

SMART TRAFFIC MANAGEMENT SYSTEM USING ANPR AND ATCC

***ANPR - AUTOMATE NUMBER PLATE RECOGNITION
ATCC - AUTOMATIC TRAFFIC CLASSIFICATION ON CONTROL***

INTRODUCTION

A robust and intelligent traffic management system leveraging ANPR (Automatic Number Plate Recognition) and ATCC (Automatic Traffic Classification and Control) to enhance traffic efficiency and safety. The system integrates **real-time monitoring**, **automated detection**, and **data analysis** for seamless traffic regulation and incident management , **security**, and **improve road safety**.

By integrating **computer vision technologies** with real-time data processing, these solutions offer a comprehensive approach to solving traffic-related challenges.



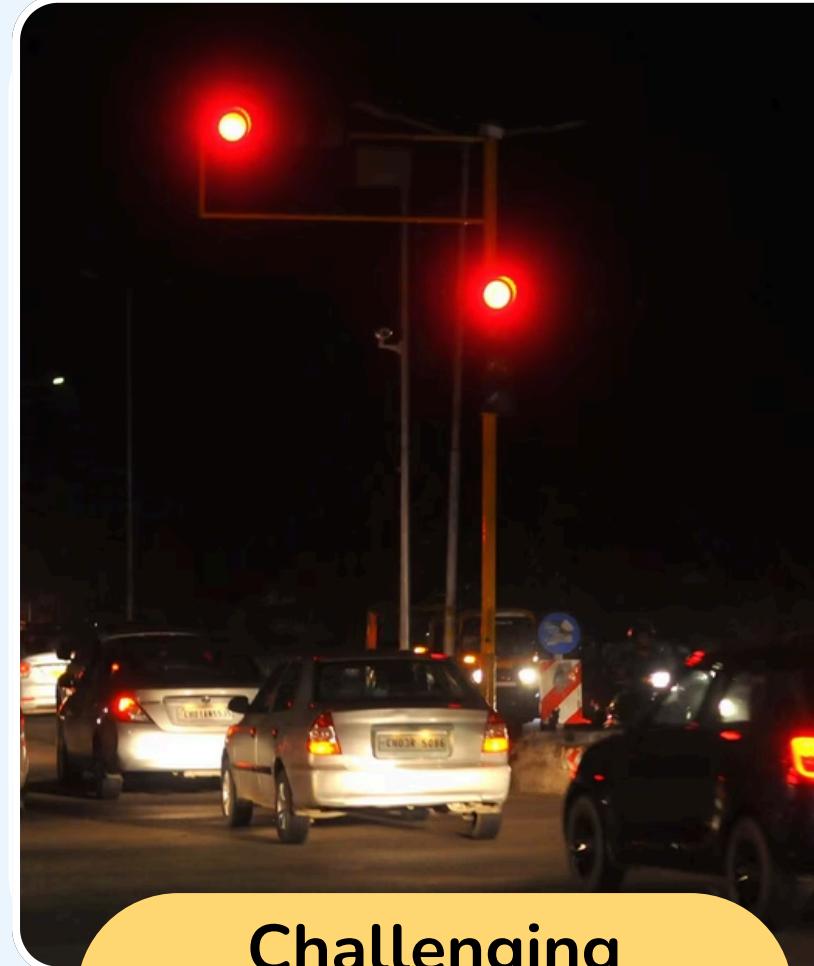
PROBLEM STATEMENT



Traffic Congestion:
causing delays and
fuel wastage



Inefficient Traffic Monitoring :
data overload, time-
consuming and prone
to errors

