International Journal on Recent and Innovation Trends in Computing and Communication
ISSN: 2321-8169 Volume: 11 Issue: 9s
DOI: https://doi.org/10.17762/ijritcc.v11i9s.7389
***Article Received**: 30 April 2023 **Revised:** 30 June 2023 **Accepted:** 20 July 2023*

Effective Moving Object Tracking Using Adaptive Background Subtraction with Advanced Probability Evolutionary Algorithm

Adinarayana Ekkurthi[1], Dr.V.Sujatha[2], K.Vijay Kumar[3]
[1]Dept .of Elctronics and Communication Engineering
Sri Mittapalli College of Engineering
Tummalapalem, NH-16, Guntur,A.P,India
adinarayanamtech@gmail.com
[2]Dept .of Computer Science and Engineering
Vignan's Nirula Institute of Tecnology and Science for Women
Guntur, A.P,India
sujathav.cse@gmail.com
[3]Dept .of Elctronics and Communication Engineering
Sri Mittapalli College of Engineering
Tummalapalem, NH-16, Guntur,A.P,India
roi.raj24@gmail.com

Abstract— Tracking moving objects is a very difficult task for many computers. The task of tracking is a moving object. There are many virtual applications such as video surveillance and object recognition. Many ideas have been suggested for moving objects tracking and detection. One of the main problems solving tracking is finding identical objects in different frames. In this article, this application mainly focuses on the detection and tracking of moving objects using adaptive Background subtraction with adaptive probability evolutionary algorithm (AREA) method. Normal probability evolutionary algorithm will track only human motion but our algorithm tracks all the moving objects very accurately. Our proposed system shows the tracked objects with the red mark border.

Keywords- Moving objects, Tracking, Detection, APEA .

I. INTRODUCTION

With the rapid development of computer science and technology, the visual analysis of human motion as sequential images is attracting more and more researchers in the laboratory and industry. It has many applications such as human analysis, intelligent visual inspection, human-machine interface, virtual reality, etc. [1], [4]. By keeping track of the image properties in a frame, such as position, speed, shape, texture, and color, (Hu et al., 2004) [3]. Various methods have been studied over the years, and these monitoring methods can be divided into regional monitoring (Haritaoglu et al., 2000; Collins et al., 2000) and feature-based monitoring (Breit and Rigoll, 2003; Schiele, 2005). Collins et al. (2000) developed autonomous video surveillance and a surveillance system called VSAM [4,5]. VSAM uses background subtraction to [6] track moving objects.

II. RELATED WORK

Current systems use background subtraction to detect moving objects. The increasing demand for intelligent video surveillance in public, commercial and home environments has made video surveillance practical [4]. Current methods detect moving objects by separating the current image from the background image. The background image BG (A,B) is obtained, subtract the background image BG(A,B) from present frame FM(A,B). If the difference between pixels is greater than threshold T, it shows that pixels obtained in moving object, otherwise as background pixels [5].

The drawback of background subtraction is very sensitive method to change in the external environment and will support only for single scalar value which will slow illumination change. Errors like small blobs, inaccurate etc are identified with this existing system. It will take more time to form the frames. Due to this, accuracy is missed to detect the moving object. The limitations of existing method are Cost of the entire System is high, Power Consumption in remote areas is high and Human Interaction is needed for monitoring.

III. PROPOSED SYSTEM

In this paper, the proposed system mainly focuses on detecting and tracking of moving object by using advanced

International Journal on Recent and Innovation Trends in Computing and Communication
ISSN: 2321-8169 Volume: 11 Issue: 9s
DOI: https://doi.org/10.17762/ijritcc.v11i9s.7389
***Article Received**: 30 April 2023 **Revised:** 30 June 2023 **Accepted:** 20 July 2023*

probability evolutionary algorithm (APEA). Normal probability evolutionary algorithm will track only human moving but our algorithm track all the moving objects very accurately. Our proposed system shows tracked objects with the red mark border.

A. Modules and Module Description

i. Video capturing and processing module
ii. Abnormal frame detection using frame comparison module
iii. Alerting System module

i .Video capturing and processing module

For video capturing process, a megapixel camera is needed. The analog signal is digitized by an A/D converter to produce a raw data stream containing the camera's video sequence. Finally, the color space data is converted to a file corresponding to one of many color spaces.

