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ABNORMAL MOTION DETECTION FOR VIDEO SURVEILLANCE SYSTEM.

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ABSTRACT

There are many approaches for detecting abnormal behavior by monitoring moving objects such as human and a car etc. The place in abnormal behavior of the moving objects occurs is deduced from the position of the moving object and the direction in which the moving object moves. An abnormal detector comprises means for determining the position of the moving object and the direction, in which the moving object, means for determining the place where an abnormal incident cause and abnormal behavior of the moving object occurs on the basis of the determined position and direction, means for displaying the place where the abnormal incident occurs. It is possible to immediately know the cause of the abnormal behavior of the moving object from the video information collected by observation of monitoring moving objects such as a human being and a car. In general, comparatively high distance indicates abnormal motion detection. In this paper, results based on the detection of abnormal motions, which consists of both normal and abnormal motions.

INTRODUCTION

A video surveillance covering a large office building or a busy airport can apply hundreds and even thousands of cameras. In avoid communication bottlenecks; the acquired video is often compressed by a local processor within the camera, and at a nearby video server. The compressed video is then transmitted to a central facility for display storage. Av abnormal motion detection is the key to effective and economical video surveillance techniques. The detection of an abnormal motion can trigger video transmission and recording process, and can be used to attract the attention of human observations to a particular video channel. In the problem is characterized by three related challenges schemes. One is the reliability of requirement; they have meaning that irregular events should be consistently detected, while the false-alarm rate should be sufficiently low. In the second is effective characterization of normal motion process, allowing discrimination between normal and abnormal activity process. Third, abnormal motion detection system should be accomplished using the limited computational power available at or near the camera. In this paper presents novel real-time abnormal motion detection. The algorithm use the macro block motion vectors that are generated anyway as part of standard video compression methods. Motion features are derived from the motion vectors process. Normal activity is characterized by the joint statistical distribution of the motion features detection, estimated during a training phase at the inspected site. During online operation, in improbable-motion feature values indicate abnormal motion.

VIDEO SURVEILLANCE

There have been a number of surveys about object detection, classification, tracking and activity analysis in the literature. The survey we present here covers only that work that is in the context as our study. Though, for the comprehensive completeness, we too give brief information on some techniques in which are used for similar tasks that are not covered in our study.

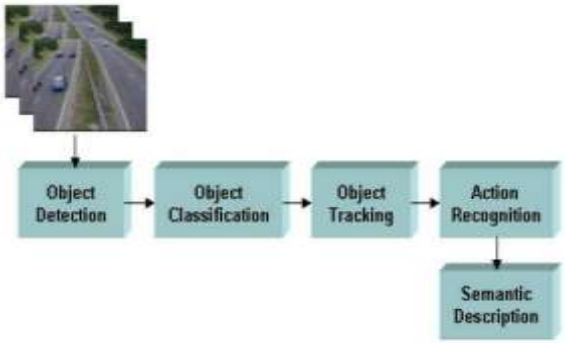

Fig: 1 A generic framework for smart video processing system

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A generic video processing framework for smart algorithms is shown in fig. 1. Although, the some steps need interchange of information with other level, this structure provides a good structure for the discussion throughout this brief survey.

MOTION DETECTION ALGORITHM

Getting the initial background image

As a first step in prepare the background to be the first frame we received, as that we now have no motion at all, we further schemes the background by applying a Grayscale filter and a Pixel late Filter. The pixilated filter here used to reduce the pixels calculates and emphasize the overall color distribution of the image; then we extract the image dimensions to use in further processing.

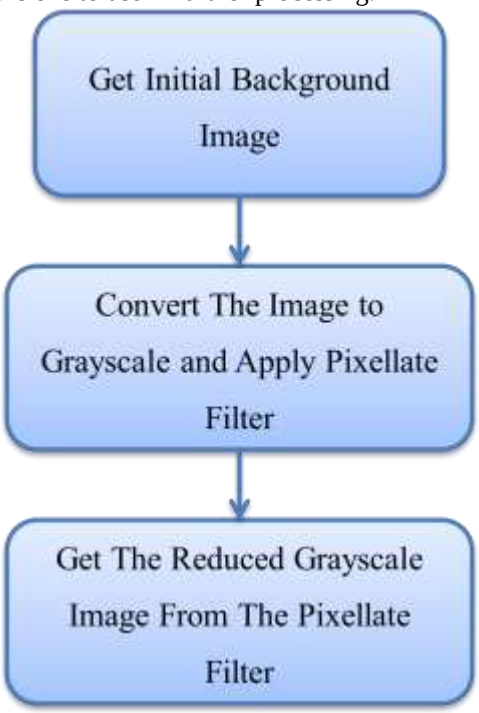

Fig: 2 Setting the initial background image.