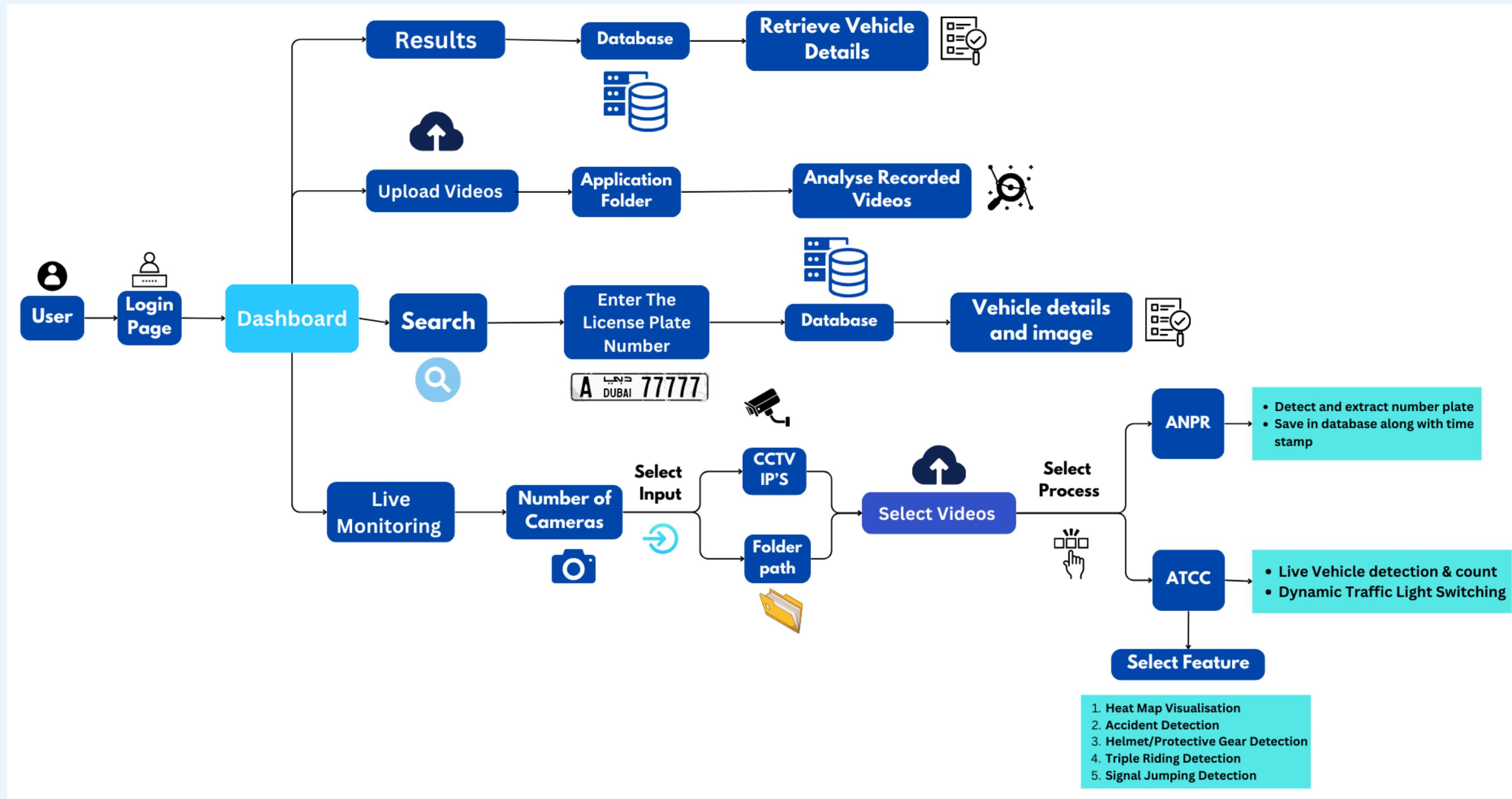


**Challenging
Violation Detection:**
like speeding, signal
jumping, or
unregistered vehicles



Security Risks :
Tracking vehicles
involved in crimes or
unauthorized access

SYSTEM ARCHITECTURE



TECHNOLOGIES USED

- **Flask (Web Framework)**: Facilitates integration of web interface with backend logic.
- **HTML, CSS, JavaScript**: Create user-friendly, responsive, and interactive web interfaces.