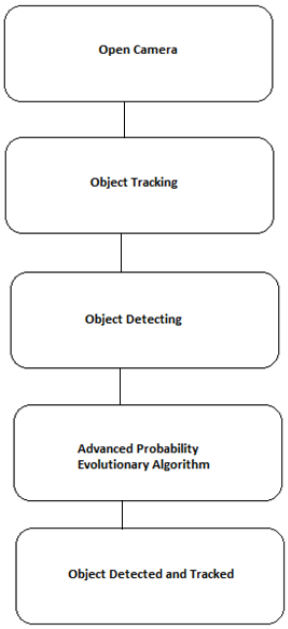
ii..Abnormal frame detection using frame comparisons module

This process involves splitting the stream into frames for comparison purposes to implement detection. The process of comparing a current frame with its preceding frame and estimating visual difference to determine human detection involves the use of Advanced Probabilistic Evolutionary algorithm (APEA).

iii..Alerting System module

An alerting system gives an audible or visual signal about a problem or condition. After detecting motion and characterizing human sequences, we propose to raise an alert for notifying the authorized end users.

B. Architecture diagram



C. APEA Algorithm

A new evolutionary algorithm called Advanced Probabilistic Evolution Algorithm (APEA) and a way to view humans as APEA has been proposed. Inspired by quantum computing and quantum evolutionary algorithms, APEA has struck a good balance between research and application, and its computational speed is very high..Individuals in APEA are encoded by probability composite bits, which are defined as the smallest data for probability representation. In APEA, the evaluation step is used to get the evaluation status of the person and the update operator is used to update the contact. In the APEA-based human tracking framework, tracking is considered a functional issue, so the goal is to optimize the mapping between the model and the image view. As the match function is a very difficult task at high altitude, APEA is used to make it better. 2D and 3D human travel tracking experiments demonstrate the effectiveness, importance and computational efficiency of the proposed human tracking system.

The following steps used in implementation of APEA.

- Start
- Take videos from static videos
- Convert the videos into frames
- Take first frame and calculate the threshold of the each frame.
- Default threshold value for the normal frame without any moving object is 0.
- If the threshold value greater than normal value the moving object is detected.
- The higher the percentage of comparison sizes, the better the performance generated by the algorithm
- For correctly moving object detected,

$$\mathrm{M}(i) = \frac{\#(\tilde{R}_i \cap R_j)}{\#(\tilde{R}_i \cup R_j)}$$

- Correct Detection (**CD**): 1-1 matches.
- False Alarm (**FA**): 0-1 matches.
- Detection Failure (**DF**): 1-0 matches.

IV. SIMULATION RESULTS AND DISCUSSIONS

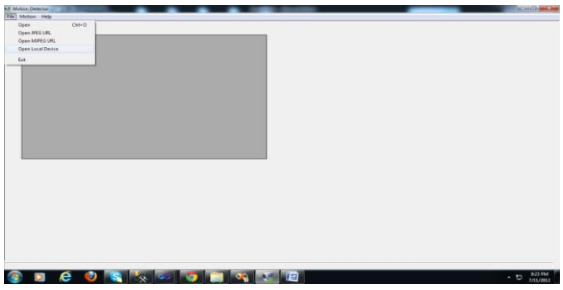


Figure 1. Open the web camera

International Journal on Recent and Innovation Trends in Computing and Communication
ISSN: 2321-8169 Volume: 11 Issue: 9s
DOI: https://doi.org/10.17762/ijritcc.v11i9s.7389
***Article Received**: 30 April 2023 **Revised:** 30 June 2023 **Accepted:** 20 July 2023*

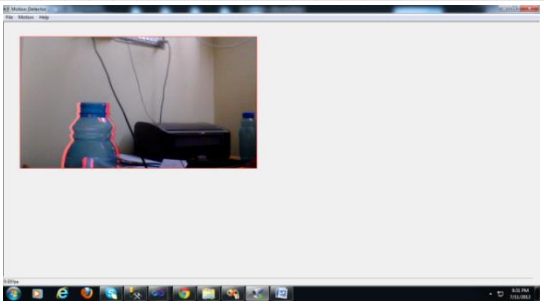


Figure 2. Object Detection

Figure 3.Human moving original image.