Updating the background image

From the steps in first we get a frame and called it the current frame, we first apply the same filters as we did with the background image process. That means we make the current frame as the same as the background image in structure and format process. For update the background image by moving the pixels intensity towards the pixels intensity of the current frame by one level, during the direction of reduces diffirence with overlay image source image is moved towards overlay image. The update equation is defined in the next way:

The bigger is step size value the more resulting image will look like overlay image. For example, the case if step size is equal to 255, the resulting image will be equal to overlay image regardless of source image pixel values. The second case if step size is set to 1, the resulting image will very little differ from the source image. However, in the case if the filter is applied repeatedly to the resulting image again and again, it will become equal to overlay image in maximum 255 iterations. In our case we repeatedly apply the filter to the updated background overlayed on the curent frame, which in result will be counted as applying the filter for the first time. The value of step per pixel, we take is 1, since if we increase the moving steps, we make the background image more similar to the current frame, among this small amount of movement we prevent the background image from become less sensitive to the changes of the upcoming frames, and also reduce the number of iterations that will be made on the background and the current frame, which yields more speed in processing the frames which is a crucial criteria in real-time processing.

OBJECT TRACKING

Tracking is a significant and difficult problem that arouses interest among computer vision researchers. The objective of tracking is to establish correspondence of objects and object parts between consecutive frames of video. It is a significant test in most of the surveillance applications since it provides cohesive temporal data about moving objects which are used both to enhance lower level processing such as motion segmentation and to enable higher level data extraction such as activity analysis and behavior recognition. Tracking has been a difficult task to apply in congested situations due to inaccurate segmentation of objects. Common problems of erroneous segmentation are shadows, partial and full occlusion of objects with each other and with stationary items in the scene. Thus, dealing with shadows at motion detection level and coping with occlusions both at segmentation level and at tracking level is important for robust tracking. Tracking in video can be categorized according to the needs of the applications and the methods it uses for its solution. Whole body tracking is generally adequate for outdoor surveillance whereas objects' part tracking is necessary for some indoor surveillance and higher level behavior understanding applications.

CHAIN CODE METHOD

Shape approximation technique in feature extraction stage, and particularly chain code has been widely used to encode the boundary line because of its

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simplicity and low storage requirement. Chain Code representation gives the boundary of signature image where the codes represent the direction of where is the location of the next pixel from current point.

Chain codes are used to represent a boundary by a connected sequence of straight-line segments of direction and specified length. The direction of each segment is coded by using a numbering scheme such as the ones shown in Figure 3.

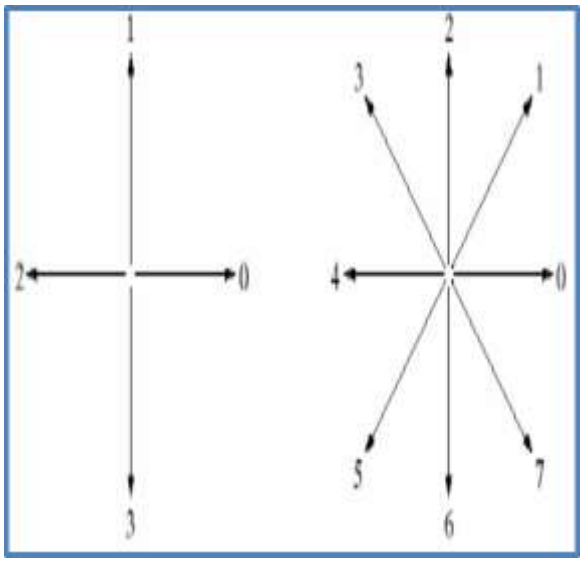

Fig: 3 Direction and 8-direction chain code

The chain code method generally is unacceptable for two principal reasons.

- The resulting chain of codes tends to be quite ling and,
- In any small disturbances along the boundary due to noise or imperfect segmentation cause changes in the code that may not be related to the shape of the boundary.
- An approach frequently used to circumvent the problem just discuss is to resample the boundary by selecting a larger grid spacing, as illustrated in Figure 5.

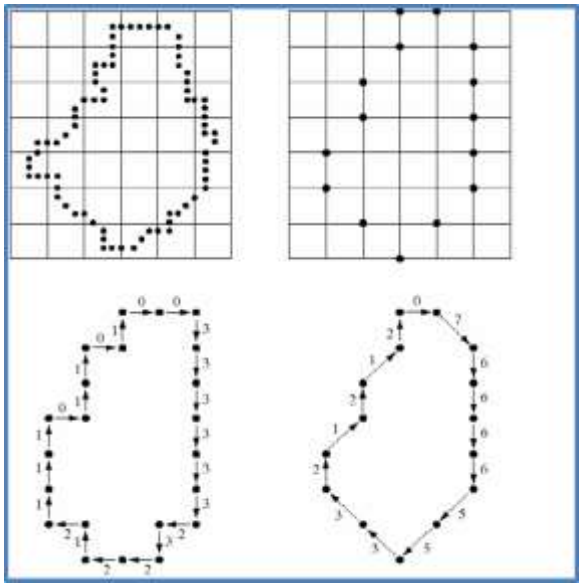

Fig: 4 Concept Object boundaries

- The chain code of a boundary depends on the starting point.
- We can normalize also for rotation by using the first difference of the chain code instead of the code itself.
- The first-difference of the 4-direction chain code 10103322 is 3133030.
- If we elect to treat the code as a circular.
- Here, the result is 33133030.

