

DBMS PROJECT REPORT

Industry Carbon Footprint Management System

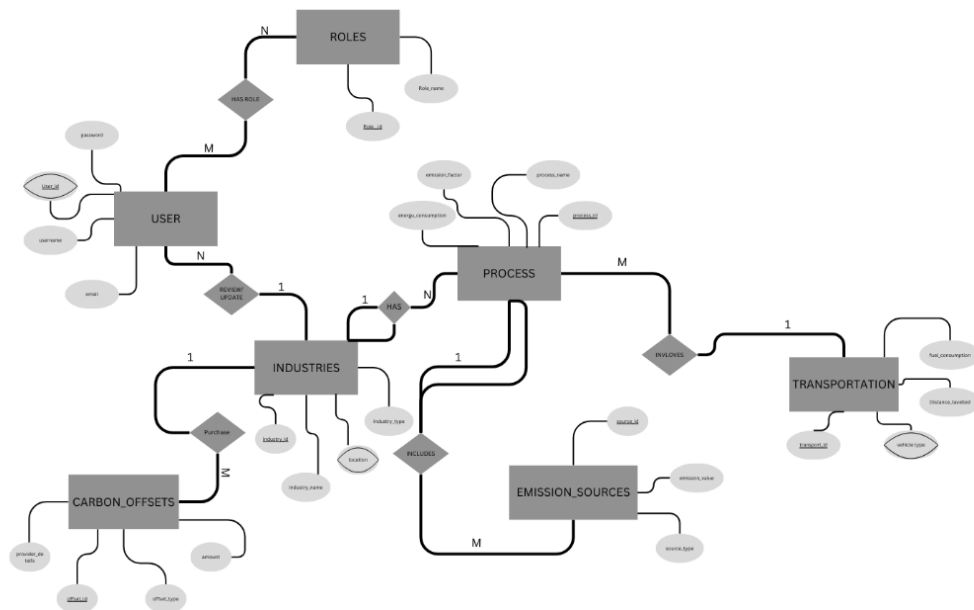
PES1UG22CS324 – Maitreya Tiwary

PES1UG22CS350 – M K Gagan

Introduction:

The Industry Carbon Footprint Management System (ICFMS) is a robust database solution aimed at tracking, managing, and reducing carbon emissions in the industrial sector. Utilizing MySQL architecture, it efficiently organizes critical data on industrial activities, emissions, and carbon offsets, ensuring data integrity through the use of foreign key constraints and triggers. The system offers real-time monitoring, compliance reporting, and actionable insights, assisting industries in meeting regulatory standards and enhancing sustainability efforts. Designed to be secure, scalable, and efficient, ICFMS enables industries to make informed, environmentally-conscious decisions.

ER Diagram:



Relational Schema:

Role	Role-id	Role-name
User	User_id	Username Email Password Role_id Industry_id
Industries	Industry_id	Industry_name Location Industry_type
Process	Process_id	Process_name Energy_consumption Emission_factor Industry_id
Carbon_offsets	Offset_id	Offset_type Amount Provider_details Industry_id
Transportation	Transport_id	Vehicle_type Distance_travelled Fuel_consumption Industry_id
Emission_sources	Source_id	Source_type Emission_value Process_id Industry_id

Triggers:

1. Trigger: before_industry_delete

This trigger executes before a row is deleted from the industries table.

When an industry is deleted, it also deletes all associated rows in the Process table where the industry_id matches the industry_id of the industry being deleted.

Ensures referential integrity by cleaning up dependent records in the Process table.

Prevents orphaned rows in the Process table that reference an industry that no longer exists.

2. Trigger: before_process_delete

This trigger executes before a row is deleted from the Process table.

When a process is deleted, it also deletes all related rows in the Emission_Sources table where the process_id matches the process_id of the process being deleted.

Ensures referential integrity by cleaning up dependent records in the Emission_Sources table.

