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VioCam : Smart Camera for Traffic Violation Detection

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Under the mentorship of
Dr. Seema Wazarkar

Background and Scope

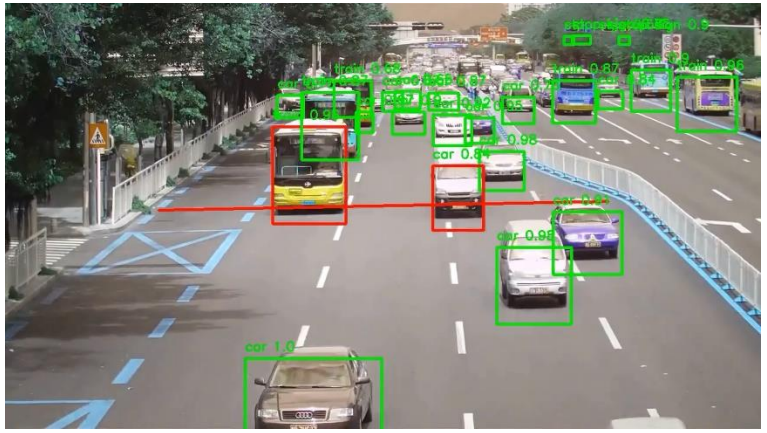
To make an automatic camera system to detect and report traffic violations with the help of machine learning with additional features like traffic congestion control, automatic challan generation that can be easily used by any state government at any traffic junction

Objectives

- Differentiate between types of vehicles
- Train the model on Indian cars
