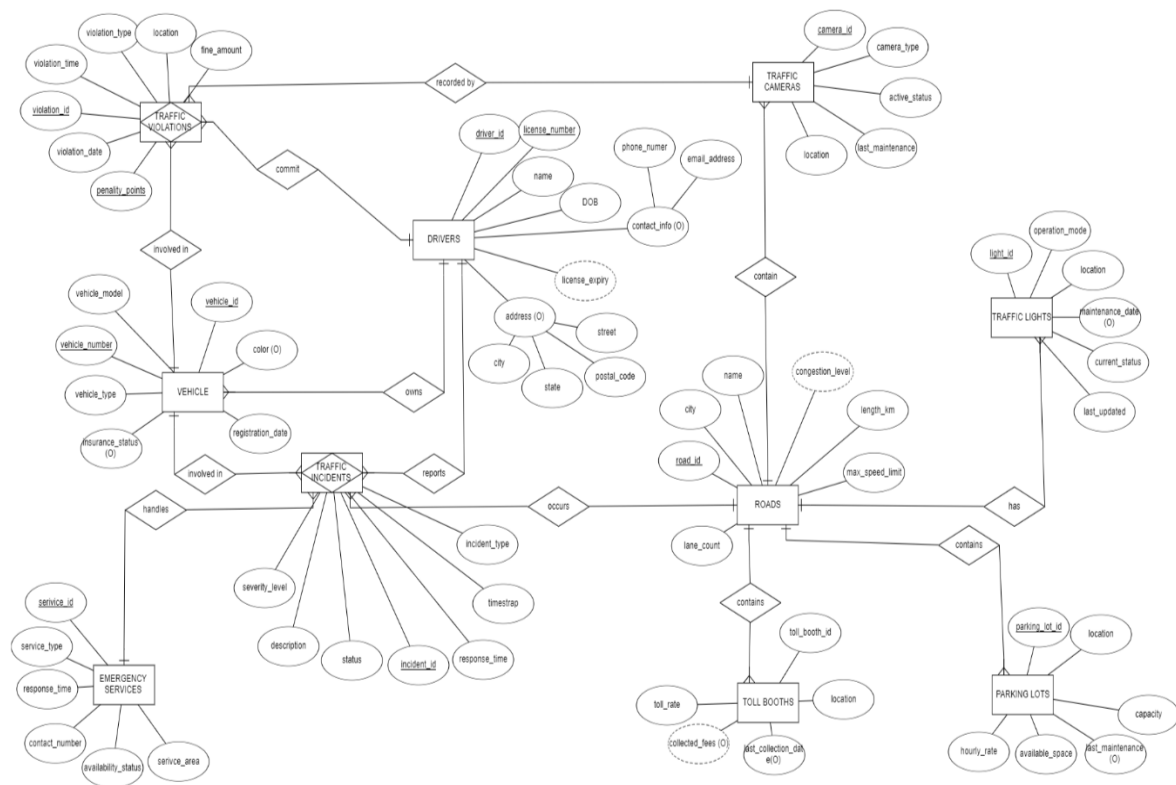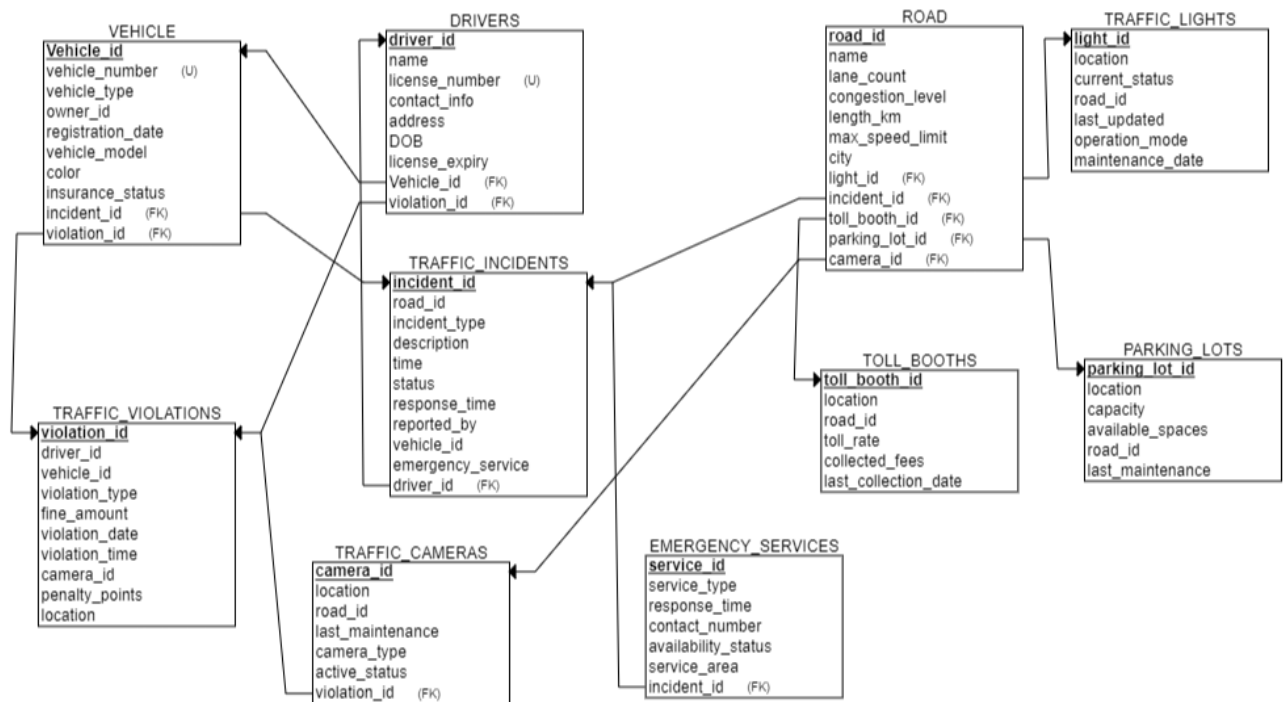# TRAFFIC VISION SYSTEM

