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REALTIME VEHICLE MOTION AND SPEED ANALYSIS FRAMEWORK

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ABSTRACT

We propose a new method of vehicle motion tracking. In our method, we use the template matching method for object tracking. The template matching method has been used in many applications. In vehicle tracking, there are some problems, such as vehicle size change, and shaded areas. To solve these problems, we divide and update the template at every frame by the background subtraction method. This paper presents a method for estimating vehicle speed by tracking the motion of a vehicle through a sequence of images. The moving direction of a vehicle is identified by using Principal Component Analysis PCA approach. The dominant component is directly estimated from the motion information. The results of tracking using PCA is proving that PCA is a great technique to track the motion of moving object, and has great potential to implement it into war field security system.

1 INTRODUCTION

This paper aims to Detect and track the vehicle from the video frame sequence. The vehicle motion is detected and tracked along the frames using Background Subtraction technique. The objective of developing this project is to identify the vehicle or any moving object and analyze the speed of the object through a Motion History Image. This project has

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a wide application in the war field. We added one advantage in this project, that is vehicle motion tracking. In existing system it cannot identify speed of the vehicle, and there is no vehicle position tracking. But we can identify the vehicle entering into our area; estimate the speed of the vehicle; and predict the moving direction of a vehicle. This is monitored by theauthorized person in an defense team .It is very helpful to identify the enemies who are entering into our location .This details are processed as report and transferred into server.We can identify the vehicles with the help of Background subtraction method. And estimate the speed of the vehicle with help of Motion History Images and Principle Component Analysis.

2 EXISTING SYSTEM

In Existing method, we can only identify the vehicle by Background Subtraction method. The background subtraction method is the method of subtracting the background image from an image that contains a moving object. There is no speed detection in the existing system. Many proposed motion tracking techniques are based on template matching, blob tracking and contour tracking.

3 PROPOSED SYSTEM

In existing system, it cannot identify speed of the vehicle, and there is no vehicle position tracking. We propose a new method of vehicle motion Tracking. And also we can estimate the speed of the vehicle by using an Motion History Images. Vehicle motion is tracked by using an Principle Component analysis. The gray-scale MHI is sensitive to the direction of motion because it can demonstrate the flow direction of the motion. In our video surveillance systems are focused on background modeling, moving vehicle classification and tracking. The increasing availability of video sensors and high performance video processing hardware opens up exciting possibilities for tackling many video understanding problems, among which vehicle tracking and target classification are very important. A vehicle tracking and classification system is described as one that can categorize moving vehicles and further classifies the vehicles into various classes. A famous motion tracking and estimation technique, Principle component analysis, however, is not being widely used and tested for the practicability on vehicle tracking system. To analyze the reliability and practicability of it, this research project proposed the idea of implementing PCA in vehicle tracking system, and will evaluate its performance.

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4 SYSTEM IMPLEMENTATION

4.1 BACKGROUND SUBTRACTION

Background subtraction, also known as Foreground Detection, is a technique in the fields of image processing and computer vision wherein an image's foreground is extracted for further processing (object recognition etc.). Generally an image's regions of interest are objects (humans, cars, text etc.) in its foreground. After the stage of image preprocessing (which may include image de-noising, post processing like morphology etc.) object localization is required which may make use of this technique

4.2 MOTION ANALYSIS

Motion analysis is used in computer vision, image processing, high-speed photography and machine vision that studies methods and applications in which two or more consecutive images from an image sequences, e.g., produced by a video camera or high-speed camera, are processed to produce information based on the apparent motion in the images. In some applications, the camera is fixed relative to the scene and objects are moving around in the scene, in some applications the scene is more or less fixed and the camera is moving, and in some cases both the camera and the scene are moving.

4.3 MOTION HISTORY

The motion history image (MHI) is a static image template helps in understanding the motion location and path as it progresses. In MHI, the temporal motion information is collapsed into a single image template where intensity is a function of regency of motion. Thus, the MHI pixel intensity is a function of the motion history at that location, where brighter values correspond to a more recent motion. Using MHI, moving parts of a video sequence can be engraved with a single image, from where one can predict the motion flow as well as the moving parts of the video action.

