OPEN ACCESS

International
Journal
Of Modern Engineering Research (IJMER)

Analysis of Human Behavior Based On Centroid and Treading Track

Ms. K. V. Patil[1], Prof. D. D. Dighe[2]
[1,2] *Matoshri College of Engineering and Research Centre, Department of E&TC, Pune University, Nashik*

Abstract: *Human body motion analysis is an important technology which modem bio-mechanics combines with computer vision and has been widely used in intelligent control, human computer interaction, motion analysis, and virtual reality and other fields. In which the moving human body detection is the most important part of the human body motion analysis, the purpose is to detect the moving human body with its behavior from the background image in video sequences, and for the follow-up treatment such as the target classification, the human body tracking and behavior understanding, its effective detection plays a very important role.*

Index Terms: *Human motion detection, object detection, Classification, Subtraction method, Tread tracking system.*

I. Introduction

Real time object detection is critical issue in embedded applications such as security surveillance and visual tracking operations. Image processing is one of the major key specification in real time applications for detecting normal and abnormal behavior of each user in video streaming. In this scenario the main challenge is to detect objects in convenient time interval without using any special hardware specifications in image processing and consuming a lot resources for development of this detection mechanism efficiently. One of the major effective techniques is background subtraction technique.

When a new image is captured, the difference between the image and background model is computed for moving object detection. In this paper we introduce to develop a new video surveillance system model for detecting human categorization effectively. Moving object detection is widely used in real time application development used in surveillance process generation such as transportation with security systems and video monitoring systems efficiently. Moving object detection is the main challenge in real time visualization system applications. The overall performance of these techniques can be discussed in experimental setup and proposed process generation in real time applications for detecting moving objects. Existing technologies of moving object detections does not give a normal and abnormal behavior of the users in realistic data event generation. Our experimental result show efficient process in moving object categorization in video surveillance.

The automatic approach to analyze and detect suspicious behavior will help to quickly and efficiently detect any such abnormal activity and may even provide warning before the occurrence of any big casualty. This is motivation behind implementation of new system. In this paper first introduction given about motion detection of object. Then after that discussed previous work about different method used for motion detection of object. Then explained how effective background subtraction method used for motion detection. After that the demerits of old surveillance system overcome in implemented surveillance system. Then discussed experimental result with algorithm and observation table of centroid movement with treading track and finally explored conclusion along with future scope.

II. Previous Work

2.1 Frame Subtraction Method

In the frame difference, or Frame Subtraction method detect moving objects by calculating the differences between pixels in consecutive frames of a video sequence, as well as extracts the motion regions by the threshold of time difference in adjacent frames pixels. Although frame Subtraction approaches are adaptive to environments with sudden illumination change, some relevant pixels cannot be extracted, this results in holes inside moving entities. The advantages of this method are the insensitive to the change of light, fast background update, good adaptive performance, its calculation is simple and easy to implement. For a variety of dynamic environments, it has a strong adaptability.

2.2 Optical Flow Method

In Optical flow method, firstly it will calculate the image optical flow field, and according to the optical flow distribution characteristics of image it will do clustering processing. It suits for the static as well as dynamic background. This method can get the absolute motion information and detect the moving object from the background better. It usually uses characteristics of flow-vectors over time to indicate moving regions in a video sequence. However, flow-vectors of moving objects only can be applied to illustrate streams of moving objects, thus detecting a sparse form of object regions.

2.3 Drawbacks of Existing Methods

- The Frame Subtraction is generally difficult to obtain a complete outline of moving object, responsible to appear the empty phenomenon; as a result the detection of moving object is not accurate.
- In Optical Flow method, a large quantity of calculation, sensitivity to noise, poor anti-noise performance, makes it not suitable for real-time demanding occasions. If used then special hardware is needed in real time processing.

III. Object Detection Using Background Subtraction

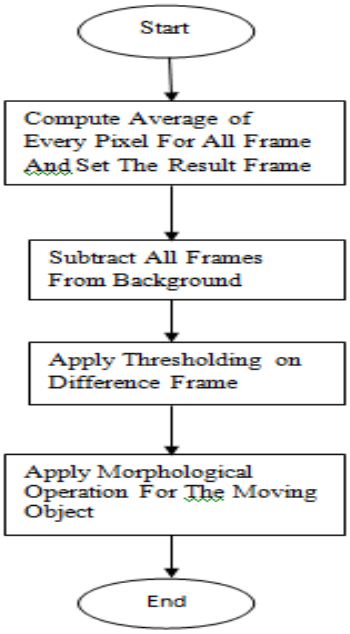

Fig.1 algorithm for background modeling method

Background subtraction method includes all the frames for computation. In this method all the pixel intensities for each and every frame are computed to get background frame. It takes difference between reference image and current image so accurate and sensitive. In this paper, we discuss a new surveillance system model for detecting moving object based on background subtraction method. This method is more accurate and sensitive than other two methods[1].