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23PW32 – SRISUDHARSHINI KB

ER DIAGRAM:

RELATIONAL SCHEMA:

TOOLS USED:

1. PyCharm
2. Django
3. MySQL Workbench

ABSTRACT:

The Traffic Vision System is an advanced traffic management platform designed to monitor, analyse, and optimize road traffic in real-time. It integrates multiple traffic-related entities such as vehicles, drivers, traffic lights, roads, cameras, and emergency services to create a holistic solution for managing urban and highway traffic. The system leverages data from these sources to enhance safety, streamline traffic flow, reduce congestion, and quickly respond to incidents.

TABLE DESCRIPTION:

1. Vehicles:

- **Attributes**:

  - vehicle_id: Unique identifier for each vehicle.
  - license_plate: The vehicle's registration number.
  - make: Vehicle's manufacturer (e.g., Toyota, Ford).
  - model: The specific model of the vehicle.
  - year: Year of manufacture.
  - type: Type of vehicle (e.g., car, truck, motorcycle).
  - owner_id: The owner (Driver) associated with the vehicle.

- **Relationships**:

  - **Belongs to Drivers**: Each vehicle is owned by a driver (belongs to relationship with the Drivers entity).

  - **May Commit Violations**: Vehicles may be involved in traffic violations (has relationship with Traffic Violations).

  - **May Appear in Incidents**: Vehicles may be involved in traffic incidents (in relationship with Traffic Incidents).

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2. Drivers:

- **Attributes**:

  - driver_id: Unique identifier for each driver.

  - name: Driver's full name.

  - license_number: Driver's license number.

  - phone_number: Driver's contact information.

  - address: Driver's home address.

  - status: Active or suspended status of the driver.

  - registration_date: Date when the driver was registered in the system.

