Build Your own Vehicle Detection Model

Aim:

To build your own vehicle detection model

Algorithm:

Step 1: import necessary libraries like numpy , CV2

Step 2: Initialization of Variables and Constants and defining the centroid function

Step 3: Open image File and set frame dimensions.

Step 4: Frames are processed in a loop and the vehicles are detected

Step 5: Release image capture and close all OpenCV windows.

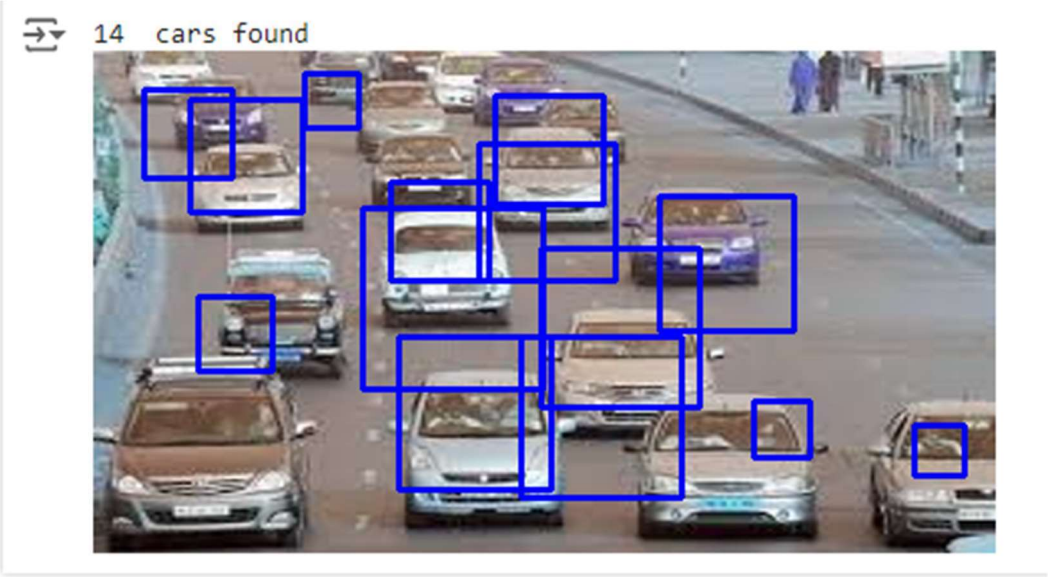
Step 6: Image displayed and detected number of cars.

Code:

```
from PIL import Image
import cv2
import numpy as np
import requests
from google.colab.patches import cv2_imshow # Import the patch for
cv2.imshow()

# Downloading and resizing the image from the URL
image_url = 'https://encrypted-
tbn0.gstatic.com/images?q=tbn:ANd9GcQCU8_ukqSbYW09CdD0bPbzHZQW0MuVIbfGyw&s'
response = requests.get(image_url, stream=True)
image = Image.open(response.raw)
image = image.resize((450, 250))

# Convert the image to a Numpy array
image_arr = np.array(image)
```

```
# Convert the image to grayscale
grey = cv2.cvtColor(image_arr, cv2.COLOR_RGB2GRAY)

# Apply Gaussian blur to the grayscale image
blur = cv2.GaussianBlur(grey, (5, 5), 0)

# Apply dilation to the blurred image
dilated = cv2.dilate(blur, np.ones((3, 3), np.uint8))

# Apply morphological closing to the dilated image
kernel = cv2.getStructuringElement(cv2.MORPH_ELLIPSE, (2, 2))
closing = cv2.morphologyEx(dilated, cv2.MORPH_CLOSE, kernel)

# Use CascadeClassifier for car detection
car_cascade_src = 'cars.xml'  # Ensure this is the correct path to the
cascade file
car_cascade = cv2.CascadeClassifier(car_cascade_src)

# Check if the cascade file loaded successfully
if car_cascade.empty():
    print("Error: Could not load cascade file. Please ensure the file path
is correct.")
    exit()

# Detect cars
cars = car_cascade.detectMultiScale(closing, 1.1, 1)

# Draw rectangles around each detected car and count
cnt = 0
for (x, y, w, h) in cars:
    cv2.rectangle(image_arr, (x, y), (x + w, y + h), (255, 0, 0), 2)
    cnt += 1

# Print the total number of detected cars
print(cnt, " cars found")

# Display the annotated image using the Colab patch
cv2_imshow(image_arr) # Use cv2_imshow instead of cv2.imshow

# Wait for a key press and close the window
cv2.waitKey(0)
cv2.destroyAllWindows()
```

Output:



Result:

The vehicle detection model has been implemented successfully.