4.4 MOTION DETECTION

Motion detection is usually a software-based monitoring algorithm which, when it detects motions will signal the surveillance camera to begin capturing the event. It is also called activity detection. An advanced motion detection surveillance system can analyze the type of motion to see if it warrants an alarm. In video surveillance, motion detection refers to the capability of the surveillance system to detect motion and capture the events. Motion

detection is usually a software-based monitoring algorithm which, when it detects motions will signal the surveillance camera to begin capturing the event.

4.5 MOTION ESTIMATION

In video editing motion estimation is a type of video compression scheme.

The motion estimation process is done by the coder to find the motion vector pointing to the best prediction macroblock in a reference frame or field. In video editing motion estimation is a type of video compression scheme. The motion estimation process is done by the coder to find the motion vector pointing to the best prediction macroblock in a reference frame or field. For compression redundancy between adjacent frames can be exploited where a frame is selected as a reference and subsequent frames are predicted from the reference using motion estimation. The motion estimation process analyzes previous or future frames to identify blocks that have not changed, and motion vectors are stored in place of blocks. The process of video compression using motion estimation is also known as inter-frame coding.

5 ARCHITECTURE DIAGRAM

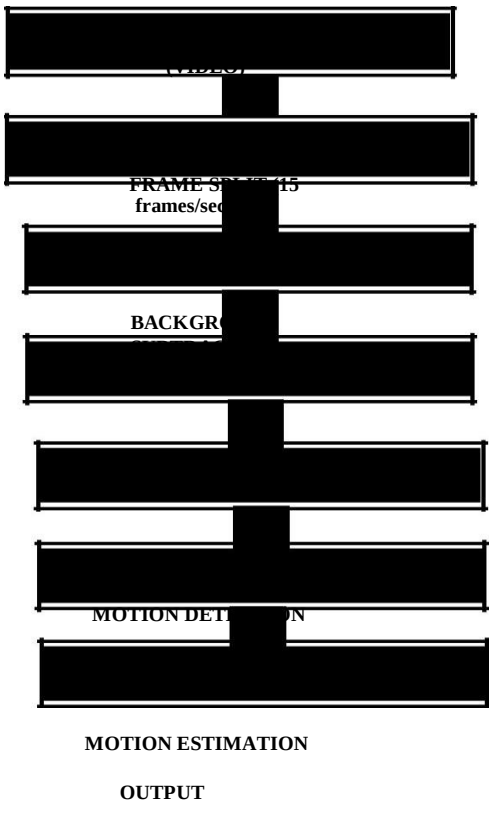

Figure 1: Architecture Diagram.

The purpose of the architecture diagram is to represent the type of software architecture that is used by the system, to describe the various hardware and software components that are used for the system implementation.

6 CONCLUSIONS

In this study, we proposed the method of vehicle motion tracking using the symmetry of the vehicle and the background subtraction method. The results of our experiments show that our proposed algorithm enables stable vehicle motion tracking in video frames. If we integrate some other functions to our method, the position and speed of vehicles can be easily obtained. For example, our method can be used in the war field that operates by tracking the three-dimensional coordinates of vehicles using the stereo system or by converting an oblique image to an overhead image taken by a monocular camera. The experimental results show that proposed technique is able to detect and track vehicle efficiently.

7 FUTURE ENHANCEMENTS

We plan to extend this work to vehicle identification, i.e., an algorithm is being developed to identify the type of vehicle, for example, car, bus, van, truck etc. This can be easily achieved by defining and identifying the state of the blob and comparing it with standard vehicle's directory/database. The experiments yielded results under the limited conditions. In the future, we would like to perform experiments under more complicated conditions, for example, disappearance of vehicle, and time conditions(daytime or night). we can overcome these issues in future by using an Thermal imaging technique. Additional information about weather conditions can be used to consider the model changes caused by environmental conditions, such as rain, fog, and snow. It is clear that improving the vehicle model using these techniques will improve the overall performance of the algorithm, although this is beyond the scope of this paper.

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