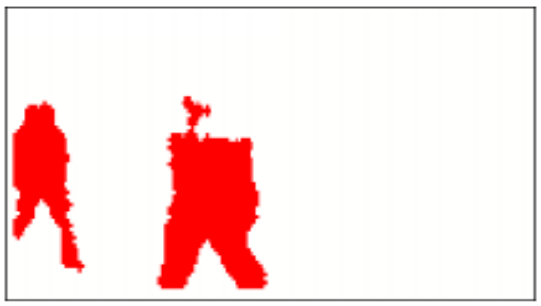


Figure 4. Moving object detection with red region

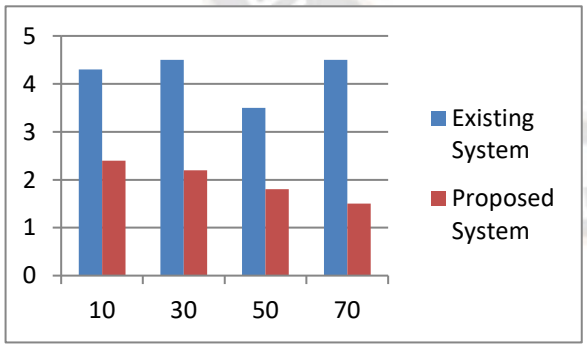


Figure 5. Shows the Performance of the proposed work with less time more number of frames are generated.

Table 1. Shows the Performance of the proposed work

	Existing System	Proposed System
Detection Rate	25 Frames/Sec	55 Frames/Sec
Accuracy	40%	85%

V. CONCLUSION

In this paper, the proposed system APEA mainly focuses on moving objects detection based on the threshold values of the each frame. This is the one of the new ideology to detect the moving object detection. Any moving object like human and any item can detect by the system using the proposed work. From the lots of research default threshold value is set as o for the normal frame without any image. By using the pixel based variation in each frame the threshold value is set as zero. Normal probability evolutionary algorithm will track only human moving but our algorithm track all the moving objects very accurately. By this we can increase the frame rate per sec by using proposed work. Our proposed system shows the any small moving object tracking with the red mark border for the moving object.

REFERENCES

[1] R. Cucchiara, C. Grana, G. Neri, M. Piccardi and A.Prati, "The Sakbot system for moving object detection and tracking," Video-based Surveillance Systems-Computer vision and Distributed Processing, pp. 145-157, 2001.

[2] C. Stauffer and W. E. L. Grimson, "Adaptive background mixture models for real-time tracking," in Proc. IEEE Conf. Computer Vision and Pattern Recognition, 1999I. S. Jacobs and C. P. Bean, "Fine particles, thin films and exchange anisotropy," in Magnetism, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271–350.

[3] Solanki, S. ., Singh, U. P. ., Chouhan, S. S. ., & Jain, S. . (2023). Brain Tumour Detection and Classification by using Deep Learning Classifier. International Journal of Intelligent Systems and Applications in Engineering, 11(2s), 279 –. Retrieved from https://ijisae.org/index.php/IJISAE/article/view/2624

[4] C. Wren, A. Azarbayejani, T. Darrell, A. Pentl, "Pfinder: Real-time tracking of the human body," In IEEE Trans. Pattern Analysis and Machine Intelligent, vol. 19, no. 7, pp. 780785.

[5] L. Qiu and L. Li, "Contour extraction of moving objects," in Proc. IEEE Int'l Conf. Pattern Recognition, vol. 2, 1998, pp. 1427–1432.

[6] Tang Sze Ling, Liang Kim Meng, Lim Mei Kuan, Zulaikha Kadim and Ahmed A. Baha'a Al-Deen, "Colourbased Object Tracking in Surveillance Application" in Proceedings of the International MultiConference of Engineers and Computer Scientists 2009 Vol I IMECS 2009, March 18 - 20, 2009, Hong Kong.

[7] Haritaoglu I., Harwood D., and Davis L.S. 1998. W4S: "A real-time system for detecting and tracking people in 2 1/2D", 5th European Conference on Computer Vision, Freiburg, Germany.