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An Advanced Object Detection Algorithm Using Feature Isolation for Surveillance Cameras

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Abstract: In this Paper Automatic motion detection technology is an important component of quick transportation systems, and is particularly necessary for management of traffic and maintenance of traffic surveillance systems. Traffic systems using video communication over real-world networks with limited bandwidth repeatedly come across difficulties due to network congestion and or unsteady or low bandwidth. This is particularly difficult in wireless video communication. This has necessity the development of a rate control system which alters the bit-rate to match the available network bandwidth, in this manner producing variable bit-rate video streams. Thy will complete and accurate detection of moving objects in variable bit-rate video streams is a very difficult task. We propose a technique for motion detection which utilizes an testing-based radial basis function network as its major component. This approach is relevant to not only in high bit-rate video streams, but we also use in low bit-rate video streams. The proposed has contains set of a various background generation stage and a moving object detection stage. During the various background generations (VBG) stage, the lower-dimensional Eigen-patterns and the adaptive background representation are recognized in variable bit-rate video streams by using the proposed technique in order to contain the properties of variable bit-rate video streams. At some stage in the moving object detection, moving objects are extracted through the proposed technique in both low bit-rate and high bit-rate video streams; detection results are then generated through the output value of the proposed Scheme. The detection results produce through technique indicates it to be highly effective in variable bit-rate video streams over real-world limited bandwidth networks. This proposed method can be easily achieved for real-time application. Quality and qualitative evaluations shows that it offers advantages over other state-of-the-art methods. For example, and accuracy rates produced through the proposed approach were up to 86.38% and 89.88% higher than those produced through other compared methods, correspondingly.

I. INTRODUCTION

Video surveillance systems have long been in use to monitor security sensitive areas. The making of video surveillance systems "smart" requires fast, reliable and robust algorithms for moving object detection, classification, tracking and activity analysis. Moving object detection is the basic step for further analysis of video. It handles segmentation of moving objects from stationary background objects. Object classification step categorizes detected objects into preened classes such as human, vehicle, animal, clutter, etc. It is necessary to distinguish objects from each other in order to track and analyse their actions reliably.
In previous system we have performed background subtraction by using Canny Edge Detection. In Canny Edge Detection process we are taking two images for comparison those are background image and foreground image.

A. Backend image
Which is already stored

B. Foreground image
Which are captured by the webcam and these are compared with the background image to get the status.Previous strategies for object detection are immense, including object detectors (supervised learning), image segmentation, Background subtraction, etc., Our methodology aims to segment objects supported motion info and it comprises a element of background modelling.
In the previous strategies we are conducting background subtraction only for images. For this we proposed a pixel wise background modelling and subtraction technique using multiple features. Hence, in this colour, gradient and Hear-Like features are integrated to handle the variation pixel. Thus, motion segmentation and background subtraction are the most connected topics to the current paper.

II. RELATED WORK

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A. A General Framework for Object Detection

This paper presents a framework for object detection in a sequence of frames in various environments. The detection technique uses analysis of the sinusoidal wave diagrams of the objects obtained from a statistical analysis of the class instances. The bject class is studied and then determined which subset wavelet basis functions it belongs to. This concrete definition is supplied as an input to a support vector machine classifier.

B. Motion-Based Background Subtraction using Adaptive Kernel DensityEstimation

This is an innovative technique for modeling dynamic scenes for differentiating between background and foreground deviation. It relies on the utilization of optical flow as feature for change detection. In order to properly utilize uncertainties in the features, a kernel based multivariate density estimation technique that adapts the bandwidth according the uncertainties in the test and sample measurement was developed.

C. Face Recognition With Contiguous Occlusion Using Markov Random Fields

A more upstanding method for face recognition with *contiguous* occlusion was developed. No explicit prior knowledge about the location, size, shape, colour, or number of the overlapping regions is recorded during initiation of the system. The only prior information we have about the occlusion is of the corrupted pixels are likely to be adjacent to each other in the image plane during object motion.

D. Robust Object Tracking with Online Multiple Instance Learning

The problem of tracking an object in a video given its location in the first frame is tackled. Recently, a class of tracking techniques called “tracking by detection” has been shown to give near accurate results at real-time speeds. These methods allocate a unique classifier solely to discriminate the object from the background. This classifier extracts positive and negative examples from the current frame by bootstraping itself by using the current tracker state.

E. Motion Competition: A Variation Approach to Piecewise Parametric Motion Segmentation

An explicit-based implementation which can be applied to the motion-based tracking of single moving object, and an implicit multiphase level set implementation where an arbitrary number of multiply connected moving objects is used for segmentation. Results for simulated ground truth experiments and for real world sequences give a preview of how this method effectively identifies segment objects based exclusively on their relative motion with other objects.

III. PROPOSED SYSTEM

We present detection of Moving Object by isolating contiguous outliers in the low-rank representation which is used for efficient object detection. Instead of using only the background subtraction algorithm like the existing systems, the Decolor algorithm is also used here.

A. Object Image Collection

The video feed from the web camera is recorded temporarily into a buffer, frame by frame. Each frame is treated as a separate image and then sent to the frame separation module.

B. Frame Separation

To isolate the features of the image, into the current image containing the object in motion and the background image, which is a constant frame most of the time.

C. K-Means Clustering

It is a method of vector quantization, originally from signal processing, that is popular for cluster analysis in data mining. *k*- means clustering aims to partition *n* observations into *k* clusters in which each observation belongs to the cluster with the nearest mean, serving as a prototype of the cluster.