- Convert the previous model to single class model
- Improve helmet detection

Literature Survey

Dongguan, China



Khulna, Bangladesh

Panchkula, India

Research findings for existing literature

Traffic signal violation using AI/ML
Detect signal jumping, using region of interest, location of vehicle in duration frames.
Average vehicle journey reduced by 12%, traffic throughput increased by 10%

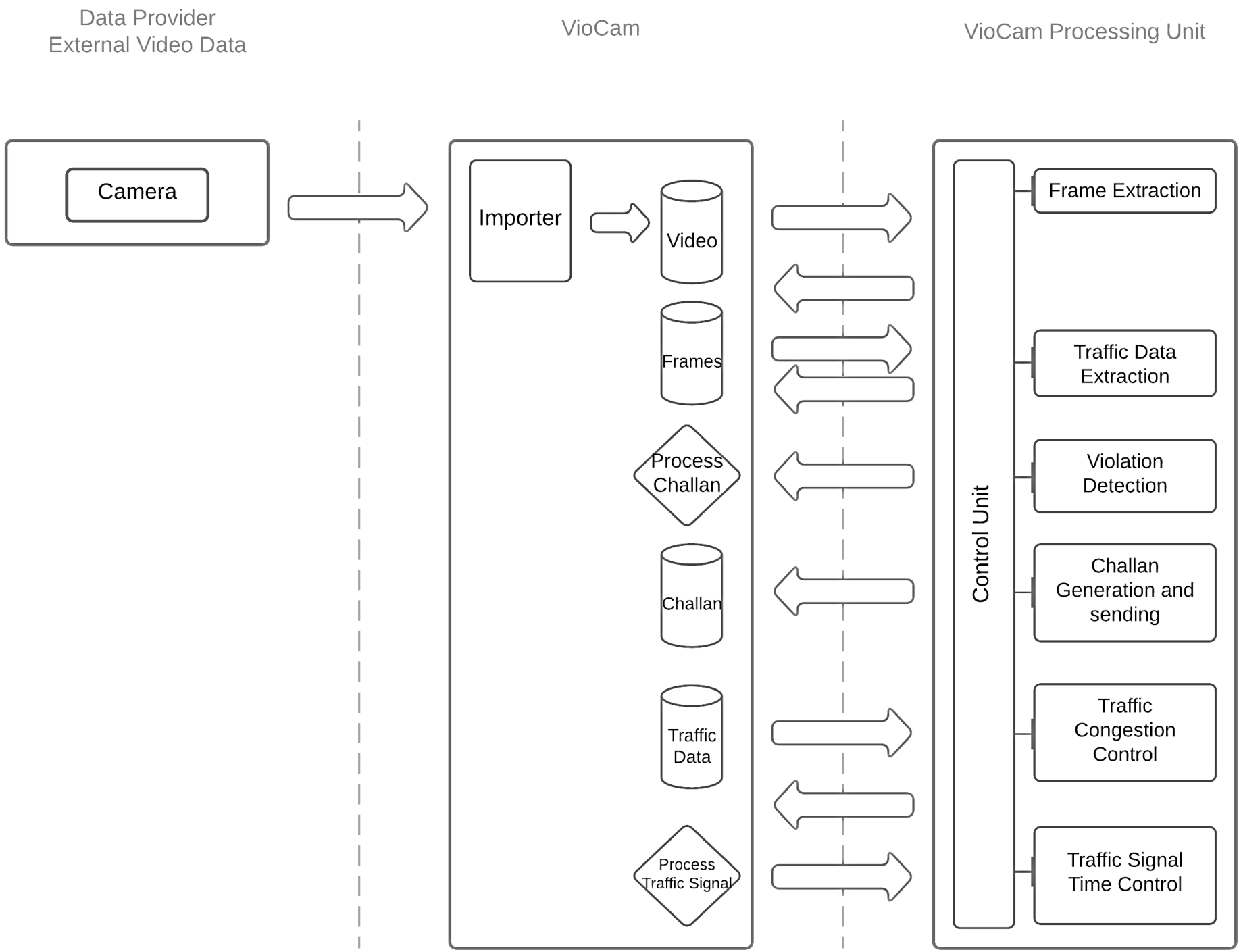
Traffic Violation Detection System based on RFID
Creating a system similar to toll plaza, for lane detection, embedding RFID readers on Light Poles. Track Activity in no parking zones/accident prone areas

