A Survey on Techniques for Motion Detection and Simulink Blocksets for Object Tracking

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Abstract - With the wide applications of video cameras in surveillance, video analysis technologies have attracted the attention of the researchers of computer vision field. In wide analysis, human behavior recognition and understanding is an important research direction. By recognizing and understanding the human behavior, prediction and recognizing the happening of crime is possible. Due to this, the information can be provided to the police or any agency so that they can react immediately. In this system, a comprehensive survey of the recent development of all these stages is provided. Multi-person tracking is a critical problem in the intelligent video surveillance system. There are many challenges that make tracking a difficult problem such as illumination changes, scale and shape changes, fast motions and real-time processing. This application is used in monitoring of each and every detail in several fields such as ATM, parking lots or traffic monitoring systems and generating large volume of data and hence require large storage capacity. To overcome this issue, the size of the data stream should be reduced.

Keywords - Image Processing, Motion Detection, Object Tracking.

1. Introduction

One of the most popular security tools for years is video surveillance. Traditional video surveillance takes a huge amount of storage space. This system produces large number of data for storage and display. Recording everything captured by a surveillance camera consumes excessive storage space and hence limits the duration of video that can be stored. Recording everything makes it time consuming for a human to review the stored video. Here, we have overcome the problem of storage capacity by recording only video that contains vital information; video that contains motion in the scene. Video surveillance is significant approach as organizations seek to safeguard their physical and capital assets. The process of locating a moving object in time that is visualized by camera and used in surveillance, animation and robotics is usually associated with the video tracking. At the same time, the necessity to observe more people, places and things coupled with a desire to pull out more useful information from video that is motivating new demands for scalability, capability and capacity. These demands are exceeding the facilities of traditional analog video surveillance approaches. This system provides a new way of collecting, analyzing and recording colossal amounts of video data.

Tracking is defined as the set of constraints that describes the better action performed. To associate target locations in respective consecutive video frames is one of the vital role in video tracking. It is impossible to detect the objects in a fast motion relative to the frame rate. Multi-person tracking is a critical problem in the intelligent video surveillance system. There are many challenges that make tracking difficult such as illumination changes, scale and shape changes, fast motions and real-time processing. Continuous-scene monitoring application generates large volume of data requiring large storage capacity. The best way to overcome this issue of storage capacity is to reduce the size of the data stream in the source file which is possible by this system by identifying and recording only video images with significant amount of motion. Motion in video frames can be calculated by finding difference between consecutive frames in captured motion. Generally, in between two consecutive frames pixel values vary. According to the changes in pixel values, motion can be detected. To detect motion, the current frame can be subtracted from the past frame, pixel by pixel, to get the frame difference.

2. Issues in Motion Detection and Object Tracking

1. It is very difficult to track the moving object present inside the moving videos. The algorithm known as macro

block motion vectors which generates a part of video methods. Motion plays the vital role in motion features. During the training phase of normal activity, motion feature generates joint statistical distribution.

2. Recording everything is very time consuming for human to review the stored video. Video surveillance is increasing significance approach as organizations seek to safe guard their physical and capital assets. But to capture each and every video is not possible. So, there is a need to review only "interesting" videos.

3. Thus, the problem of storage capacity can be resolved by recording only video that contains important information and contains motion in the scene. The large amount of data for storage and display are produced by video surveillance. Continuous and long-term human monitoring of the related video is impractical, ineffective and time-consuming. There is a need of identifying and recording only those images with significant amount of motion in the field of view and thus the video can be compressed.

3. Related Work

3.1 Title: "Application of SAD algorithm in image processing for motion detection and Simulink blocksets for object tracking" May- June 2012, Issue 3, pp. 731-736.

Author's Names and Addresses: Minakshi Bhat, Pragati Kapoor, B.L. Raina.

Keywords: video processing, frame display, background subtraction, edge detection, segmentation and tracking.

