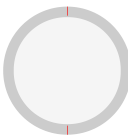



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The dot product of the two vectors is then calculated using the above-mentioned formula. There are 7 attributes involved in the similarity calculation, so taking $n = 7$, the formula can be re-written with consideration of the attributes as:

If the 7 attributes of A is named as $a_1, a_2, a_3, a_4, a_5, a_6, a_7$ and that of B is named as $b_1, b_2, b_3, b_4, b_5, b_6, b_7$ and then the similarity score is computed as:

1.1.1. Phase 2: Predicted rating generation using weighted average

The second phase is the implementation of the predicted rating calculation to find which charging station is to be recommended. The system calculates the weighted average using the method as mentioned in section 4.2.4 of this document.

Here, w is the weight value, r_i is the item value and w_i is the weight obtained after the computation. For this system, the weight is the similarity score between the charging stations. The item value is the rating provided to the charging station by the user. So, if we consider r_i as the predicted rating of charging station for user u , w_i as the similarity score between the charging station i and u , and r_u as the rating provided by user u to charging station i then we can rewrite the formula as:

1.2. Testing

Testing is the process subjecting the system to various conditions, scenarios, or constraints so as to find whether the system performs correctly and desirably. Testing is performed parallelly to coding. If any bugs or errors are found during the testing phase, it is fixed via editing the code or re-coding.

Validation ensures that the software satisfies the user requirements. If the software matches the user requirements, it is said to be validated.

Verification makes sure that the system is developed following the proper specifications and methodologies. If the software matches the development criteria it is said to be verified.

This system was subject to various scenarios and the outcome was noted. The system was tested using test cases which have been documented as:

Table 5.2: Test case for signup

Test Case ID

TC-1

Test Scenario

Register new user

Actions

1. Open Register page
2. Input the name, email, and password.
3. Click "Register" button.

Input

Name: Ram Dhami

Email: ramdhami@gmail.com

Password: 23morang@33

Confirm password: 23morang@33

Expected Results

- * Redirected to recommendations page.
- * Ram Dhami is displayed on top right of screen.

Observed Results

As expected

Assertion

Pass

Table 5.3: Test case for login

Test Case ID

TC-2

Test Scenario

Login existing user

Actions

1. Open Login page
2. Input the email and password.
3. Click "Login" button.

Input

Email: ramdhami@gmail.com

Password: 23morang@33

Expected Results

- * Redirected to recommendations page.
- * Ram Dhami is displayed on top right of screen.

Observed Results

As expected

Assertion

Pass

Table 5.4: Test case for addition of rating with valid data

Test Case ID

TC-3

Test Scenario

Addition of rating using valid data.

Actions

1. Open rate page.
2. Input the location, the charging station, and rating.
3. Press "Add Rating" button.

Input

Province: Bagmati

District: Kathmandu

Metropolitan: Kathmandu

Ward: 22

Charging Station: Jagat Charging Station

Rating: 4

Expected Results

- * Success message is displayed.
- * "ratings" table is updated.

Observed Results

As expected

Assertion

Pass

Table 5.5: Test case for addition of charging station with valid data

Test Case ID

TC-4

Test Scenario

Addition of charging station with valid data.

Actions

1. Open Add Charging Station page.
2. Input the locations and the charging station details.
3. Press "Add Charging Station"

Input

Name: Shiva Shakti Charging Station

Province: Bagmati

District: Kathmandu

Metropolitan: Kathmandu

Ward: 30

Fast Charging AC Ports: 2

Fast Charging DC Ports: 3

Regular AC Ports: 4

Regular DC Ports: 4

Nearest Restaurant: 312

Nearest Shopping Mall: 569

Nearest Cinema Hall: 452

Expected Results

- * Success message is displayed
- * "charging_stations" table has a new entry with the columns having the values as inputted.
- * Redirect to index page.

Observed Results

As expected

Assertion

Pass

Table 5.6: Test case for addition of charging station with invalid data

Test Case ID

TC-5

Test Scenario

Addition of charging station using invalid data.

Actions

1. Open Add Charging Station page.
2. Input the locations and the charging station details.
3. Press "Add Charging Station" button.

Input

Name: Jagat Charging Station

Province: Bagmati

District: Kathmandu

Metropolitan: Kathmandu

Ward: 22

Fast Charging AC Ports: 2

Fast Charging DC Ports: 3

Regular AC Ports: 4

Regular DC Ports: 4

Nearest Restaurant: 312

Nearest Shopping Mall: 569

Nearest Cinema Hall: -1

Expected Results

* System does not allow the invalid data and error message is displayed

Observed Results

As expected

Assertion

Pass

Table 5.7: Test case for getting recommendation without ward

Test Case ID

TC-6

Test Scenario

Get recommendation of charging station without inputting ward.

Actions

1. Open Recommendations page.
2. Input the location and check the Exclude Ward checkbox.
3. Press "Get recommendation" button.

Input

Province: Bagmati

District: Kathmandu

Metropolitan: Kathmandu

Expected Results

* Top 3 charging stations displayed.

Observed Results

As expected

Assertion

Pass

Table 5.8: Test case for getting recommendation with ward

Test Case ID

TC-7

Test Scenario

Get recommendation of charging station.

Actions

1. Open Recommendations page.
2. Uncheck the Exclude Ward checkbox.
3. Input the location.
4. Press "Get recommendation" button.

Input

Province: Bagmati

District: Kathmandu

Metropolitan: Kathmandu

Ward: 3

Expected Results

* Top 3 charging stations displayed.

Observed Results

As expected

Assertion

Pass

2

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