Deep learning approach for intelligent intrusion system
The paper proposes that, YoloV3 is a good measure to detect vehicle count detection with 97.67% accuracy

Automated Traffic Violation system using genetic algorithm and ANNs
Catching violators swerving or blocking the pedestrian lane with an accuracy of 90.67% with 1.34s runtime

Big data platform of traffic violation detections, identifying the risky behaviors of vehicle drivers
4 Stages, MAPE - Unstructured data collection, knowledge base creation, unsafe driving behavior detection, Storing data in HDFS. As nodes increases from 1 to 7, it becomes 75% more faster.

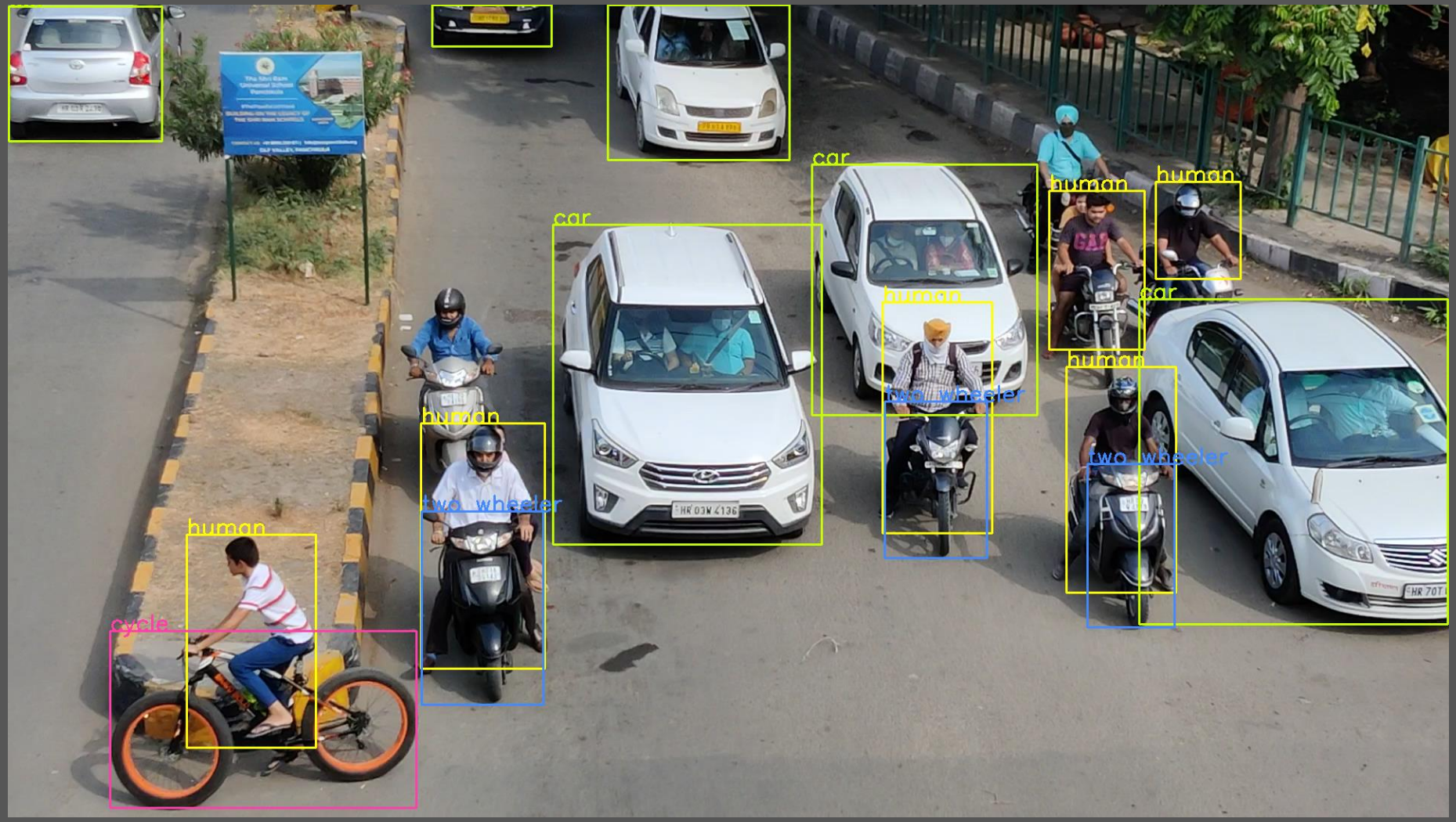
Traffic Violation detection using multiple trajectories evaluation of vehicles
Image processing is being used to detect lane violation, using mean square displacement method (MSD)



