



# **A Recent Survey on Multilevel Hierarchical Motion Pattern Mining Approach Using Complex Dynamic Scene**

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**ABSTRACT:** A numerous surveillance circumstances such as those involving a busy traffic scene, a busy rail station, or a shopping mall, various motions are involved. It is highly desirable to analyze the motion patterns and obtain some high-level interpretation of the semantic relations content. For example, in a video monitoring intersection, without any prior knowledge about the traffic rules in the specific scene. A multilevel hierarchical motion pattern mining useful to discover typical Color versions of one or more of the information. Two traffic scenes illustrate activities and traffic states. Arrows and show single agent, multiple agent motion patterns while arrows grouped by the same colors show interaction patterns vehicle behaviors and their dependencies involved in this scene and detect inconsistent motion for security distress motion patterns involved in a complex dynamic scene usually are of a hierarchical nature; that is, at low level, they consist of single agent motion, multiple agent patterns, which are combined at a higher level to form interaction patterns.

**KEYWORDS:** Hierarchical motion pattern mining, semantic relations, video segmentation, visual surveillance

## **I. INTRODUCTION**

With growing of population and mixture of creature activities, dynamic scenes have been more frequent in the real world applications. It brings vast challenges to public organization, security or safety. Humans have the ability to extract useful information of behavior of hierarchical motions patterns in the surveillance area, monitor the scene for abnormal situations in real time, and provide the potential for immediate response [1]. Extremely video scenes require monitoring an extreme number of individuals and their activities, which is a significant challenge even for a human observer. One important application is intelligent surveillance in replace of the traditional passive video surveillance. Although many algorithms have been developed to track, recognize and understand the behaviors of various scenes in video. As illustrious in [2], [3], video scene understanding may refer to scene layout (rail station, shopping mall, buildings, sidewalks), motion patterns (vehicles turning, pedestrian crossing) [2,] [3] and scene status. In this paper, combined with previous studies, we will elaborate the key aspects of video scene analysis in automated video surveillance.

Video analysis and scene understanding usually involve object detection, tracking and behavior recognition [3][4]. A motion pattern the problem of analyzing and understanding dynamic video scenes. A multi level motion pattern mining approach is proposed. At the first level, single-agent motion patterns are modeled as distributions over pixel-based features. At the second level, interaction pattern are modeled as distributions over single-agent motion patterns. At the third level motion pattern are modeled as hybrid over pixel based and interaction between video scenes. Both patterns are shared among video clips. Compared to other works, the advantage of our method is that interaction patterns are detected and assigned to every video frame. This enables a finer semantic interpretation and more precise anomaly detection. Specifically, every video frame is labeled by a certain interaction pattern and moving pixels in each frame which do not belong to any single agent pattern or cannot exist in the corresponding interaction pattern are detected as anomalies. We have tested our approach on a challenging traffic surveillance sequence containing both pedestrian and vehicular motions and obtained promising results.



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## II. EXISTING SYSTEM

The pixel-wise segmentation it could be further divided into automatic way or interactive way. In automatic way, a background model is automatically learned. The current scene, when an object moves into the view, a pixel-wise object mask could be automatically segmented. As for the interactive way, some pixels are first specified manually as foreground or background pixels, and then the whole image is further segmented as foreground regions and background regions. Block-wise segmentation is a natural evolution of block-based video encoding. Reported a seeded region growing based motion vector grouping method for segmentation. However, it could only be applied in the video with static background.

### Drawbacks:

- First, we develop an optical flow-based algorithm for automatically initializing contours at the first frame.
- Second, the color-based contour evolution, Markov random field theory is used to measure correlations between values of neighboring pixels for posterior probability estimation.
- Finally the dynamic shape-based contour evolution, a shape mode transition matrix is learnt to characterize the temporal correlations of object shapes.

## III. PROPOSED SYSTEM

The proposed system is to predicting the object motion and detecting the abnormal activities from surveillance videos, which is based on the learning of statistical motion patterns. Proposed different tracking methods, such as point tracking, kernel tracking and silhouette tracking to support this requirement. Re-uses the motion information extracted during the video encoding phase, which provides approximated object masks for silhouette tracker. Experimental results confirm that such a block-based object masks is sufficient for a robust silhouette tracker to reliably track moving objects. The proposed algorithm is robust to the object's sudden movement or the change of features. There is an increasing desire and need in video surveillance applications for a proposed solution to be able to analyze human behaviors and identify subjects for standoff threat analysis and determination.

### Advantages:

- BIT processor program memory, for boot code and firmware and
- Working buffer, for intermediate data from the BIT processor and the video decoding hardware
- Bit stream buffer, for loading bit stream data.
- Parameter buffer, for BIT processor command execution arguments and return data.
- Search RAM, used by the memory module to reduce SDRAM bus loading data.
- Frame by frame buffer for storing image frames.

## IV. LITERATURE SURVEY

The main purpose of this survey is to look at current developments and capabilities of visual surveillance systems and assess the feasibility and challenges of using a visual surveillance system to automatically detect abnormal behavior, detect hostile intent, and identify human subject. Video surveillance devices have long been in use to gather information and to monitor people, events and activities. Visual surveillance technologies, CCD cameras, thermal cameras and night vision devices, are the three most widely used devices in the visual surveillance market. Visual surveillance in dynamic scenes, especially for humans, is currently one of the most active research topics in computer vision and artificial intelligence. It has a wide spectrum of promising public safety and security applications, including access control, crowd flux statistics and congestion analysis, human behavior detection and analysis, etc.

