SAFER INDIA HACKATHON

Unfit Vehicle Detection

TEAM NAME: CodeCult

SITUATION

Cause of concern:

Old vehicles constitute < 1 % of the total fleet - but contribute 15% of total vehicular pollution.

It is estimated that India will have over 2 crore unfit vehicles by 2025.

11 / 12 cities with the highest levels of particulate pollution are located in India.

There are just 75,000 traffic cops to manage 20 crore vehicles.

COMPLICATION

Manual identification and persuasion of so many vehicles is an impractical task

SOLUTION

Automating the entire process and reducing the amount of manual labour, cost and time consumed

PIPELINE

1

Cameras pick up Video Feed

Traffic Cameras across the city capture video feed which is processed on a server.

2

Plate Localization

The deep learning algorithm designed using YOLO and OpenCV detects the number plate.

3

OCR to extract Vehicle Number

OCR will recognize the text from the number plate and store it as text.

4

Database Check

Vehicle details will be checked in the database.

5

Flag vehicle if Unfit

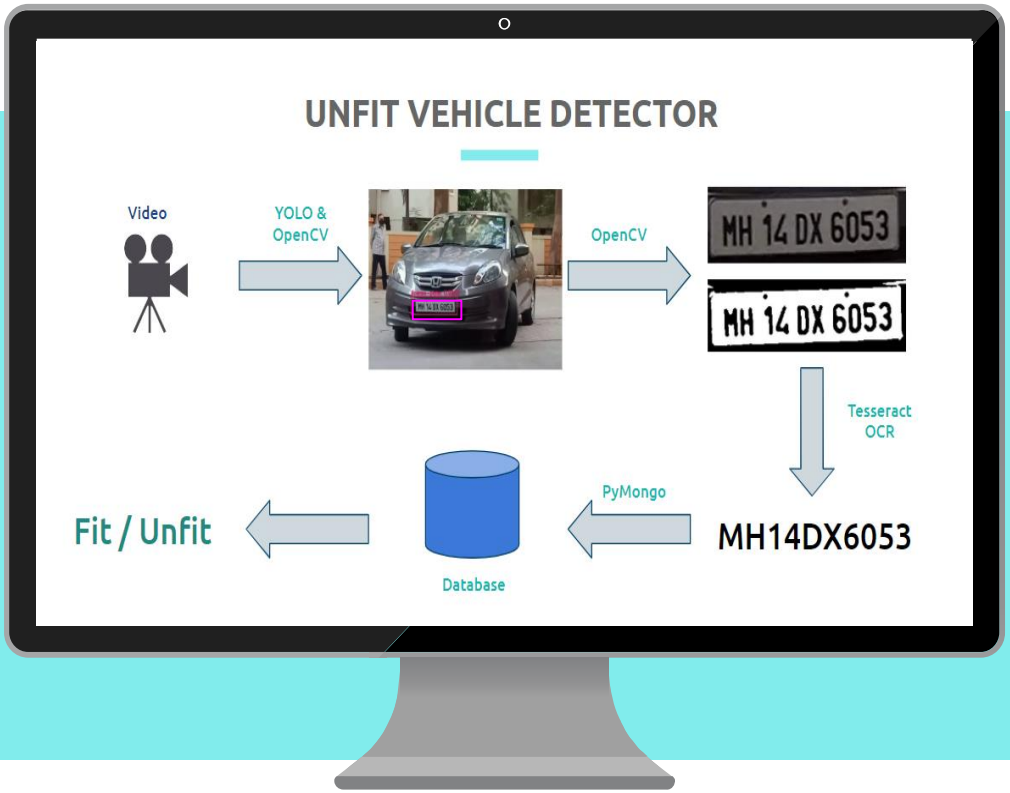
Vehicle will be flagged as unfit if its fitness expiry date has passed.

TECHNOLOGY

1. Deep Learning -
    a. **YOLO** - This is an extremely fast real-time object detection algorithm. We used this to detect and separate the number plate from the image/frame.
    b. **Tesseract** - Tesseract is an optical character recognition engine for various operating systems. Once the YOLO algorithm detects the number plate, Tesseract will parse the vehicle number from it.

2. Image Processing -

    OpenCV - We used OpenCV to remove any noise from the image and to grayscale the image of the number plate received, before sending it to Tesseract OCR to recognize the text on the number plate.



Flow

The process flow of our proposed solution.

ADDITIONAL PROBLEMS SOLVED

SECURITY

Persons of interest/suspect can be tracked or triangulated

SPEEDING DETECTION

Avg speed of a vehicle between two points can be determined, sanctioning those who sped over the limit

TRAFFIC MANAGEMENT

Areas with constant congestion can be monitored and vehicles can be taxed

PUCC AND INSURANCE

PUCC and insurance validity can be checked

HELMET DETECTION

This algorithm can be further trained to detect helmets or lack thereof

CRIME DETECTION

Vehicle theft can be automatically tracked when alerted.

Existing Systems

London congestion charge

A System that charges motorists entering a specific busy area between 7 a.m. and 6:00 p.m

Italy

Italy found a 22% drop in road accidents reducing mortality rate by 50%, and injury rate by 34%

Belgium

The city of Mechelen uses an ANPR system to scan all cars crossing the city limits. Cars listed on 'black lists' generate an alarm, so they can be intercepted by a patrol.

Australia

The system identifies unregistered and stolen vehicles as well as persons having an outstanding warrant

Thank you for this opportunity!

THE TEAM

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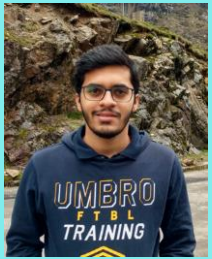

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