3 Tier Architecture

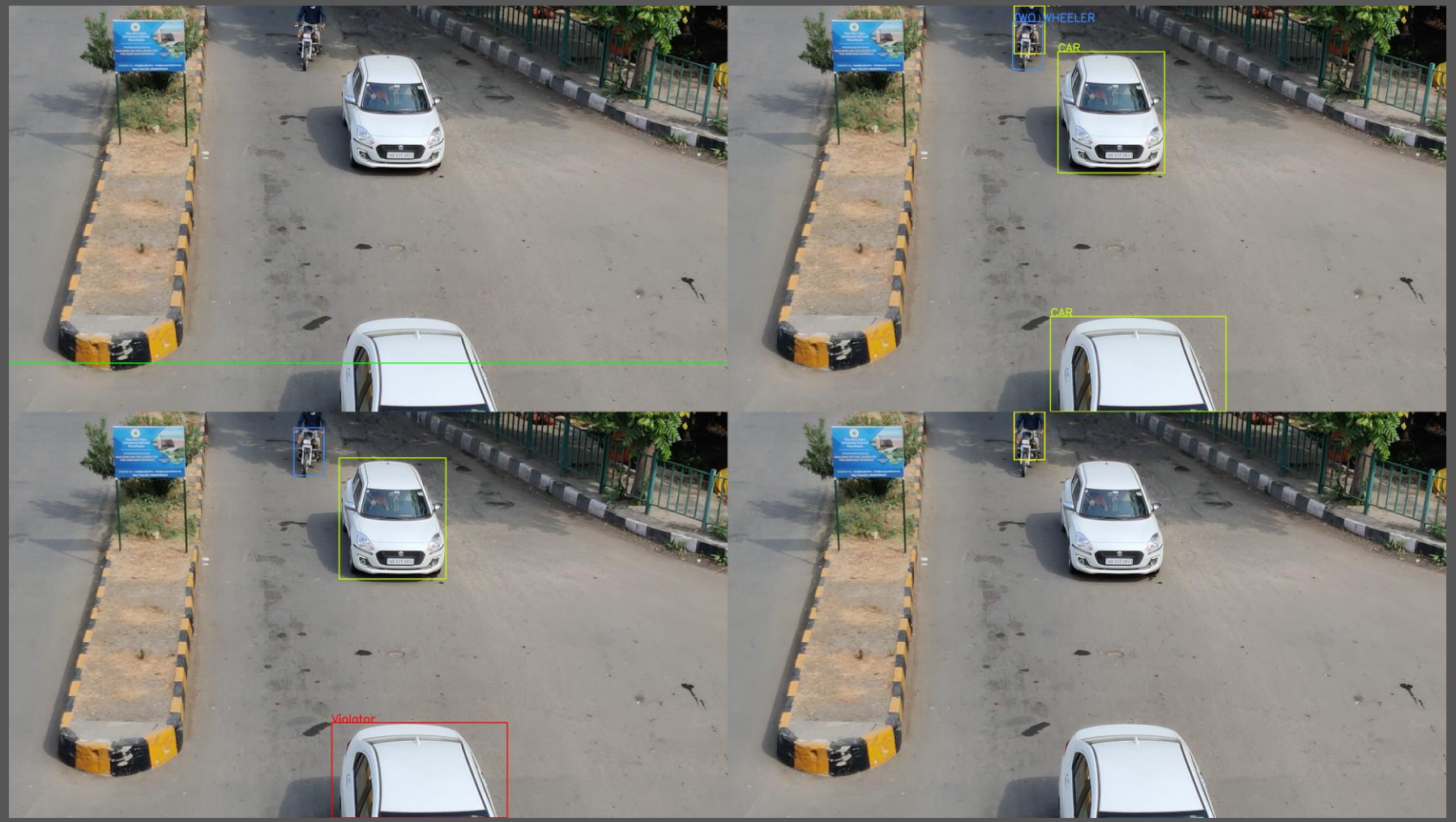
Tools/Platform Used

Working of the Project