There are many challenges in developing a good background subtraction algorithm. First, it must be robust against changes in illumination. Second, it should avoid detecting non-stationary background objects and shadows cast by moving objects. A good background model should also react quickly to changes in background and adapt itself to accommodate changes occurring in the background.

IV. Video Surveillance System

This system is able to distinguish moving and stopped foreground objects from the static background scene, track the objects and detect the unusual activity. The first step is to separate foreground objects from stationary background. It use an adaptive background subtraction method and post-processing methods to make a foreground pixel representation at every frame[4]. Then do the grouping of connected regions in the foreground pixel map and object features such as bounding box and center of mass are calculated. Tracking is the next step after background subtraction. An object level tracking Algorithm is used in our video surveillance system. It can't track the object parts such as limbs of human, but track the object as a whole from frame to

frame. Final step is the unusual activity (abandoned object / human fall / person hiding) detection. This system uses a single camera view and unusual activity is detected using the background subtraction and object tracking result[6].

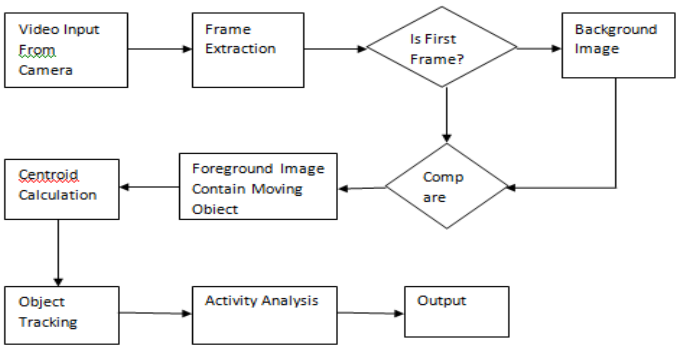

Fig.2 video surveillance system procedure for detecting object categorization

V. Experimental Results

5.1. Extracting Object Feature

5.1.1Centroid

After segmentation of foreground regions, extracted the features of corresponding objects from the current image scene. These features are the size (Si) and center of mass (Ce) of the object. In order to estimate the size of the object just calculate the number of pixels of foreground and to calculate the center of mass Ce = (xCi, yCi) of an object O, use the equation given in (1)[9].

$$xCi = \sum ik\ xi / k,\quad yCi = \sum ik\ yi / k \qquad (1)$$

Where,

xi is the location of white pixel on x Co-ordinate,

yi is the location of white pixel on y Co-ordinate.

5.1.2Treading Track

This system can use the background subtraction method to detect contour of person successfully, meanwhile, it can process irregular behavior recognition based on type of track which followed according to centroid movement of person accurately i.e. continuously changes or stable[10].

5.2 Activity Detection

5.2.1Algorithm 1: Steps for detecting moving object analysis

Input: Video Streaming

Output: Object Tracking process when abnormal behavior accessing.

Step1: Read first frame as background image from recorded video.

Step 2: Convert it into gray.

Step 3: Assign previous_centroid= current_centroid.

Step 4: Read next frames from video.

Step 5: Convert it into gray.

Step 6: Find difference between background and current frame.

Step 7: Apply canny edge detection video.

Step 8: Apply dilation followed by holes filling operation on image.

Step 9: Label different isolated regions of image.

Step 10: Remove isolated areas which are lesser than area A.

Step 11: If two persons are found then copy only those 2 persons in separate image.

Step 12: Find centroid of both the persons.

Step 13: Track the centroid. If continuous change in centroid location is found then display message 'safe'.

Step 14: If irregular or abrupt translation of centroid is found then display message abnormal behavior'.

Step 15: Go to step 3.

5.2.2 Results of abandoning of bag by a person

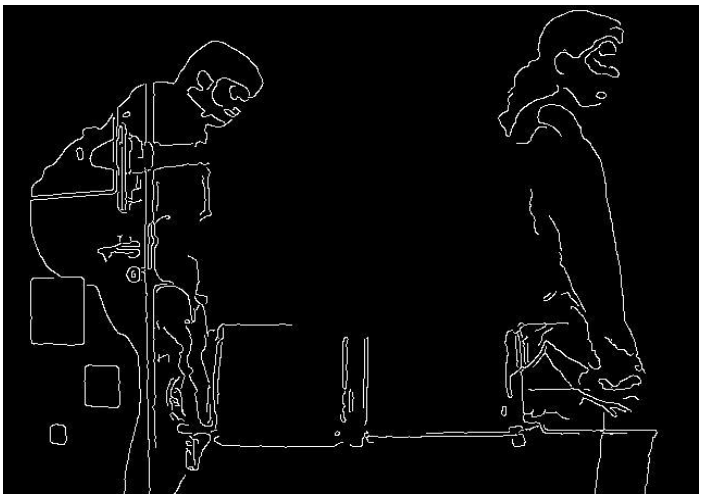

Fig.3 result of edge detected image

Fig.4 result of filled image

Fig. 5 result of final image

The abandoned or carried object detection process uses the output of the tracking model and features extraction as the input for each frame, and determines if they are abandoned or carried. The output of tracking step contains the number of objects, their identities. If the distance between the location of the centroid of the abandoned object or carried object and the person is greater than fixed value and increases continuously then unusual activity is detected.

