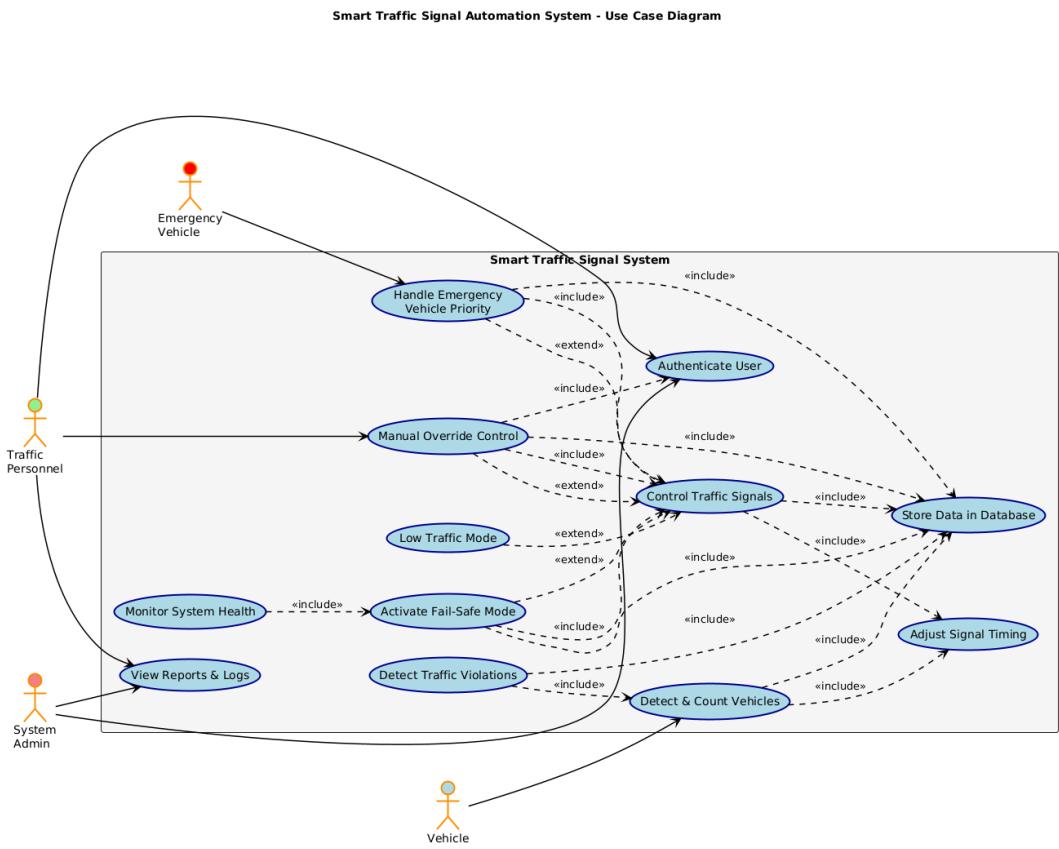# Use Case Diagram

Use Cases Identification

Traffic Personnel Use Cases

Manual Override Control - Take manual control of traffic signals during special situations

View Reports & Logs - Access traffic data and violation reports

Authenticate User - Login to system with credentials

System Admin Use Cases

Authenticate User - Verify login credentials for system access

View Reports & Logs - Monitor all system activities and events

Monitor System Health - Check system status and performance

Vehicle Use Cases

Detect & Count Vehicles - Camera captures and OpenCV processes vehicle images

Adjust Signal Timing - Modify green signal duration based on traffic density

Detect Traffic Violations - Identify wrong-way driving and overspeeding

Store Data in Database - Save vehicle counts and violation records

Emergency Vehicle Use Cases

Handle Emergency Priority - Give immediate green signal to emergency vehicles

Override Normal Sequence - Stop regular cycle for emergency passage

Store Data in Database - Log emergency events with timestamp

System Use Cases (Backend)

Control Traffic Signals - Sequential operation through all four sides

Activate Fail-Safe Mode - Fixed 30-second cycles when system fails

Low Traffic Mode - Reduced 10-15 second cycles during low traffic

Store Data in Database - Save all events to MySQL database

Actors Identification

Primary Actors (Direct Users)

Traffic Personnel - Operator who monitors and controls traffic signals manually

System Admin - Administrator with full system access and monitoring rights

Vehicle - Regular vehicles (cars, trucks, buses) detected by camera

Emergency Vehicle - Ambulances and fire trucks requiring priority passage

Secondary Actors (Systems/Services)

Camera System - Captures images at regular intervals for vehicle detection

OpenCV - Computer vision library for image processing and vehicle detection

MySQL Database - Stores traffic data, violations, and system events

Fail-Safe System - Backup mechanism ensuring safe operation during failures