3.2 Title: "Real-time Object Classification in Video Surveillance Based on Appearance Learning", Computer Vision and Pattern Recognition, 2007, IEEE Conference Issue Date: 17-22 June 2007, Print ISBN: 1-4244-1180-7, pp.1-8.

Author's Names and Addresses: Lun Zhang Li, S.Z. Xiaotong Yuan Shiming Xiang, Beijing.

Keywords: real-time segmentation, background subtraction or thresholding and error.

3.3 Title: "Adaptive background mixture models for real-time tracking", IEEE Computer Society Conference on Computer Vision and Pattern Recognition. Volume 2. Ft. 1999, pp. 252–258.

Author's Names and Addresses: Stauffer. C, Grimson W.E.L.

Keywords: pixel value and online approximation.

3.4 Title: "Interesting Video Frames Capturing on Digital Video Development Platform" June-July 2013.

Author's Names and Addresses: Mary Joans, Mrs. S. J. Grace Shoba & D. Nethaji.

Keywords: video surveillance and interesting video frames.

3.5 Title: "Motion Activated Video Surveillance Using TI DSP", DSPS FEST '99, Houston, Texas, August 4-6, 1999.

Author's Names and Addresses: Ching-Kai Huang and Tsuhan Chen.

Keywords: video surveillance system, digital video camera and DSP algorithm.

3.6 Title: Considered model-based entity detection for traffic surveillance, aiming at object categorization.

Author's Names and Addresses: Wijnhoven et al.

Keywords: traffic surveillance and motion analysis.

4. Proposed Approach

It is better to use the macro block motion vectors which generate part of standard video methods. Motion is totally relied on motion features. During the training phase of the normal activity, this estimates joint statistical distribution of the motion features. During online operation, improbable-motion feature values indicate abnormal motion. Considering the motion vectors rather than pixel data helps us to reduce the input data rate by about two orders of magnitude that allow the real-time application on limited computational platforms. Previous works that rely on segmentation, grouping have been reported. There is a step during activity analysis which generates liberation from the process of segmentation. Movie Player is used to detect suspicious frames in videos also used to give special effects for movies.

Following are the process in the development stage:

1. Functional Requirements.
2. System modeling and simulation.
3. Code generation and implementation.

5. Figures

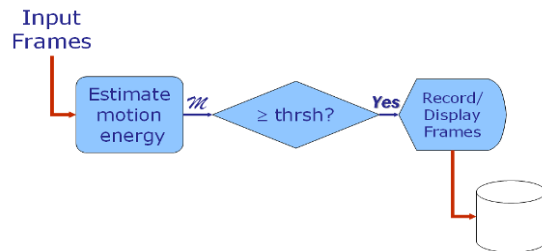Proposed methodology is shown in below figures:
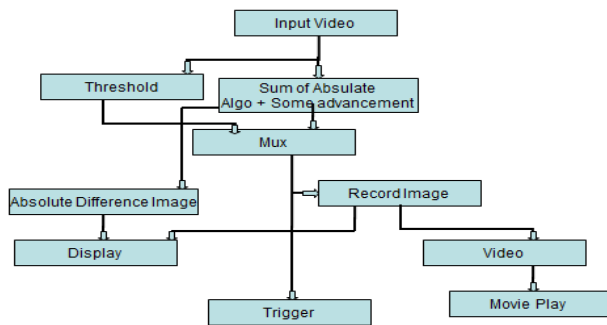

Fig. 1. The Motion Detection Process

Fig. 2. Video surveillance block diagram.

6. Conclusion

This paper reviews the existing developments and different types of video surveillance systems which are used for object tracking, behavior analysis, motion analysis and behavior understanding. It is better to use macro block motion vectors that are generated for video methods. Certain challenges have been observed: more time-consuming and maximum storage capacity. The objective of writing a survey paper on this topic is to reach insight in visual surveillance systems from a big picture.

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