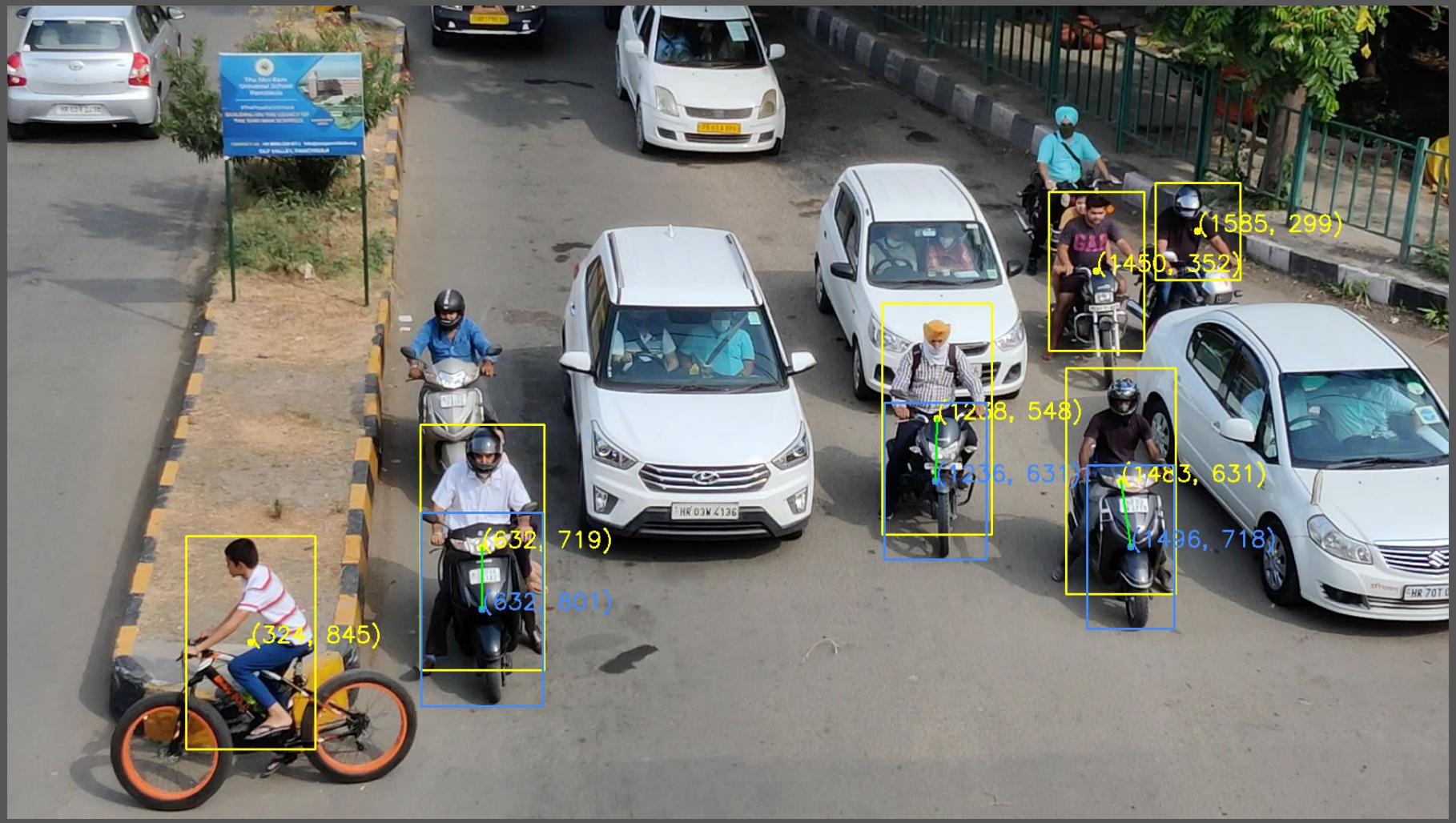
Vehicle detection, vehicle classification and human detection