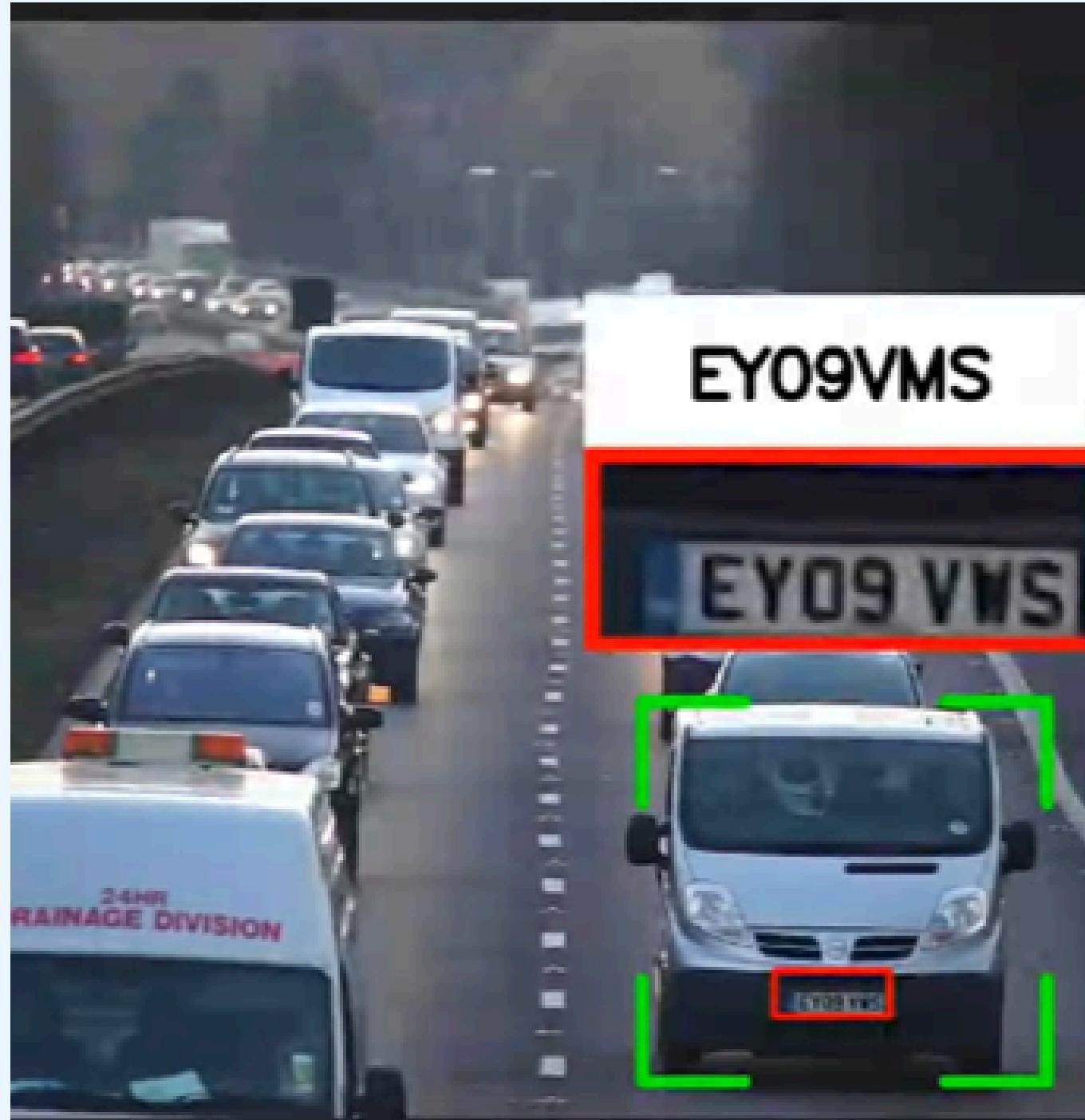
Back-End:

- **Python (Core Language)**: Powering computer vision, ML, and OCR functionalities.
- **OpenCV & YOLO**: For real-time vehicle detection, classification, and counting.
- **PyTesseract**: OCR-based license plate recognition.
- **MySQL**: Stores traffic data, violations, and actionable insights.
- **Dynamic Graphs & Heatmaps**: Visualizes traffic patterns and congestion data.

