Real Time Vehicle Detection and Counting (Traffic surveillance)

Introduction

- Due to the high vehicle growth, traffic monitoring has become a great research topic.

- Detecting and counting vehicles is a challenging problem in computer vision.

- Essential for road usage and management.

- Using a camera mounted on a tall structure looking down on the traffic scene.

Applications

- Monitoring activities at traffic intersections, which allow the detection of congestions.

- Assisting in regulating traffic.

- The need for highway usage statistics in large metropolitan areas.

- Playing an important role for civilian and military applications.

Objectives

- Detection of moving vehicles in a video.

- Tracking vehicles.

- Identification of Vehicles.

- Counting the total number of vehicles

Difficulties

- Occlusion either by vehicles or background obstacles such as road signals, trees, weather, pedestrians, etc.

- Noise in the images.

- Complexity in vehicle motion.

- Complexity in vehicle shapes since different vehicles have different shapes.

A general overview

- A vehicle can be simply defined as a set of pixels moving in a coherent manner, either as a darker background over a lighter region or vice versa.

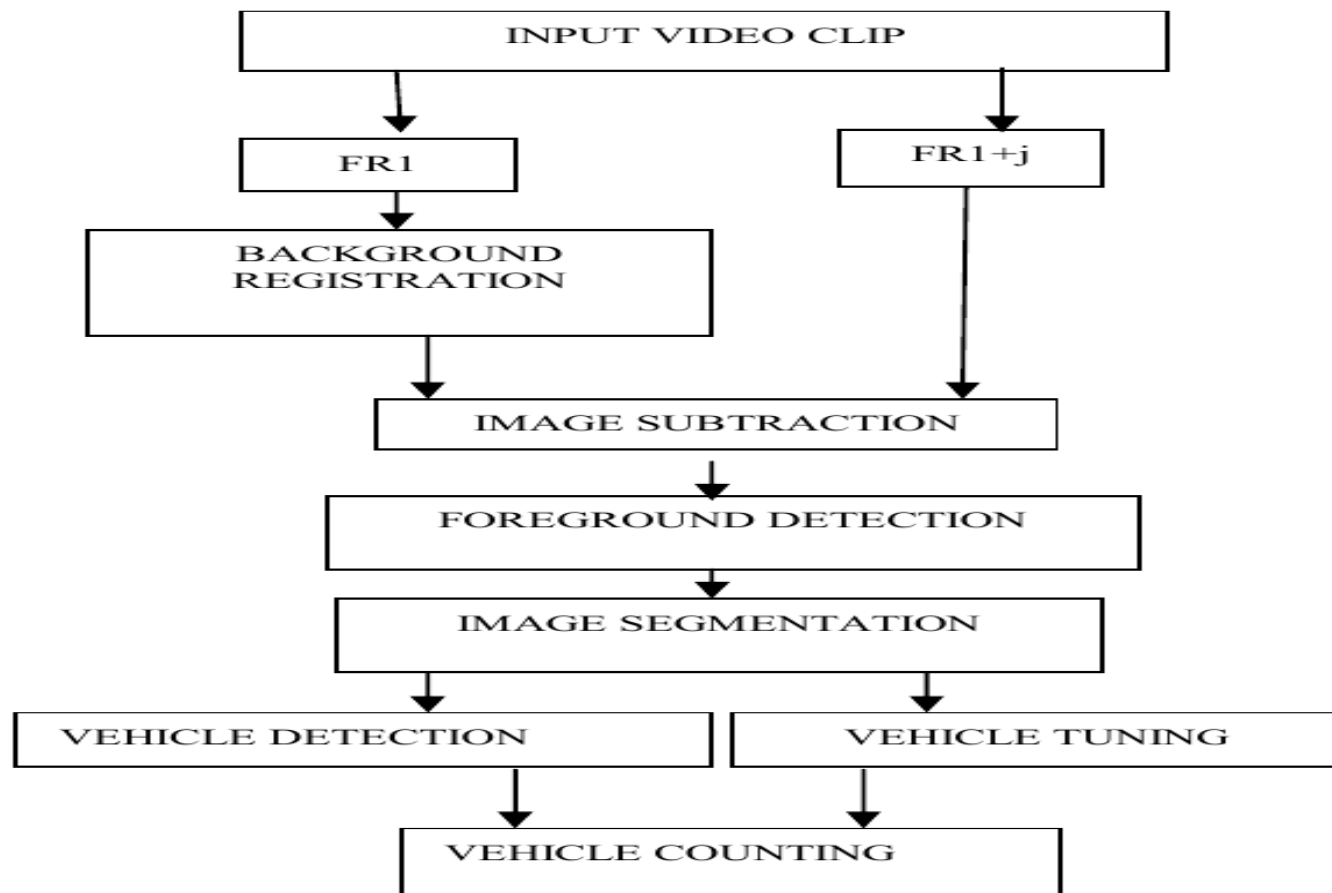Input Frames → Segmentation → Detection → Tracking → Counting
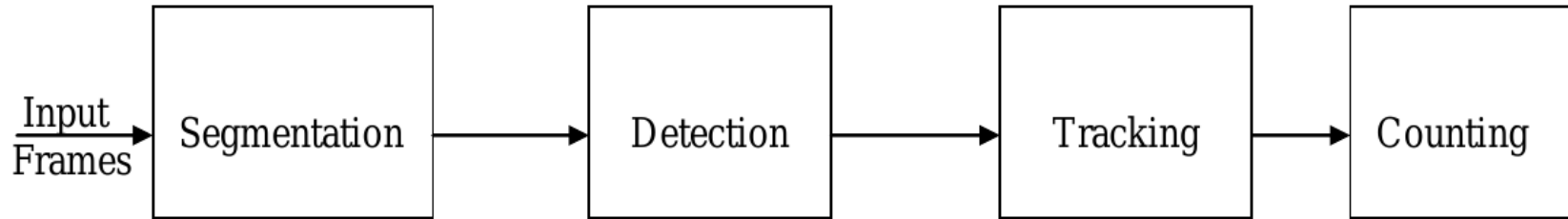
Fig.1.Architecture and modelling

Background subtraction

Background subtraction involves computing a reference image and subtracting each new frame from this image and thresholding the result.

The process in brief

- Reading and dividing a video clip into a number of frames.
- Implement the major procedures such as finding frame differences and identifying the background registered image.
- Next, post-processing is carried out, and the background is removed, thus keeping only the foreground objects.
- Helping to count the detected objects (blobs).

Moreover, once a video clip is provided, the initial problem is separating it into a number of frames. On the other hand, every frame is considered as an independent image, which is mostly in RGB format and has to be converted into Gray scale. Next, the difference between frames at certain intervals should be computed. Besides, this interval can be decided according to motion of an object in a video. In case the object is moving very fast, the difference between every successive frame ought to be considered.

Bibliography

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