3) Give the nodes as inputs. 4) Enter the number of trucks. 5) Enter 'Get paths'
25	Company's carbon footprint	Open the dashboard of the manager	1) Register as a manager and login. 2) Click on the "Log"
26	Choose from map	Open the dashboard of the manager	1) Register as a manager and login. 2) Click on the CFP calculation tab. 3) Click on "Add nodes on map". 4) Choose the nodes on the map. 5) Check the DB.

27	Identifying hotspots with high carbon emission {Parameter-wise)	Open the dashboard of the executive officer and click on visualise data tab	1) Register as a EO and login. 2) Click on "Visualise".
28	Identifying hotspots with high carbon emission	Open the dashboard for executive officer and click on Visualise data tab	1) Register as a EO and login. 2) Click on "Visualise" and select "Year" from dropdown
29	Identifying hotspots with high carbon emission	Open the dashboard for executive officer and click on Visualise data tab	1) Register as a EO and login. 2) Click on "Visualise" and choose "Vehicle" from dropdown
30	Identifying hotspots with high carbon emission	Open the dashboard for executive officer and click on Visualise data tab	1) Register as a EO and login. 2) Click on "Visualise" and choose Radius size from slider
31	Identifying hotspots with high carbon emission	Open the dashboard for executive officer and click on Visualise data tab	1) Register as a EO and login. 2) Click on "Visualise" and choose Blur size from slider
32	Logout	Login	1)Login. 2)Click on Logout. 3)Check local storage.