

A People Tracking Using Background Subtraction for Surveillance Application

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Abstract- In the video analysis, the most important part in object detection and tracking is movement of object. The purpose is to detect the movement of object from the background image in video sequence and for the object tracking. This paper proposes a method to detect object based on background subtraction method. A reliable background updating model is established. Optimization threshold method is used to obtain behaviour of moving object and tracking. Motion of a moving object and tracking in a video stream is studied and detected. The centroid of object is computed to use in the analyses of the position of the moving human body. The experimental results show that the proposed method runs quickly, accurately and fits for the real-time detection.

Keywords- Background subtraction, Object detection, Object tracking.

I. INTRODUCTION

Detection and tracking target are the essential technique in visual surveillance. In order to count passed human accurately, we must detect and track human real time and stably. It has become more and more important in many practical applications such as video surveillance, pedestrian traffic management and tourists flow estimation. It is a crucial part of smart surveillance systems since without object tracking, the system could not extract cohesive temporal information about objects and higher level behaviour analysis steps would not be possible. Moving object detection is the first step in video analysis. Some of the applications are as follows

(i) *Visual surveillance:* A human action recognition system process image sequences captured by video cameras monitoring sensitive areas such as bank, departmental stores, parking lots and country border

to determine whether one or more humans engaged are suspicious or under criminal activity [1].

(ii) *Content based video retrieval:* A human behaviour understanding system scan an input video, and an action or event specified in high-level language as output. This application will be very much useful for sportscasters to retrieve quickly important events in particular games.

(iii) *Precise analysis of athletic performance:* Video analysis of athlete action is becoming an important tool for sport straining, since it has no intervention to the athletic [2].

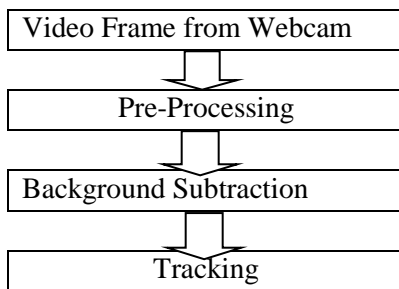
All these applications fixed cameras are used with respect to static background and a common approach of background subtraction is used to obtain an initial estimate of moving objects. First perform background modelling to yield reference model. This reference model is used in background subtraction in which each video sequence is compared against the reference model to determine possible variation. The variations between current video frames to that of the reference frame in terms of pixels signify existence of moving objects. The variation which also represents the foreground pixels are further processed for object localization and tracking. Ideally, background subtraction should detect real moving objects with high accuracy and limiting false negatives (not detected) as much as possible. At the same time, it should extract pixels of moving objects with maximum possible pixels, avoiding shadows, static objects and noise.

II. OBJECT DETECTION USING BACKGROUND SUBTRACTION

Detection and tracking target are the essential technique in visual surveillance. In order to count

passed human accurately, we must detect and track human real time and stably [3].

To obtain background subtraction, the background has to model first. Then, the incoming frame is obtained, and subtract out from the background model. With the background model, a moving object can be detected. This algorithm is called as "Background Subtraction". The efficiency of a background subtraction technique correlates with three important steps: modelling, noise removal and data validation as shown in below block diagram.



Basic block diagram of People Tracking System

A basic block diagram shown in Fig for people tracking system has been discussed. The video sequences captured by a webcam are pre-processed to make it suitable for the tracking purpose. In this, a real time bi-directional people tracking method is used for the application in video surveillances. This method used with the feature extraction from the target followed by tracking and counting of each individual entering into the detection area of the camera. Again to describe the background, A Gaussian mixture model (GMM) was proposed for the background subtraction. The GMM is extended with a hysteresis threshold. This method uses a Gaussian probability density function to evaluate the pixel intensity value. It finds the difference of the current pixels intensity value and cumulative average of the previous values.

III. OBJECT TRACKING BASED ON COLOURED OBJECT

Object tracking means identifying & following same object in sequences of video frames. Webcam is used

as input sensors to acquire frames to form the video. The acquired video may have some noise due to bad (light, wind, etc. Or due to problems in sensors). To remove noise from captured frames noise reduction technique is used to improve the image quality, to detect moving object, based on colour of the moving object in frame. Extraction of objects from frame using the different features is known as object detection [4-6]. Every object has a specific feature based on its shape.

The availability of high quality and inexpensive video cameras, and the increasing need for automated video analysis has generated a great deal of interest in object tracking algorithms [7]. There are three key steps in video analysis: detection of interesting moving objects, tracking of such objects from frame to frame, and analysis of object tracks to recognize their behaviour. In its simplest form, tracking can be defined as the problem of estimating an object in the image plane as it moves around a scene. In other words, attacker assigns consistent labels to the tracked objects in different frames of a video.

A rectangular coloured bounding box is plotted around the foreground objects detected from GMM based Background subtraction. By using the dimensions of rectangular bounding box, a centroid is plotted. The position of the centroid is stored & object is bounded in box.

IV. RESULTS

First we select static background mode to detect the moving object on it, static background is show in fig 1 .The next step we will capture image by webcam then we compare static background and on current image by using python code, this is show in fig 2 which tool name as Raspberry Pi promotes Python as the main programming language, with support for BBC BASIC), with the help of Open CV (Open Source Computer Vision).At last we subtract foreground object which is show in fig 3, this foreground object we consider as a final result.



Fig. 1 Background Mode



Fig.2 Current Frame



Fig.3 Foreground objects detected

For object detection, we use reliable background model, thresholding method to detect moving object and update the background in real time. Target detection and process is realized on the video image.

V. CONCLUSION

A real-time video of moving object detection and tracking is beneficial for time efficient, and it works well for small numbers of moving objects. Target detection and process is realized on the video image. Video image data of the human body is processed, and its geometrical centroid is obtained in different time intervals, it is getting tracked.

VI. REFERENCES

- [1] Huazhong Xu, Pei Lv and Lei Meng, "A People Counting System based on Head-shoulder Detection and Tracking in Surveillance Video", 2010 International Conference on Computer Design and Applications (ICDDA 2010), IEEE, Volume 1.
- [2] Vibha L, Chetana Hegde, P Deepa Shenoy, Venugopal K R and L M Patnaik, "Dynamic Object Detection, Tracking and Counting in Video Streams

for Multimedia Mining", IAENG International Journal of Computer Science, 35:3, IJCS_35_3_16, August, 2008.

- [3] Honglian Ma and Huchuan Lu Mingxiu Zhang, "A Real-time Effective System for Tracking Passing People Using a Single Camera", Proc. Of the 7th World Congress on Intelligent Control and Automation, June 2008.
- [4] Chao-Ho (Thou-Ho) Chen, Yin-Chan Chang, Tsong-Yi Chen and Da-Jinn Wang. "People Counting System for Getting In/Out of a Bus Based on Video Processing", Eighth International Conference on Intelligent Systems Design and Applications, 2008.
- [5] Tsong-Yi Chen, Chao-Ho Chen, Da-Jinn Wang and Tsang-Jie Chen, "Real-Time Counting Method for a Crowd of Moving People", Sixth International Conference on Intelligent Information Hiding and Multimedia Signal Processing, 2016
- [6] Javier Barandiaran, Berta Murguia and Fernando Boto, "Real-Time People Counting Using Multiple Lines", IEEE Ninth International Workshop on Image Analysis for Multimedia Interactive Services, 2008.
- [7] Hartono Septian, Ji Tao and Yap-Peng Tan, "People Counting by Video Segmentation and Tracking", 9th International Conference on Control, Automation, Robotics and Vision, 5 - 8 December 2006.