- **Relationships**:

- **Owns Vehicles**: Drivers can own multiple vehicles (owns relationship with Vehicles).
- **May Commit Violations**: Drivers can be associated with traffic violations (commits relationship with Traffic Violations).
- **May Be Involved in Incidents**: Drivers can be involved in traffic incidents (participates in relationship with Traffic Incidents).
- **May Request Emergency Services**: In the case of traffic incidents, drivers may request emergency services (requests relationship with Emergency Services).

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3. Traffic Lights:

- **Attributes**:
  - traffic_light_id: Unique identifier for each traffic light.
  - location: GPS location of the traffic light.
  - status: Current status (e.g., green, yellow, red).
  - last_maintenance: The date of the last maintenance check.
- **Relationships**:
  - **Controls Traffic**: Traffic lights regulate the flow of vehicles at specific intersections (controls relationship with Roads).
  - **Monitors Violations**: Traffic lights may capture violations such as running red lights (monitors relationship with Traffic Violations).

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4. Roads:

- **Attributes**:
  - road_id: Unique identifier for each road.
  - name: Name of the road.
  - type: Type of road (e.g., highway, city road).
  - length: Length of the road (in kilometers).
  - condition: The current condition of the road (e.g., good, under construction).
- **Relationships**:

- **Contains Traffic Lights**: Roads may have traffic lights installed at intersections (has relationship with Traffic Lights).

- **Monitors Traffic**: Roads monitor the flow of traffic (monitors relationship with Traffic Cameras).

- **May Be Scene of Incidents**: Traffic incidents can occur on roads (has relationship with Traffic Incidents).

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5. Traffic Incidents:

- **Attributes**:

  - incident_id: Unique identifier for each incident.

  - date_time: Date and time of the incident.

  - location: Location of the incident.

  - description: Detailed description of the incident.

  - severity: Severity of the incident (e.g., minor, major).

- **Relationships**:

  - **Involves Vehicles**: Traffic incidents may involve one or more vehicles (involves relationship with Vehicles).

  - **Involves Drivers**: Drivers are participants in traffic incidents (involves relationship with Drivers).

  - **Requests Emergency Services**: Some incidents may require emergency services (requests relationship with Emergency Services).

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6. Emergency Services:

- **Attributes**:

  - service_id: Unique identifier for emergency services.

  - type: Type of service (e.g., ambulance, fire brigade, police).

  - response_time: Time taken to respond to an emergency.

  - status: Current status of the service (e.g., dispatched, on-site).

- **Relationships**:

- **Responds to Incidents**: Emergency services are dispatched in response to traffic incidents (responds relationship with Traffic Incidents).

- **Requested by Drivers**: In case of an emergency, drivers can request assistance from emergency services (requested by relationship with Drivers).

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7. Traffic Violations:

- **Attributes**:
  - violation_id: Unique identifier for each violation.
  - date_time: Date and time the violation occurred.
  - type: Type of violation (e.g., speeding, running a red light).
  - fine_amount: The fine amount for the violation.
  - status: Status of the violation (e.g., pending, paid).

- **Relationships**:
  - **Committed by Drivers**: Violations are committed by drivers (committed by relationship with Drivers).
  - **Involves Vehicles**: Violations may involve specific vehicles (involves relationship with Vehicles).
  - **Monitored by Traffic Lights**: Certain violations, such as running red lights, are monitored by traffic lights (monitored by relationship with Traffic Lights).
  - **Monitored by Cameras**: Violations are captured by traffic cameras (monitored by relationship with Traffic Cameras).

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8. Traffic Cameras:

- **Attributes**:
  - camera_id: Unique identifier for each camera.
  - location: GPS location where the camera is installed.
  - status: Operational status of the camera (e.g., active, under maintenance).

- last_maintenance: Date of the last maintenance check.

- **Relationships**:

  - **Monitors Roads**: Cameras monitor traffic activity on roads (monitors relationship with Roads).

  - **Captures Violations**: Cameras capture traffic violations, such as speeding (captures relationship with Traffic Violations).