Prevents orphaned rows in the Emission_Sources table that reference a process that no longer exists.

Functions:

1. Function: get_total_carbon_offset

This function takes an industryId as input and calculates the total carbon offset for that industry by summing the amount_offset values in the Carbon_Offsets table for the given industry_id.

The function returns the total carbon offset as a DECIMAL(10,2) value.

- Steps/Logic:

1. Declares a variable totalOffset to hold the sum.
2. Executes a SELECT query with a SUM aggregate function to calculate the total offset for the specified industry_id.
3. Assigns the result to totalOffset.
4. Returns the calculated value.

Provides a quick way to retrieve the total carbon offset for a specific industry.

Can be used in other SQL queries, reports, or applications that need to access this information.

Aggregated Queries:

1. The function get_total_carbon_offset includes an aggregated query:

```
SELECT SUM(amount_offset) INTO totalOffset
```

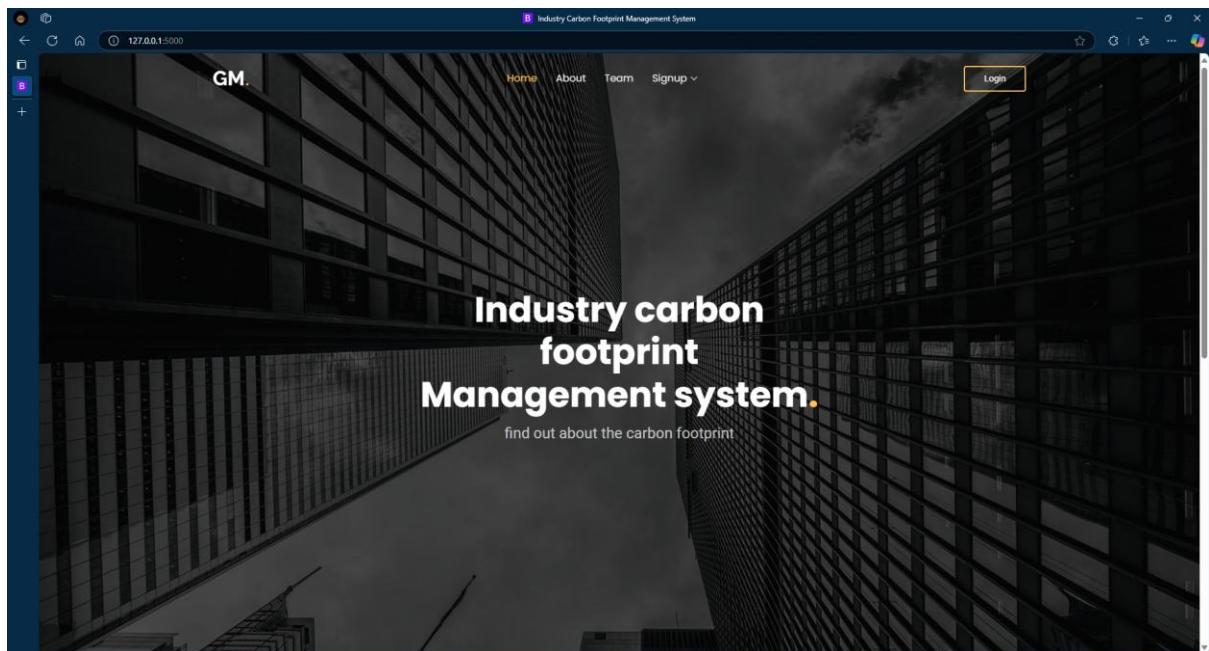
```
FROM Carbon_Offsets
```

```
WHERE industry_id = industryId;
```

