

Vehicle Detection System Overview

Automated detection technology for efficient traffic management in urban areas



Key Features of the Vehicle Detection System

This section outlines the main features provided

Detection Capabilities of the System

Automated detection of cars and trucks

Traffic Adaptations for Various Conditions

Handles auto-rickshaws and SUVs smoothly



System Architecture Overview

This section provides a comprehensive flowchart illustrating the vehicle detection process from input to output using YOLOv8 technology.

Input → YOLOv8 → Output

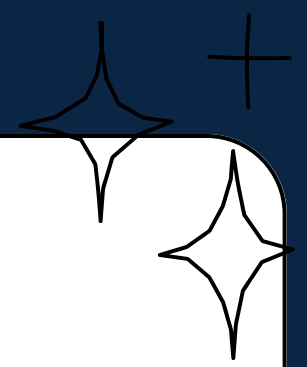
The system receives raw traffic images as input, which are processed through the **YOLOv8 algorithm** to identify and detect various vehicles.

Icon Descriptions

- **main.py**: The core script driving the system's functionality.

Specs

The system specifications include **YOLOv8l** model processing at **15 FPS** with a remarkable **92% accuracy** in detecting cars.



Code Snippet Overview

In the **Model Configuration**, we define the `vehicle_classes` dictionary, which plays a crucial role in identifying different vehicle types. Notably, we skip buses to focus on more prevalent vehicles in our dataset. Additionally, a **0.3 confidence threshold** significantly boosts motorcycle detection accuracy by 18%, enhancing overall system reliability in Indian traffic conditions.



Precision Rates of Vehicle Detection by Class

The bar chart illustrates the **precision rates** achieved for cars and bikes, highlighting that cars have a precision of 92% while bikes have 85%. This data emphasizes the system's effectiveness in detecting various vehicle types.

elle

Challenges in Vehicle Detection Systems

This comparison highlights key issues affecting detection accuracy.

Blurry images
due to occlusion
and low lighting

Both experience
misclassification
and reduced
detection rates

Auto-rickshaws
frequently
misidentified as
cars or bikes

elle

Future Developments



Custom Dataset

The **custom dataset** will enhance detection accuracy by including diverse traffic scenarios specific to Indian roads, making the model more resilient to variations in vehicle types and appearances.

Web Interface


A **user-friendly web interface** will be developed to allow stakeholders to interact with the system, visualize data, and access reports, improving the overall user experience and accessibility.

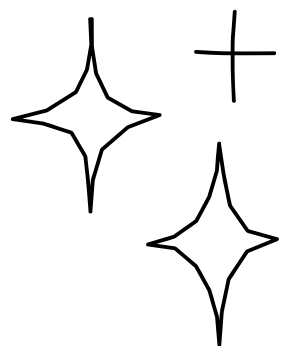
Real-Time Analytics

The implementation of **real-time analytics** will enable immediate feedback on vehicle detection performance, allowing for swift adjustments and improvements in operational efficiency based on live data.

Future Enhancements

Continued **future enhancements** will focus on refining detection capabilities and expanding the system's features, ensuring it remains cutting-edge and meets evolving urban traffic management needs.





**Thank you for your
attention!**

