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import cv2
import numpy as np

# Initialize video capture
cap = cv2.VideoCapture(r"C:\Users\RINI\Downloads\traffic.mp4")

# Initialize variables
prev_frame = None
initial_frame = None
pixel_to_meter_ratio = 1 # Adjust this based on your scene

while cap.isOpened():
    ret, frame = cap.read()

    if not ret:
        break

    gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)

    if prev_frame is not None:
        # Calculate optical flow
        flow = cv2.calcOpticalFlowFarneback(prev_frame, gray, None, 0.5, 3, 15, 3, 5, 1.2, 0)
        magnitude, angle = cv2.cartToPolar(flow[..., 0], flow[..., 1])

        # Calculate average flow magnitude as vehicle speed
        speed = np.mean(magnitude) * pixel_to_meter_ratio

        print(f"Estimated speed: {speed} meters per frame")

    prev_frame = gray.copy()

    cv2.imshow('Frame', frame)
    if cv2.waitKey(1) & 0xFF == ord('q'):
        break

cap.release()
cv2.destroyAllWindows()

```