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9. Parking Lots:

- **Attributes**:

  - parking_lot_id: Unique identifier for each parking lot.

  - location: GPS location of the parking lot.

  - capacity: Number of vehicles the parking lot can accommodate.

  - status: Current availability status (e.g., full, available).

- **Relationships**:

  - **Provides Parking for Vehicles**: Parking lots provide parking spaces for vehicles (provides relationship with Vehicles).

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10. Toll Booths:

- **Attributes**:

  - toll_booth_id: Unique identifier for each toll booth.

  - location: GPS location of the toll booth.

  - toll_fee: The fee charged for passing through the toll booth.

  - status: Operational status of the toll booth (e.g., active, inactive).

- **Relationships**:

  - **Collects Fees from Vehicles**: Toll booths collect fees from vehicles passing through (collects relationship with Vehicles).

  - **Monitors Traffic**: Toll booths monitor traffic flow (monitors relationship with Roads).

INTERFACE PAGES:
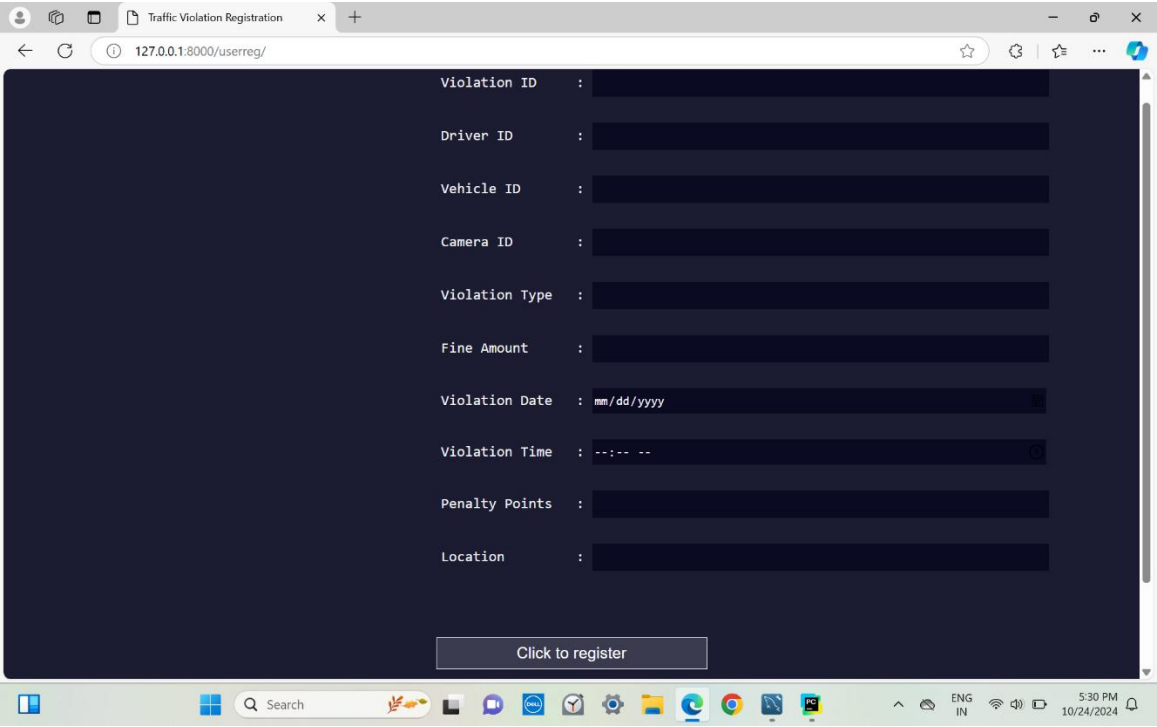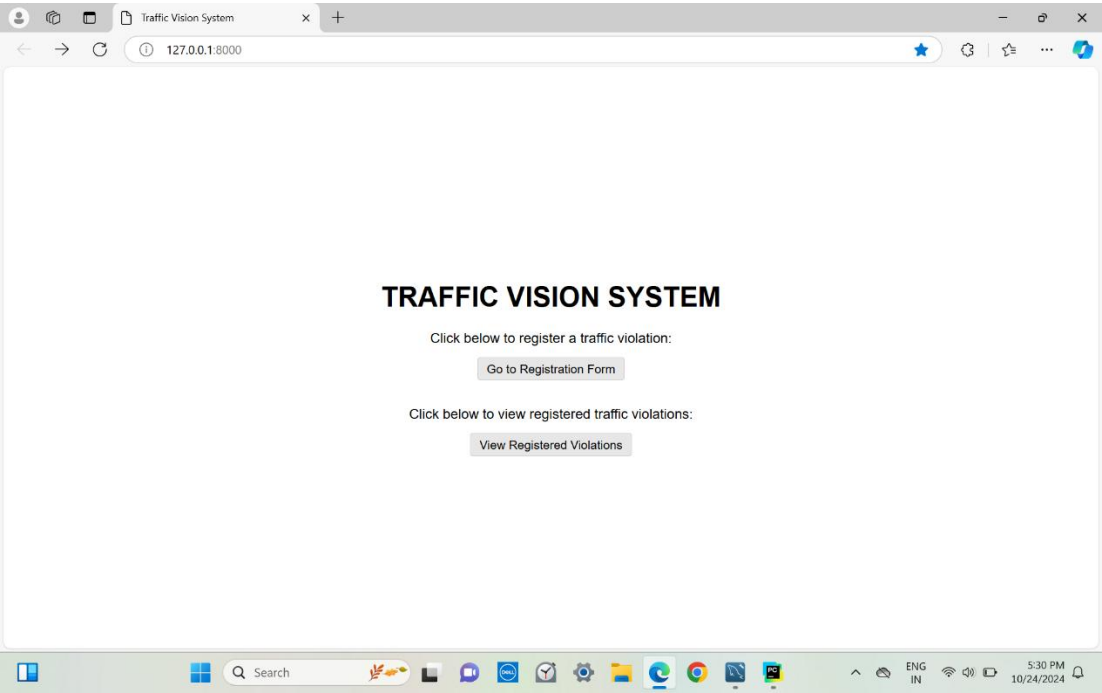
Traffic Violation Records