Visual surveillance in dynamic scene with multiple cameras, attempts to detect, recognize and track certain objects from image sequences, and more importantly to understand and describe object behaviors. The main goal of visual surveillance is to develop intelligent visual surveillance to replace the traditional passive video surveillance that is proving ineffective as the number of cameras exceed the capability of human operators to monitor them. The goal of

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visual surveillance is not only to put cameras in the place of human eyes, but also to accomplish the entire surveillance task as automatically as possible. The capability of being able to analyze human movements and their activities from image sequences is crucial for visual surveillance.

In general, the processing framework of an automated visual surveillance system includes the following stages: Motion/object detection, object classification, object tracking, behavior and activity analysis and understanding, person identification, and camera handoff and data fusion.

Almost every visual surveillance system starts with motion and object detection. Motion detection aims at segmenting regions corresponding to moving objects from the rest of an image. Subsequent processes such as object tracking and behavior analysis and recognition are greatly dependent on it. The process of motion/object detection usually involves background/environment modeling and motion segmentation, which intersect each other

## V. ARCHITECTURE OF MOTION TRACKING BLOCK

The process of tracking objects as they move in substantial clutter, and to do it at, or close to, video frame-rate is challenging. The challenge occurs if elements in the background mimic parts of features of the foreground objects. In the most severe case, the background may consist of objects similar to the foreground object(s). The object tracking module is responsible for the detection and tracking of moving objects from individual cameras; object locations are subsequently transformed into 3D world coordinates. The camera handoff and data fusion module (or algorithm) then determines single world measurements from the multiple observations. Object tracking can be described as a correspondence problem and involves finding which object in a video frame related to which object in next frame. Normally, the time interval between two successive frames is small, thus the inter-frame changes are limited, allowing the use of temporal constraints and/or object features to simplify the correspondence problem. In Figure.1 shows the architecture diagrams of the block tracking block. In this architecture diagram the object tracking as well as in an object classification is that the motion pixels of the moving objects in the images are segmented as accurately as possible. Foreground pixel detection identifies the pixels in the current frame that differ significantly from the previous frame. For this implementation, better results were obtained by scaling the increment and decrement by a step factor if the absolute difference between the current pixel and the median-modeled previous pixel is bigger than a threshold.

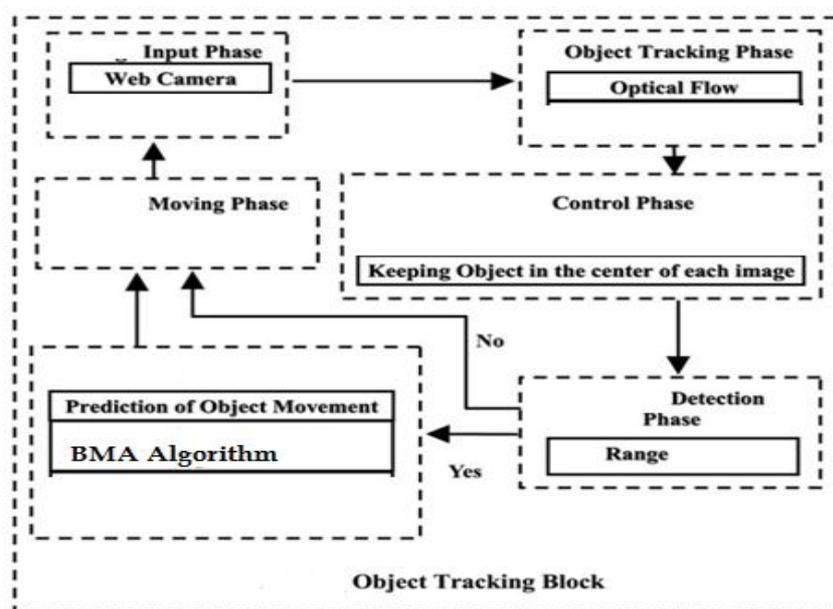


Figure 1 Object Tracking Block



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## VI. BMA ALGORITHM

A Block Matching Algorithm (BMA) is a way of locating matching blocks in a sequence of digital video frames for the purposes of motion estimation. The purpose of a block matching algorithm is to find a matching block from a frame  $i$  in some other frame  $j$ , which may appear before or after  $i$ . This can be used to discover temporal redundancy in the video sequence, increasing the effectiveness of inter frame video compression and conversion. Block matching algorithms make use of an evaluation metric to determine whether a given block in frame  $j$  matches the search block in frame  $i$ .

### Steps in BMA Algorithm

Step1: Divide frame  $f$  into equal-size blocks.

Step2: For each source block obtained in step1,

Find its motion vector using the  
Block-matching algorithm based  
On the reconstructed frame  $f-1$   
compute the DFD of the block.

Step3: Transmit the motion vector of each block to decoder.

Step4: Transmit the encoded DFD's to decoder.

## VII. CONCLUSION

Video surveillance systems have been around for a couple of decades. Most current automated video surveillance systems can process video sequence and perform almost all key low-level functions, such as motion detection and segmentation, object tracking, and object classification with good accuracy. Recently, technical interest in video surveillance has moved from such low-level functions to more complex scene analysis to detect human and/or other subject behaviors, i.e., patterns of activities or events, for standoff threat detection and prevention. This paper reviews and exploits developments and a general strategy of stages involved in video surveillance and analyzes the challenges and feasibility for combining object tracking, motion analysis, BMA algorithm. A multilevel motion pattern using video surveillance involves the most advanced and complex researches in image processing, computer vision, and artificial intelligence. There were many diverse methods have been used while approaching this challenge; and they varied and depended on the required speed, the scope of application, and resource availability, etc. The motivation of writing and presenting a survey paper on this topic instead of a how-to paper for a domain specific application is to review and gain insight in video surveillance systems. To better developments and strategies of stages involved in a general video surveillance system; how to detect and analyze behavior and intent; and how to approach the challenge, if we have opportunities.

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