Boundary Segments

- Decomposing a boundary into segments often is useful.
- Decomposition reduces the boundary's complexity and thus simplifies the description process.
- In this case use of the convex hull of the region enclosed by the boundary is a powerful tool for robust decomposition of the boundary.

RESULTS AND DISCUSSION

System descriptionTo conduct the experiment, as a data set we used different videos from outdoor places which comprise of both normal and abnormal motions. The experimental results of one of the videos have been presented in figure 6-8. The video consists of 100 frames where both normal and abnormal motion exists.

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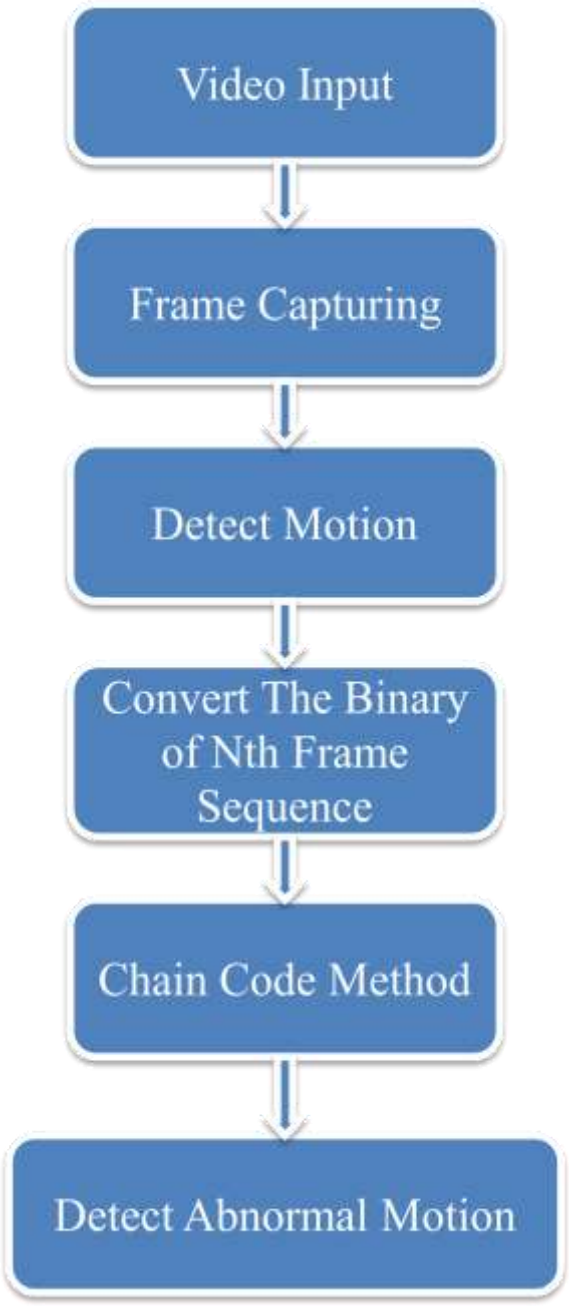

Fig: 5 Sytem block diagram

Fig: 6 Normal motion of the Truck

Fig: 7 Abnormal motion of the Truck

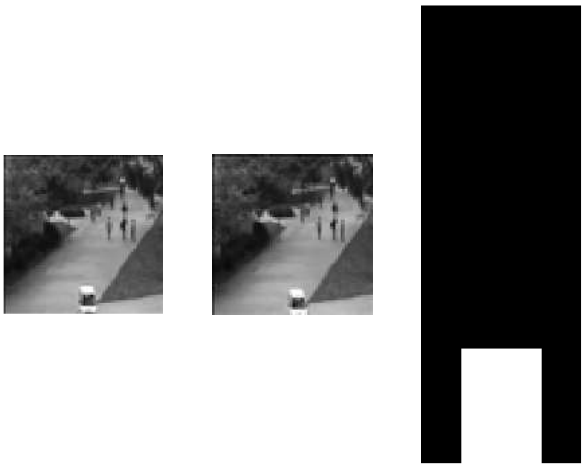

Fig: 8 Abnormal motion of the Truck

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CONCLUSION

In this paper, abnormal motion detection for video surveillance system. Thus motion based change detection in .avi video format was completed and successfully implemented. The proposed algorithm extracted the background from the all frames of video and detected the foreground effectively. This algorithm also dynamically updating the background frame by frame. Finally this algorithm works for On-line (Real time) and Off-line video processing and its computational complexity is low.

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