Driver ID	Vehicle ID	Violation Type	Fine Amount	Violation Date	Violation Time	Camera ID	Penalty Points	Location	Violation ID	Actions
101	201	speeding	1500.00	Oct. 24, 2024	5:05 p.m.	301	3	coimbatore	401	Delete | Edit
102	202	Red Light Violation	2500.00	Oct. 2, 2024	9:45 a.m.	302	3	Mettupalayam Road	402	Delete | Edit
103	203	Speeding	1500.00	Oct. 24, 2024	5:12 p.m.	303	2	East Coast Road	403	Delete | Edit

3NF (THIRD NORMAL FORM):

Roads(road_id, name, lane_count, congestion_level, length_km, max_speed_limit, city)

Traffic_lights(light_id, location, current_status, road_id, last_updated, operation_mode, maintenance_date)

Toll_Booths(toll_booth_id, location, road_id, toll_rate, collected_fees, last_collection_date)

Drivers(driver_id, name, license_number, contact_info, address, date_of_birth, license_expiry)

Vehicles(vehicle_id, vehicle_number, vehicle_type, owner_id, registration_date, vehicle_model, color, insurance_status)

Emergency_Services(service_id, service_type, response_time, contact_number, availability_status, service_area)

Traffic_Incidents(incident_id, road_id, incident_type, description, timestamp, status, response_time, severity_level, reported_by, vehicle_id, emergency_service_id)

Traffic_Cameras(camera_id, location, road_id, last_maintenance, camera_type, active_status)

Traffic_Violations(violation_id, driver_id, vehicle_id, violation_type, fine_amount, violation_date, violation_time, camera_id, penalty_points, location)

Parking_Lots(parking_lot_id, location, capacity, available_spaces, hourly_rate, road_id, last_maintenance)