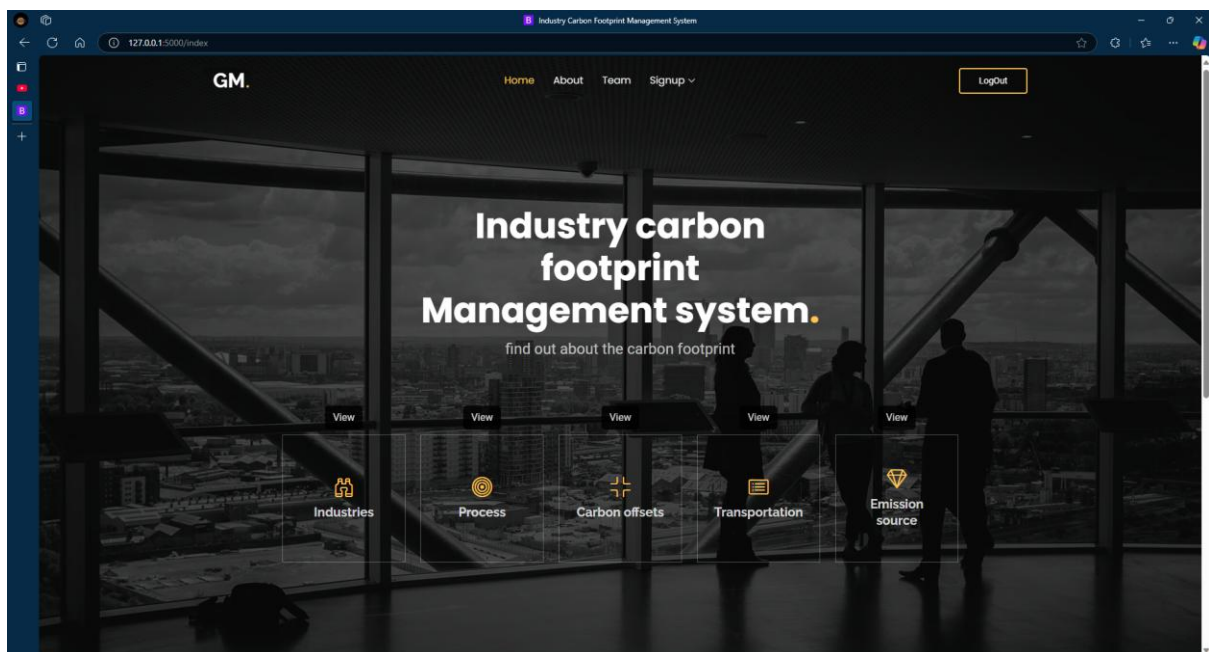
It calculates the total (SUM) of the amount_offset column for rows in the Carbon_Offsets table where the industry_id matches the given input parameter (industryId).

Working Instances:

Home screen:

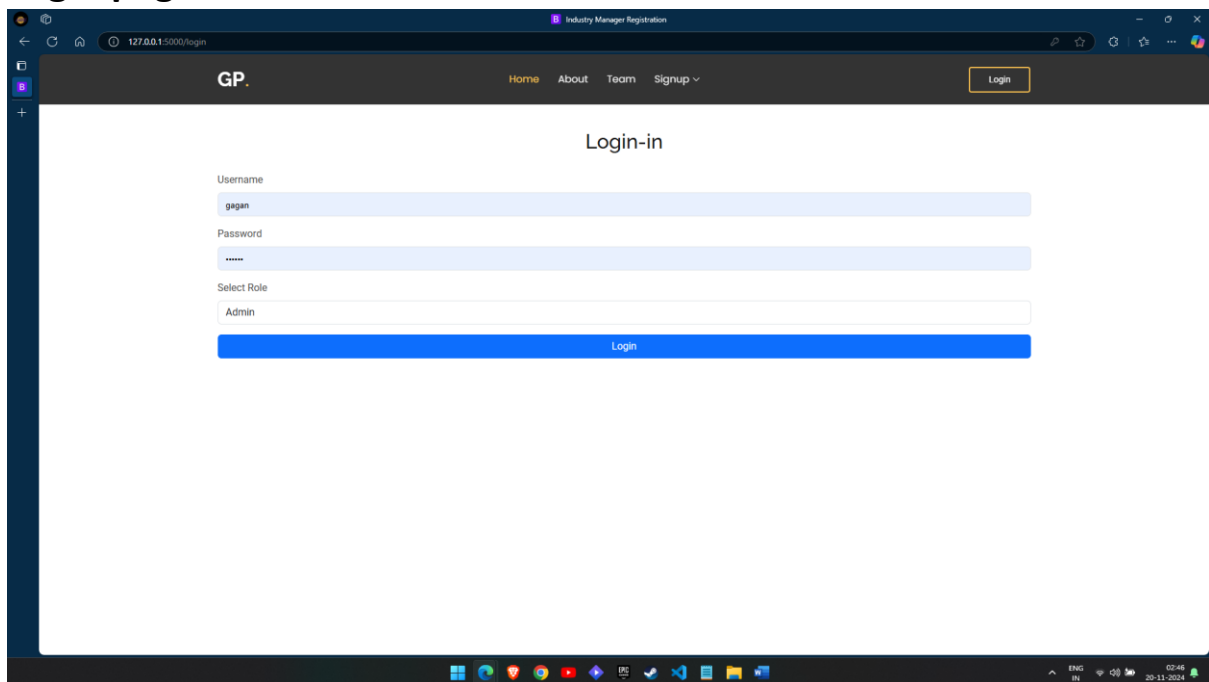


Dashboard:



This is the page the user will see once he has logged in. The different tiles take him into adding into the tables with the respective labels

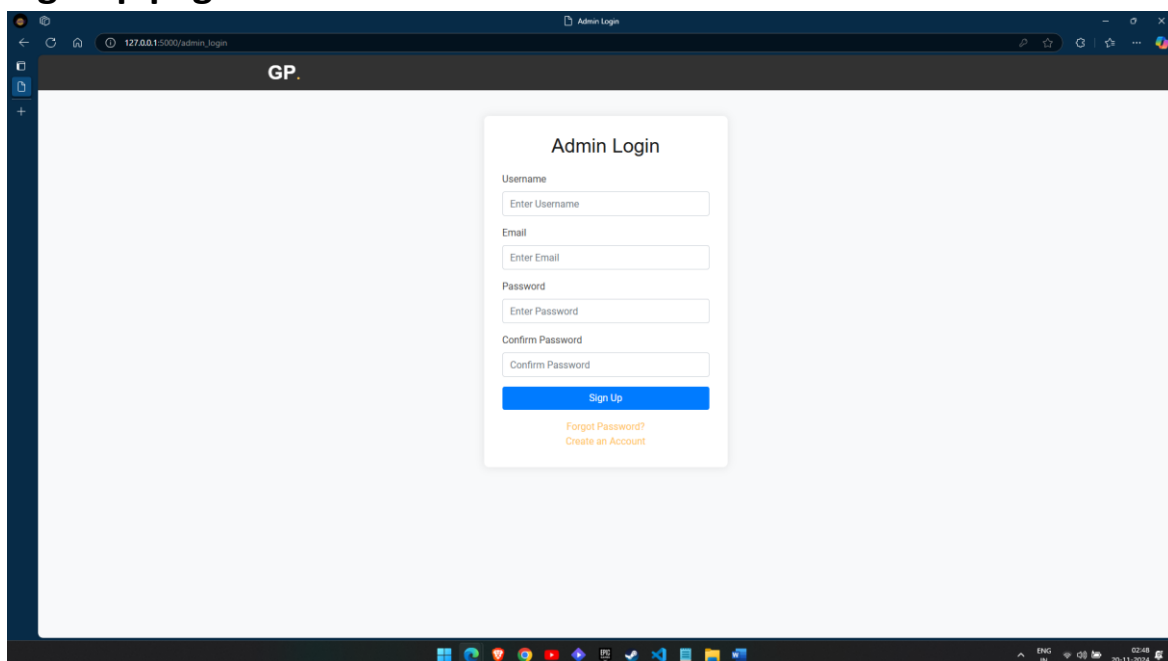
Login page:



The screenshot shows a web browser window with the URL `127.0.0.1:5000/login`. The page has a dark blue header with the GP logo and navigation links: Home, About, Team, and Signup. A Login button is in the top right. The main content area is titled "Login-in" and contains a form with the following fields: Username (with the value "gagan"), Password (masked with dots), Select Role (with the value "Admin"), and a blue Login button.

Here, pre-existing users can login using their credentials, and based on the permission level allotted to their account, they will be able to create changes, or only view the details ahead.

Sign-up page:

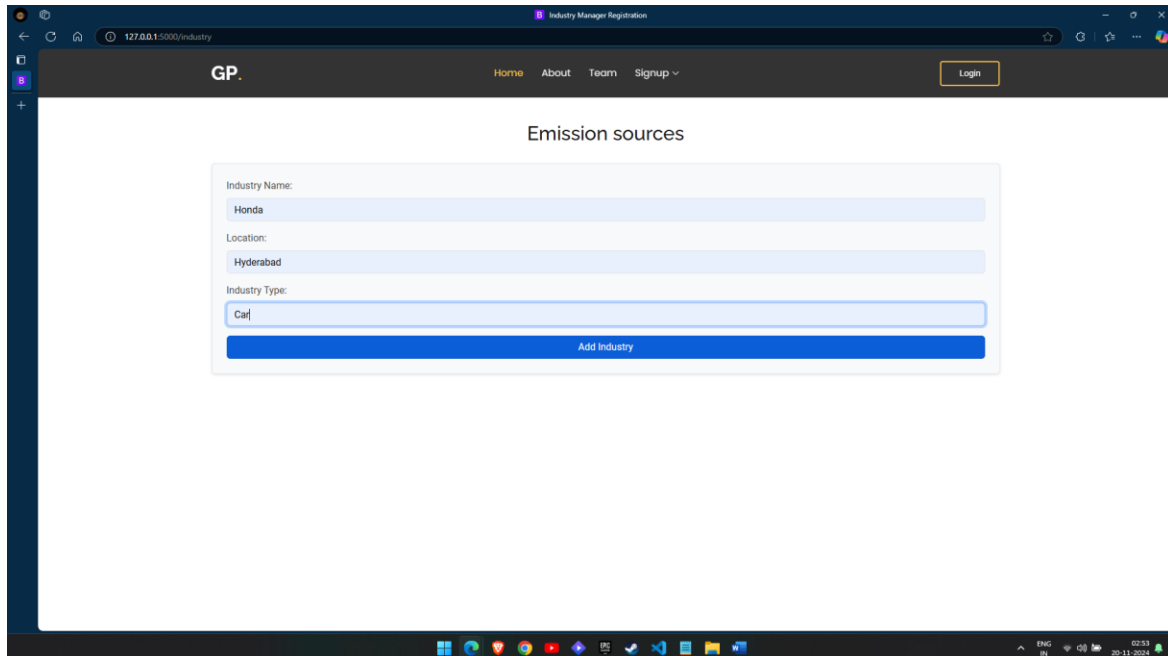


The screenshot shows a web browser window with the URL `127.0.0.1:5000/admin_login`. The page has a dark blue header with the GP logo. The main content area is titled "Admin Login" and contains a form with the following fields: Username (placeholder "Enter Username"), Email (placeholder "Enter Email"), Password (placeholder "Enter Password"), and Confirm Password (placeholder "Confirm Password"). Below the fields is a blue Sign Up button. At the bottom of the form, there are two links: "Forgot Password?" and "Create an Account".