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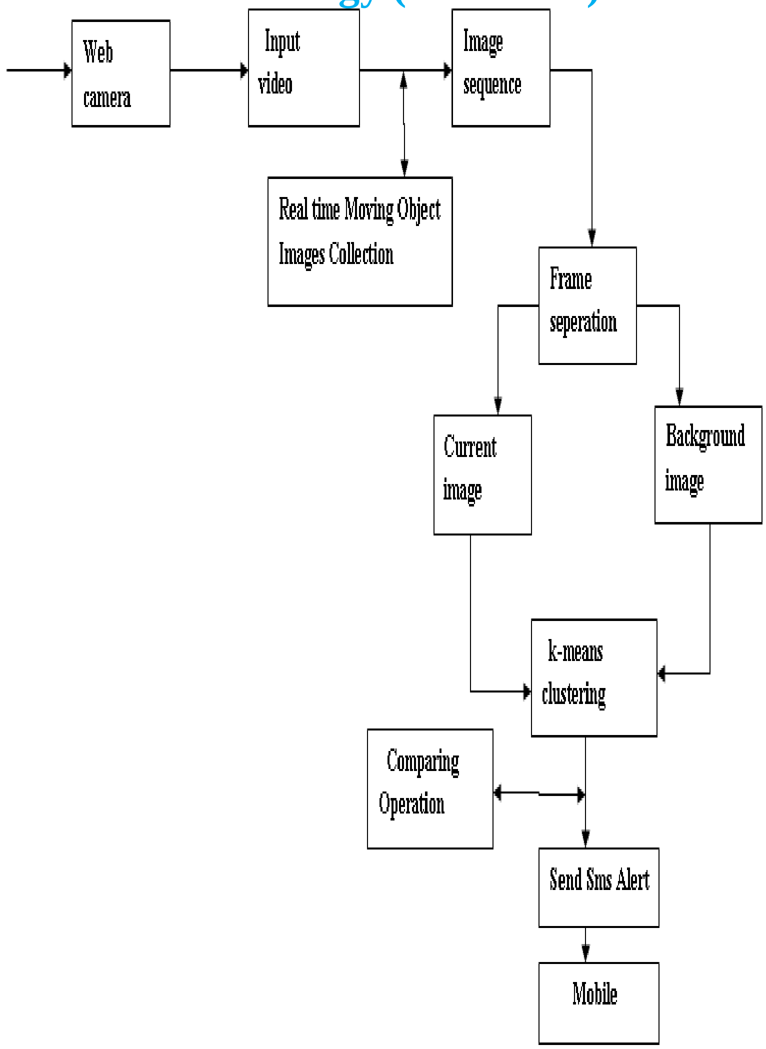

IV. IMPLEMENTATION

The algorithm includes the following steps:
Step1: Capturing the area to be monitored and saving the video feed.
Step2: Each frame of the video is taken sequentially.
Step3: Send each frame to the frame separation unit.
Step3 i): Isolate the current image which has a disturbance from the original image caused by a moving object.
Step3 ii): Discard the frame if it is identical to the background image.
Step4: Use k-means clustering to obtain a final feed without the frames that have no moving object in them.
Step5: Compare the frames and if a difference arises, send an SMS alert to the concerned authority.
Modules

A. Video capturing

Digital video refers to the capturing, manipulation, and storage of moving images that can be displaced on computer screens. First, a camera and a microphone capture the picture and sound of a video session and send analog signals to a video-capture adapter board.

B. Moving object detection

In an open area, the objects will be able to move in any direction and objects will enter and leave the field of view on all its boundaries. The size of an object will change when it moves towards or away from the camera. The objects' freedom of movement also implies that they can move in a way where their shapes may overlap each other in the video feed or remain static for a few sequential frames. Different environments will contain different objects. A surveillance video of a parking lot for example will contain vehicles, persons, and maybe birds or dogs. Conventional surveillance systems would be able to distinguish between these objects, and treat them in the way most appropriate to that type of object.

C. Motion segmentation

The frames of the video are analyzed to identify from which frame a moving object is detected. The background image is kept in the data storage as a reference frame and each frame is compared with it. The first k video frames are used to train the background model to achieve a model that represents the variation in the background during this period. Frames from k + 1 and onwards are each processed by the background subtraction module to obtain the changes that arise in the foreground image of the frame with pixel value deviation. These changes are constantly recorded using Continuous Updating Method, Layered Updating or both if necessary. The mask obtained from the background subtraction is subjected to post processing module to minimize the effect of noise in the mask.

D. SMS Alert System

After detecting the changes in video frames, we alert the central control unit through SMS using a GSM Modem, which is a wireless modem that works with a GSM wireless network, like a dial-up modem. The difference between the two is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. An external GSM modem of baud rate 9600 and compatible with a 900 SIM is connected to a computer through a 9 pon USB to Serial converter. An SMS alert and also an image of the frame where movement is detected can be sent via GPRS.

V. CONCLUSION

This is a more efficient and feasible method of surveillance. The primary advantage is that the memory space used is much less than that used by the conventional surveillance, saving memory device costs.

It is easier to identify the time where a movement is detected as the effort of navigating through the entire video to view the motion is eliminated.

VI. FUTURE WORK

This method of surveillance is very efficient when used during non-working hours of the concerned area being monitored. During working hours, this method is moot. The shift between the night mode and conventional mode can be done by manually disconnecting the GSM modem from the surveillance system, which will stop the SMS alerts. The future enhancement to be done is to implement automatic switching between different modes by setting a timer in advance.

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