Working of the Project



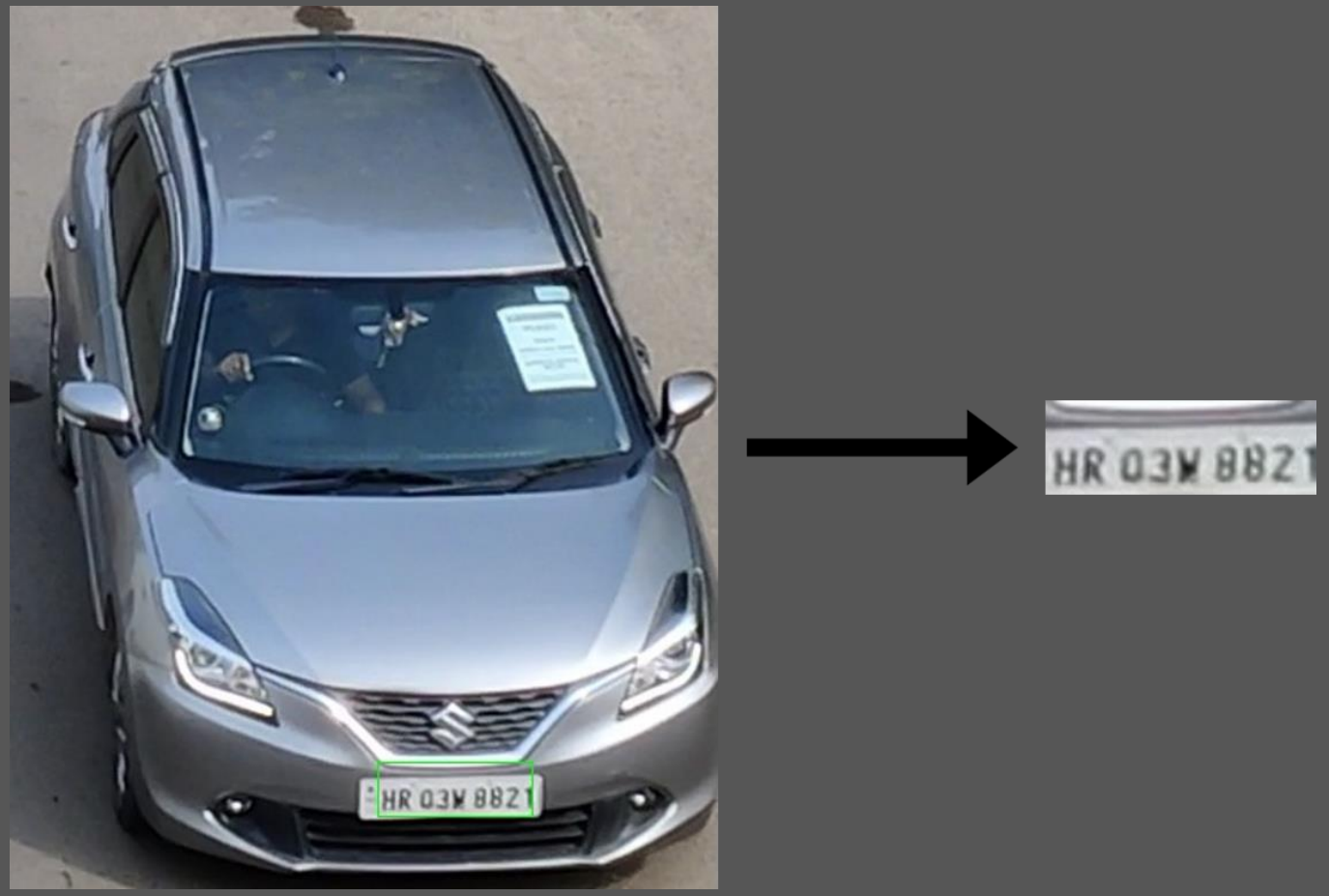
Violation Detection

Working of the Project



Improving helmet detection

Working of the Project

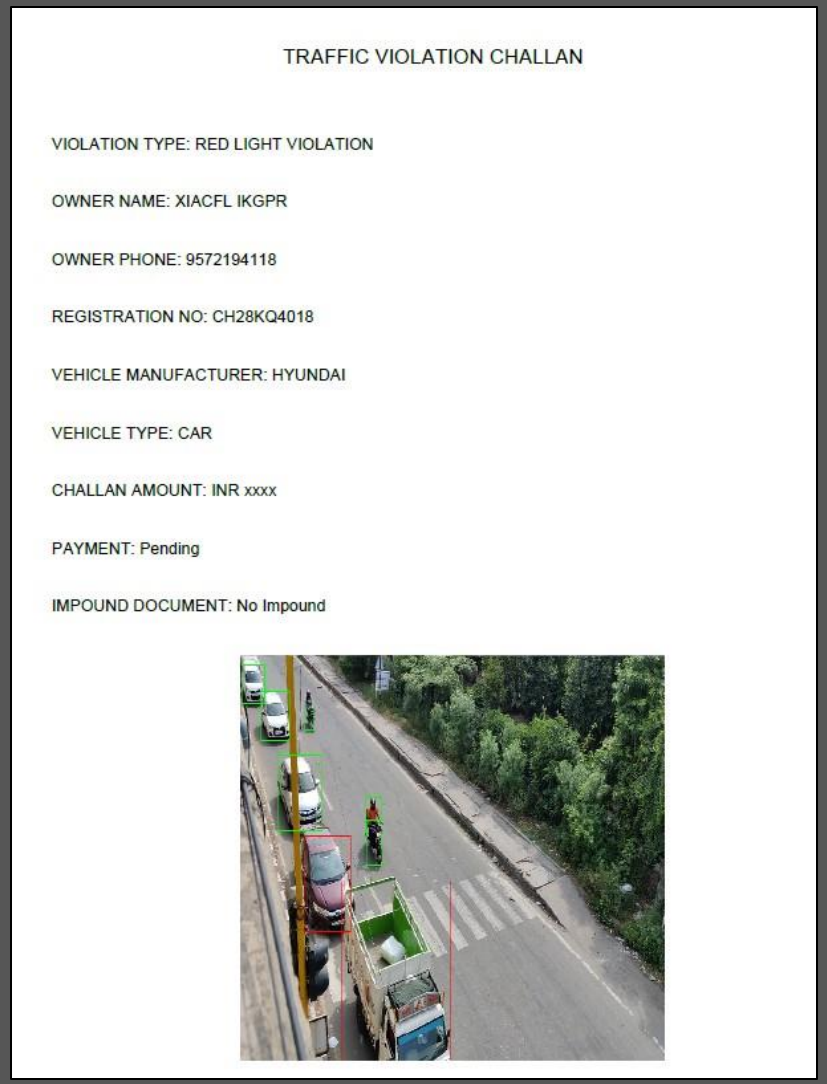


Number Plate Detection

Working of the Project

	S.No	Vehicle_No	Vehicle_type	vehicle_manufacturer	Owner_Name	Owner_Phone
0	1	HP31JO7056	BIKE W/O GEAR	HYUNDAI	TIOQCP YXQCX	6873271722
1	2	CH83AD1737	BIKE	MARUTI SUZUKI	SMPPMK XMTUH	9145941382
2	3	HP47UT7020	BIKE W/O GEAR	MARUTI SUZUKI	KPJUIX AUWWV	4682268214
3	4	UP59DJ5305	BIKE W/O GEAR	HYUNDAI	PNFUJV PGYOM	7548144684
4	5	HR45QJ4320	BIKE	HYUNDAI	CWNJBB ZPVQH	5587436358