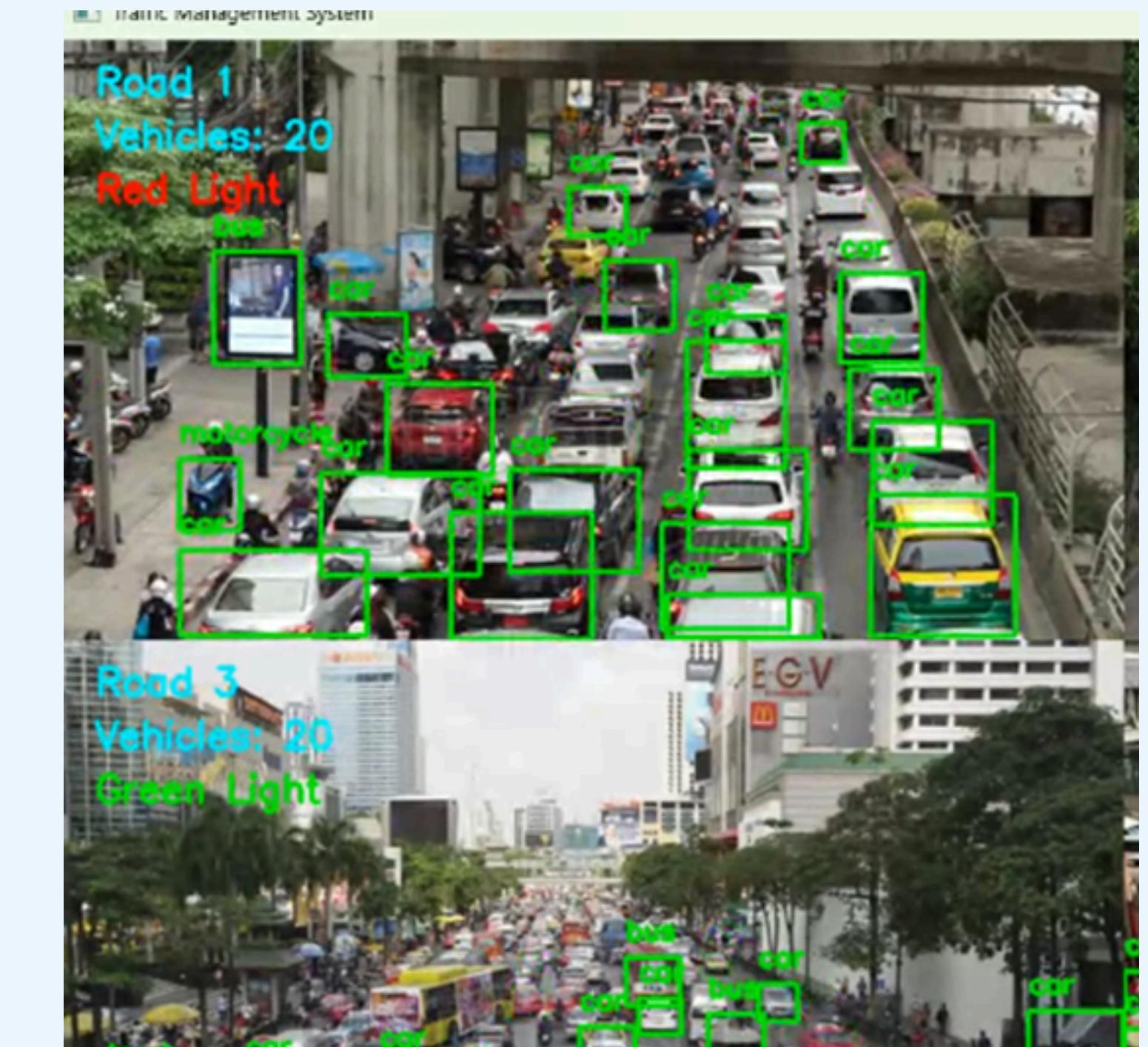
Additional Libraries:

- **TensorFlow**: Used for ML model implementation.
- **Threading & os**: For concurrent processes and system-level operations.
- **Skimage & Imutils**: Assist in image processing and optimization tasks.