In the 'sign-up' tab, the user is prompted with options to sign up as 'admin', 'industry manager', 'auditor' or 'guest'. Admins have access to view and/or alter any table, Industry managers can alter their

respective data as well as view any data and auditors and guests can only view data.

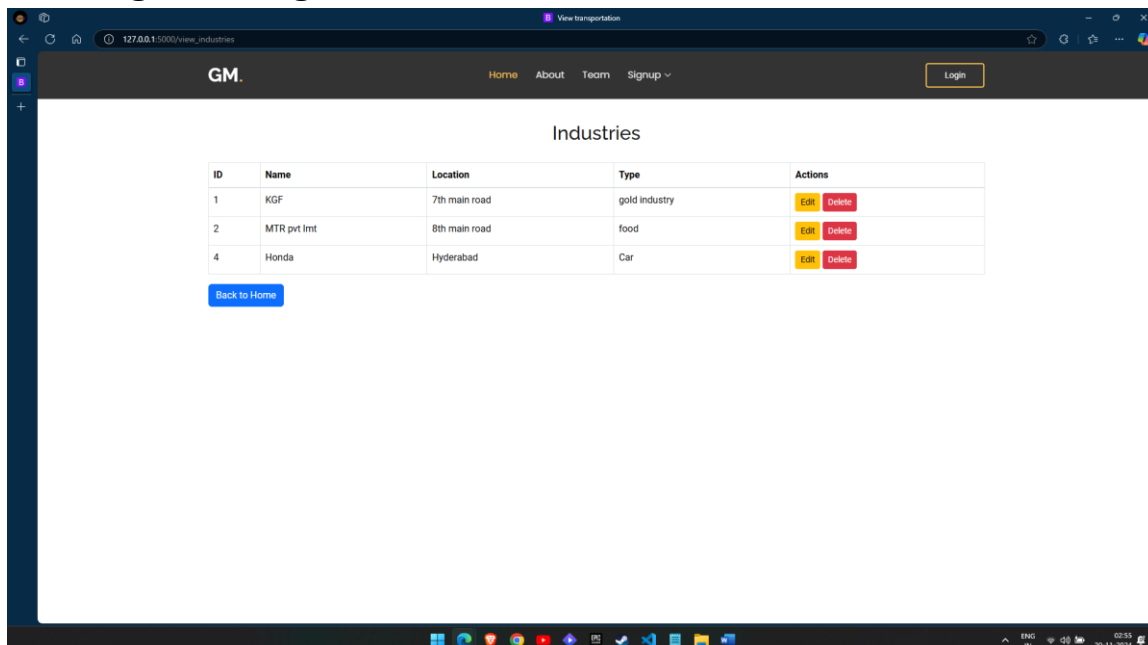
Adding a new industry:



The screenshot shows a web application interface for adding a new industry. The page title is "Emission sources". The form contains three input fields: "Industry Name" with the value "Honda", "Location" with the value "Hyderabad", and "Industry Type" with the value "Car". Below these fields is a blue button labeled "Add Industry". The application's header includes the logo "GP." and navigation links for "Home", "About", "Team", and "Signup", along with a "Login" button. The browser's address bar shows the URL "127.0.0.1:5000/industry".

Here, we can add a new industry into the table.

Viewing/deleting Industries:



The screenshot shows a web application interface for viewing and deleting industries. The page title is "Industries". The table displays the following data:

ID	Name	Location	Type	Actions
1	KGF	7th main road	gold industry	Edit Delete
2	MTR pvt lmt	8th main road	food	Edit Delete
4	Honda	Hyderabad	Car	Edit Delete

Below the table is a blue button labeled "Back to Home". The application's header includes the logo "GM." and navigation links for "Home", "About", "Team", and "Signup", along with a "Login" button. The browser's address bar shows the URL "127.0.0.1:5000/view_industries".

Here, we can view the added industries, as well as edit the information of, or delete an industry. Similar tasks can be carried out for processes, carbon offsets, transportation and emission sources.