ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 8, August 2016

A Moving Target Detection, Tracking and Counting in Dynamic Background in Video Surveillance System

Jyoti V. Targude, Prof.S.S.Shetkar

ME, Dept of Electronics Engg. M.S.Bidve Engg. College, Latur, Maharashtra, India

M.Tech, Dept .of Electronics Engg. M.S.Bidve Engg. College, Latur, Maharashtra, India

ABSTRACT: Tracking moving objects in video sequence is an important problem inseveral field.such as videosurveillance and target tracking. The two algorithms background subtraction method and frame difference method are analysed in this paper. Then based on the background subtraction method, a moving target detection algorithm for dynamic background is analyzed. The background image used to process the next frame image is generated through superposition of the current frame image and the current background image with a certain probability. The experimental results show that this algorithm can detect moving targets more effectively and precisely. we propose a small improvement to an existing background model, and incorporate a novel technique for shadow Removal in Gray-scale video sequences. In this paper, background is updated over time to re-construct the background images. So we detect and track the moving target is more accurately.
.

KEYWORDS: Background subtraction; Frame difference; Moving target detection; Dynamic background; Moving target tracking; Counting

I. INTRODUCTION

Intelligent video observation is another exploration course in the field of PC vision. It utilizes the technique for PC vision and distinguishes the development focus in the observing scene via programmed investigation the picture grouping by the camera recording. In this manner the powerful location of moving targets decides the framework execution. Along these lines, this article concentrates on key innovation in the moving targets identification and extraction. In conclusion, this paper chooses the foundation subtraction technique to enhance it and present a moving target identification calculation taking into account the foundation which has dynamic changes.

IMAGE PREPROCESSING

Noise is any entity which is not of benefit to the purpose of image processing. The influence of noises on the image signal amplitude and phase is complexity. So how to smooth out noise and keep the details of image is the major tasks of the image filtering. B. Noise Filter We use the median filter in this paper. Median filter is a non-linear method for removing noise. Its basic idea is to use the median of the neighbourhood pixel gray value instead of the gray value of pixel point. For the odd elements, the median refers to the size of the middle value after sorting; For even numbered elements, the median refers to the average size of the two middle values after sorting [1]. Median filter as a result of this method is not dependent on the neighbourhood with a lot of difference between typical values, which can remove impulse noise, salt and pepper noise at the same time retain the image edge details. In general the use of a median filters contain odd numbered points of the sliding window.

IMAGE SEGMENTATION

In the Images research and application, Images are often only interested in certain parts. These parts are often referred to as goals or foreground (as other parts of the background). In order to identify and analyse the target in the image, we need to isolate them from the image. The Image segmentation refers to the image is divided into regions, each with characteristics and to extract the target of interest in processes [2]. The image segmentation used in this paper is threshold segmentation. To put it simply, the threshold of the gray-scale image segmentation is to identify a range in

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 8, August 2016

the image of the gray-scale threshold, and then all image pixels gray values are compared with the threshold and according to the results to the corresponding pixel is divided into two categories: the foreground of, or background. Threshold segmentation has two main steps:

l) Determine the threshold T.

2) Pixel value will be compared with the threshold value T.

II. LITERATURE REVIEW

To determine the issue of the rocket location in the space early-cautioning process, a proficient strategy in view of nonlinear versatile separating is proposed to distinguish the little IR focus of low SNR under the perplexing foundation in this paper. The strategy can kill the impact of the unbalance foundation to the picture division, select the little moving target and the clamor focuses and after that take out wrong direct focuses toward acquire the agreeable location result. The viability of the strategy is demonstrated by the exploratory results for a few infrared picture successions [1]. we connected between casing distinction and optical stream calculation to identify obscure moving target, and utilized the molecule channel calculation to track the identified moving target. Since the process time of optical stream is long, we utilize between edge contrast strategy to remove rough target district and afterward figure nearby optical stream. An element circular format with relative changes was built and a dynamic movement model was set up to anticipate molecule state. The intricate minute was utilized as the element as a part of the reference locale and applicant districts. In the meantime, the Gaussian capacity was utilized to ascertain molecule weights so that the particles with little weights were resample. At long last, the following article state was processed by utilizing particles weighted total. Test results demonstrate that the rate of perceiving and following moving target is enhanced and the layout can powerfully do some relative changes with the moving target[2]. In [3] paper is scrutinized clever reconnaissance framework which depends on installed framework stage and remote correspondence innovation. To overcome obstruction that originating from little target development or foundation light changes, moving target discovery calculation is proposed in this framework. Irregular matters at the screen zone can be recognized precisely by breaking down the constant picture data, and successful security moves will be made with comparing designs. The trial results demonstrate that the framework has the upsides of continuous standard, high validity and practicability[3].A continuous calculation is introduced to recognize moving focuses in submerged complex environment. The distinction picture is acquired by subtraction operation in edges of picture arrangement. A fitting limit is chosen and the parallel picture of the distinction picture is gotten. All aspects of the double picture is fragmented into one single picture by picture portion calculation. A meaning of direct level is given in view of the state of items framed by movement of focuses in the distinction picture. The genuine sizes of the first moving targets are construed from direct level and territory of the framed items. The capacity of ongoing distinguishing submerged moving targets is actualized utilizing this calculation. The calculation has been utilized as a part of submerged wise observing framework in some vast worldwide diversions and meets the necessity of continuous. By and by, it is demonstrated a quick and stable calculation [4].