Dummy Dataset


TRAFFIC VIOLATION CHALLAN

VIOLATION TYPE: RED LIGHT VIOLATION

OWNER NAME: XIACFL IKGPR

OWNER PHONE: 9572194118

REGISTRATION NO: CH28KQ4018

VEHICLE MANUFACTURER: HYUNDAI

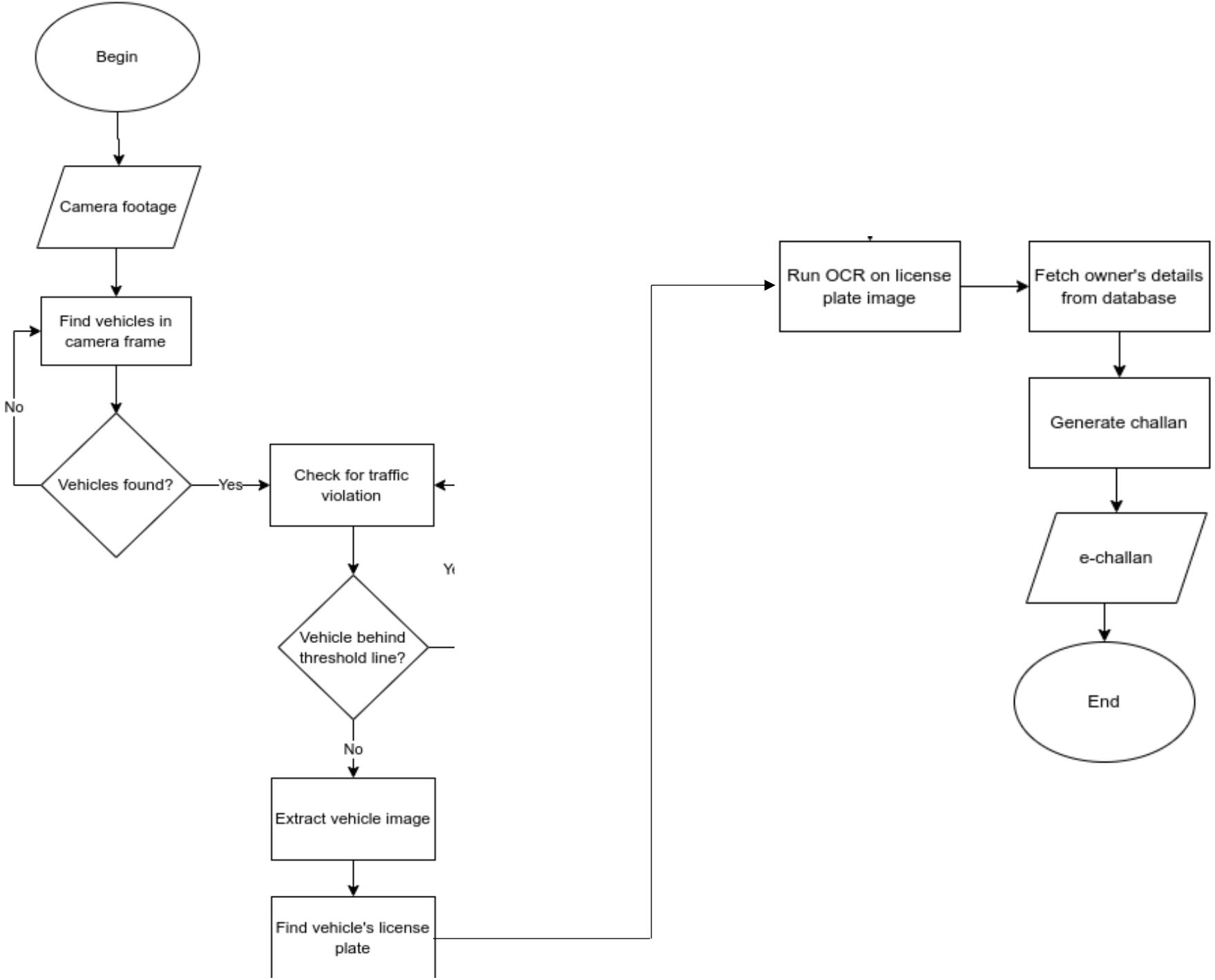
VEHICLE TYPE: CAR

CHALLAN AMOUNT: INR xxxx

PAYMENT: Pending

IMPOUND DOCUMENT: No Impound

Generated Challan



Project Design

Flowchart

Deliverables of the project

An automated traffic management system that can:

- Detect traffic violations such as red light jumping and no-helmet riding
- Detect the number plate and recognize the characters on the number plate
- Automatically generate challan for a violator
- Differentiate between vehicle types and check for vehicle type specific violations.

Individual Roles

- Aryan Tyagi – Improving Helmet Detection, Training the model on Indian cars, , Optimization, Testing, Documentation
- Tushar Kumar Riyat – Implement vehicle classification, Testing, Training the model on Indian cars, Optimization, Documentation
- Aditya Singh – Implement vehicle classification, Training the model on Indian cars, Optimization, Documentation

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