ANPR & ATCC



Automatic Number Plate Recognition



Automatic Traffic Classification on Control

ADDITIONAL FEATURES



HeatMap Visualisation



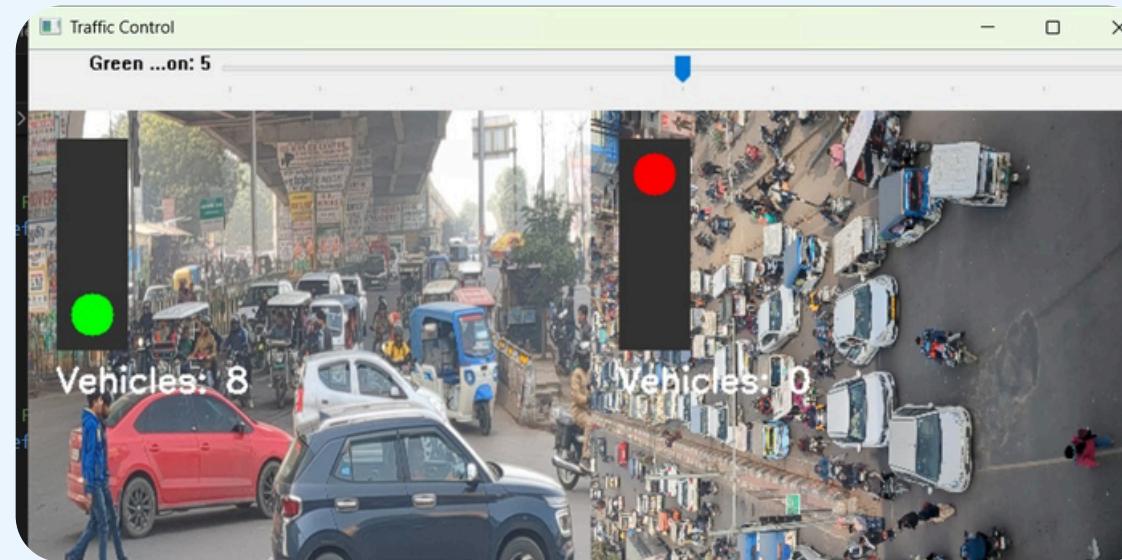
Helmet Detection



Accident Detection



Triple Riding Detection



Dynamic Traffic Light Switching



Signal Jumping Detection

APPLICATIONS

Traffic Management:
Real-time monitoring and classification of vehicles to optimize traffic flow.

Toll Collection:
Automating toll payments by recognizing vehicle details and integrating them with payment systems.

Law Enforcement:
Identifying stolen or unauthorized vehicles and monitoring traffic violations.

Urban Planning:
Analyzing traffic patterns to assist in infrastructure development and policy-making.

Parking Management:
Efficient management of parking spaces by tracking vehicles entering and exiting.

Surveillance:
Enhancing security by tracking vehicles in sensitive or restricted areas.

FUTURE WORK

- Advanced Analytics: Introduce predictive analysis for traffic patterns and violations.
- Hardware Integration: Integrate with IoT-enabled devices like smart traffic signals and sensors.
- AI Integration: Employ deep learning for improved detection accuracy and adaptive traffic control.
- Send real-time alerts : to authorities or app users about traffic violations, accidents, or congestion via SMS, email, or mobile app notifications.
- Data Visualization Dashboard: Develop an interactive dashboard with detailed visualizations, including heatmaps, traffic flow simulations, and congestion points, for administrators and city planners.
- Integrate multi-language OCR for AMPR.

THANK YOU