From the observation of graph and Table1 frame no 50-75 we observe abnormal detection as difference for two corresponding frame is less than considered magnitude so that less difference count increases

and persons observed stable or doing some different from standard i.e. graph not changes continuously it was stable line which is irregular detection. Our method detects people in the target posture with a very low error rate. The few false positives still correspond to people but at some what inaccurate scales or orientations.

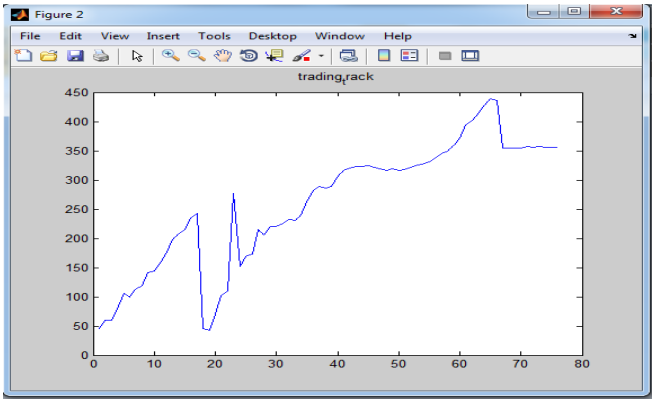

Fig.6 result of treading track image

Table.1 Result of activity detection

Frame No.	Centroid Variation	Observation	Result
58	317.104	0	Safe
59	320.7904	0	Safe
60	322.6346	0	Safe
61	323.3333	0	Safe
62	324.0833	1	Abnormal
63	321.4795	1	Abnormal
64	319.7225	1	Abnormal
65	317.0629	1	Abnormal
66	318.6056	1	Abnormal

VI. Conclusion

This method has also a very good effect on the elimination of noise and shadow, and be able to extract the complete and accurate picture of moving human body. In this proposed work static background considered but in future it can be improved for non-static background. System can be developed to distinguish human activities also human or nonhuman objects also face identification of human can be done.

REFERENCES

[1] Lijing Zhang and Yingli Liang, "Motion human detection based on background Subtraction," Second International Workshop on Education Technology and Computer Science, IEEE Computer Science, vol.1, pp.284-287, Mar 2010.

[2] Xiaofei Ji and Honghai Liu, "Advances in view-invariant human motion analysis: a review," IEEE Transactions on SMC PART C, vol.40, pp.13-24, Jan 2010.

[3] Fan-chieh cheng, Shih-chia Huang, and Shanq- jang Ruan ,"Illumination-sensitive background Modeling approach for accurate moving object detection," IEEE Transactions on Broadcasting, vol. 57, no. 4, pp.794-801, Dec 2011.

[4] Jin-Bin Yang, Min Shi, and Qing-Ming Yi, "A New Method for Motion Target Detection by Background Subtraction and Update," International Conference on Medical Physics and Biomedical Engineering, 2012.

[5] Shengyong chen, Jianhua Zhang, Youfu Li, and Jianwei Zhang, "A hierarchical model incorporating segmented regions and pixel descriptors for video background subtraction," IEEE Transactions on Industrial Informatics, vol.8, no. 1, pp.118-127, Feb 2012.

[6] Prithviraj Banerjee and Somnath Sengupta, "Human Motion Detection and Tracking for Video Surveillance," pp.1-6, Apr 2008.

[7] Sreedevi M, Yaswanth kumar Avulapati, Anjan babu G, and Sendhil kumar R, "Real Time Movement Detection for Human Recognition," WCECS, pp. 24-26, Oct 2012.

[8] Eyup Gedikli and Murat Ekinci, "Human Motion Detection, Tracking and Analysis For Automated Surveillance," vol. 89, no. 10, Jan 2001.

[9] R. Manikandan and R. Ramakrishnan, "Human Object Detection and Tracking using Background Subtraction for Sports Applications," International Journal of Advanced Research in Computer and Communication Engineering Vol.2, Issue 10, October 2013.

[10] Ye Zhang and Zhi-Jing Liu, "Irregular Behavior Recognition Based On Treading Track," Proceedings of the 2007 International Conference on Wavelet Analysis and Pattern Recognition,vol.3, pp.1322-1326, Nov 2007.