Detection of objects in a video of traffic

A.K.Parida[1] B Karan Kumar[2], Asish Mahankud[3], Pratik Kumar Mishra[4]

[1]Assistant Professor in Department of Electronics & Communication, GIET, Gunupur, Odisha, India
[2]UG student in Department of Electronics & Communication, GIET, Gunupur, Odisha, India
[3]UG student in Department of Electronics & Communication, GIET, Gunupur, Odisha, India
[4]UG student in Department of Electronics & Communication, GIET, Gunupur, Odisha, India

---***---

Abstract - *Moving object detection is receiving a greater scope with the emergence of traffic surveillance systems. Automatic monitoring is advancing in order to avoid predictable human errors which can occur due to different parameters. This work combines statistical assumptions with the identification of moving objects acquired in the processing of the previous frames. The proposed approach extracts gray color information for background subtraction to improve object segmentation. An AVI file is used and it is decomposed into R, G and B components and the moving objects are detected. The implementation of the algorithm is written in Matlab. The system can process both color and gray images from a camera. It can handle object detection in both indoor and outdoor environment and under challenging illumination conditions.*

Key Words: Video Surveillance, Moving Object Detection, Background Subtraction, Moving Object Tracking, Frame differencing

1. INTRODUCTION

As surveillance systems are popular, robust detection and tracking techniques are needed to
determine moving objects. Object detection and tracking in the field of military, intelligence monitoring, human machine interface, virtual reality, motion analysis and many other fields have wide application prospects in science and engineering. It has important research value, which attracting more and more researchers at home and abroad. Our paper is based on image processing to achieve the objectives of detection and tracking system. Image sequence of moving target tracking, is detected in each frame of the goal of the various independence movements, or the users interested in the movement areas (such as the human body, vehicles, etc.), and extract the object's position information, to receive the various objectives. Identification of moving objects from a video sequence is a critical task in many computer applications. A basic approach is to implement background subtraction which identifies moving objects from the portion of a video frame that differs significantly from the reference model. There are many challenges in developing a good object detection algorithm. First, it must be robust to the changes in illumination .Second, it should avoid detecting non stationary background objects like swinging leaves, rain, snow, and shadow cast by moving objects. The analysis of motion gives access to the dynamics of the process. Motion analysis is generally a very complex problem. At present, it is seen that surveillance cameras are already prevailing in commercial establishments with camera output being recorded to tapes that are either rewritten periodically or stored in video archives. Real time segmentation of moving regions in image sequences is a fundamental step in many vision systems. Image background and foreground are needed to be separated, processed and analyzed. The data found from it is used further to detect motion. This method is chosen to obtain the objective by minimizing the complicacy faced during the implementation and the primary idea of the solution is discussed along with the proposed algorithm with it's describe execution of algorithm, simulation results and conclusions enhancing the future work.

2. BACKGROUND

Object tracking is an important job in the field of computer vision. Tracking is the process of locating the motion of object or multiple objects over a period of time using a camera. The high powered computers, the availability of high quality and inexpensive video cameras and the increased need for automated video analysis has initiated a great interest in object tracking algorithms. There are few key steps in video analysis:

. Detection of moving objects.
. Tracking of objects from one frame to another.
. Analysis of object tracks to recognize the behavior.

The use of object Tracking is implemented in the field of:

. Motion based recognition
. Automated surveillance
. Human computer interface
. Traffic monitoring
. Vehicle navigation

3. OBJECT DETECTION

Tracking process requires an object detection mechanism either in every frame or when the object first appears in the video. An approach for object detection is to use information in a single frame. However, some object detection methods make use of the various information resulted from a sequence of frames to reduce the number of false detection. For object detection, there are several methods:

1. Point detectors: These are used to find interesting points in image which have an expressive texture. A desirable quality of an interest point is it's invariable to changes in illumination and camera viewpoint.
2. Background subtraction: The object detection can be achieved by creating a representation of the scene called the background model followed by finding deviations from the model for each incoming frame. Any significant change in the image region from the background model identifies a moving object. The pixels clustering the regions undergoing change are marked for further processing.

4. SIMULATION RESULTS

REFERENCE IMAGE

GRAYSCALE IMAGE

BINARY IMAGE

VISUALISE THE RESULT

5. CONCLUSION

The proposed algorithm extracts the background from all frames of a video and detects the foreground effectively. This algorithm also dynamically update the background frame by frame .This algorithm identifies the shadow of the moving objects and it is removed to calculate the area of the object accurately. This algorithm also identifies even minute object by adjusting the threshold values. Even the small, slow, fast of a moving region is detected accurately by selecting the proper value of the objects. This algorithm works for Online (Real time) and Offline (Quasi real time) video processing and its computational complexity is low.

6. FUTURE WORKS:

This will be directed towards achieving the following issues:

1. Object classifications.
2. Improved data logging and retrieval mechanisms to support entire system operations.

3. Better camera control to enable smooth object tracking at maximum zoom, incase video is vibrating video stabilization algorithm is required.
4. Acquisition and selection of clear views with the eventual goal of detecting individuals in the scene.

7.REFERENCES

1. Ahmed Elgammal, David Harwood, Larry Davis, Non-parametric Model for Background Subtraction, Computer Vision Laboratory University of Maryland, College Park, USA.
2. Alan J. Lipton Hironobu Fujiyoshi Raju S. Patil. Moving Target Classification and Tracking from Real-time Video The Robotics Institute Carnegie Mellon University 5000 Forbes Ave Pittsburgh, PA, 5213.
3. C.R. Wren, A. Azarbayejani, T. Darrell, and A.Pentland, “Pfinder: Real-Time Tracking of the Human Body,” IEEE Trans. Pattern Analysis and Machine Intelligence.
4. Du Yuren Zhou Aijun Yuan Feng “Moving objects detection for video monitoring system”, the Eighth International Conference on Electronic Measurement and Instruments, ICEMI’2007.
5. E. Grimson, C. Stauffer, R. Romano, and L.Lee, ªUsing Adaptive Tracking to Classify and Monitoring Activities in a Site, Proc.Computer Vision and Pattern Recognition Conf., pp. 2229, 1998.
6. I. Haritaoglu, D. Harwood, and L. Davis, W4: Who, When, Where, What: A Real Time System for Detecting and Tracking People, Proc. Third Face and Gesture Recognition Conf., pp. 222-227, 1998.
7. J. Bergen, P. Anandan, K. Hanna, and R. Hingorani. Hierarchical model-based motion estimation. In Proceedings of the European Conference on Computer Vision, 1992.