**Pedestrian and Vehicle detection**

**system using open-cv tools**

**Vehicle and Pedestrian Detection System**

**Introduction**

This Python script implements a real-time vehicle and pedestrian detection system using OpenCV. The system captures video frames, detects moving vehicles, and counts them as they cross a predefined line. Additionally, it detects pedestrians in the video frame.

**Vehicle Detection**

**Requirements**

Python 3.x

OpenCV

NumPy

**Downloading Pre-trained Cascade Classifiers**

To improve the accuracy of vehicle detection, you can download pre-trained cascade classifiers for car detection.

**Car Cascade Classifier**: Download haarcascade\_car.xml (Download the raw data from GitHub and unzip it.)

**Code Overview:**

python

Copy code

# ... (Code for importing libraries and setting parameters)

# Load pre-trained cascade classifier for car detection

car\_cascade = cv2.CascadeClassifier('path/to/haarcascade\_car.xml')

# ... (Rest of the code for video capture and processing)

**How It Works:**

The script captures video frames from a specified file (video.mp4).

Background subtraction is applied to detect moving objects in the video.

Morphological operations are performed for noise reduction.

Contours are identified in the processed frame.

Rectangles are drawn around contours that meet specified size criteria.

The script counts vehicles that cross a predefined counting line.

The vehicle count is displayed on the video frame.

**Pedestrian Detection**

**Requirements**

Python 3.x

OpenCV

**Code Overview:**

python

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# ... (Code for setting parameters)

# Load pre-trained HOGDescriptor for pedestrian detection

hog = cv2.HOGDescriptor()

hog.setSVMDetector(cv2.HOGDescriptor\_getDefaultPeopleDetector())

# ... (Rest of the code for video capture and processing)

**How It Works:**

The script captures video frames from a specified file (walking.avi).

The frames are converted to grayscale.

The HOG (Histogram of Oriented Gradients) descriptor is used for pedestrian detection.

Detected pedestrians are outlined with rectangles.

The script counts pedestrians that cross a predefined counting line.

The pedestrian count is displayed on the video frame.

**Usage:**

Ensure Python and required libraries are installed.

Download the pre-trained cascade classifier for car detection as mentioned above.

Set the video file paths ('video.mp4' and 'walking.avi') or adjust the video captures accordingly.

Run the respective scripts for vehicle and pedestrian detection.

Press the 'Esc' key to exit the programs.