III. EXISTING SYSTEM

Intelligent visual surveillance system can be used manydifferent methods for detection of moving targets, A typicalmethod such as background subtraction method, framedifference method. These methods have advantages anddisadvantages; the following will be introduced.

A. Background subtraction method

Background subtraction method is a technique using thedifference between the current image and background image todetect moving targets. Process flow chart is shown as Fig. 1.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 8, August 2016

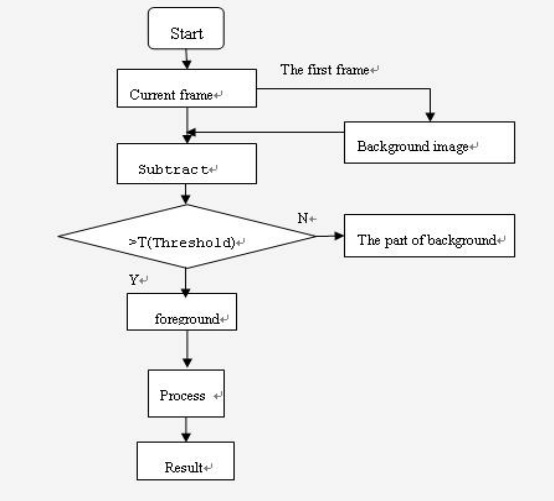


Figure.1.Background subtraction method.

The basic idea is the first frame image stored as background image. Then the current frame imagefk with the pre-stored background image B subtraction, And if the pixel difference is greater than the certain threshold, then it determines that the pixel to pixel on the moving target, or as the background pixel. The choice of threshold of the background subtraction to achieve the success of motion detection is very important. The threshold value is too small will produce a lot of false change points, the threshold choice is too large will reduce the scope of changes in movement. The appropriate threshold request be adapt with the impact which be had by scenes and camera on the wavelength of the color, the changes of light conditions, so the choice of the dynamic threshold should be selected [3]. The method formula is shown as (1) and (2).

$$R_k(x,y) = f_k(x,y) - B\ (x,y) \quad \ldots(1)$$

$$Dst_k(x,y) = \begin{cases} 1, \text{background} & R_k(x,y) > T \\ 0, \text{target} & R_k(x,y) \le T \end{cases} \quad \ldots\ldots(2)$$

Background subtraction is used in case of the fixed cameras to motion detection. Its advantage is easy to implement, fast, effective detection, can provide the complete feature data of the target. The shortcomings are frequent in moves of the occasions may be difficult to obtain the background image. Immovable background difference is particularly sensitive for the changes in dynamic scenes, such as indoor lighting gradually change. The following is the video screenshot of the background subtraction method to achieve as shown in figure.

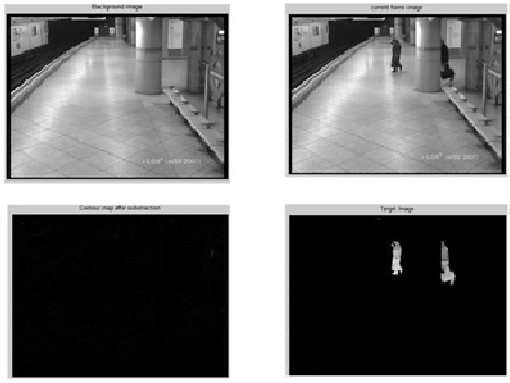


Figure. 2:Result of background subtraction Algorithm

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 8, August 2016

This is due to the fixed background subtraction method does not process the dynamic changes in background. This is an important drawback of the method.

Moving Target Detection Based on Dynamic Background :

A. The dynamic update of the background

In the background subtraction method, we can consider that the whole scene from two parts: the background, the foreground. Background is a static scene and which can be seen; Foreground is the moving objects which are interested in the video surveillance, such as: vehicles, pedestrians, etc. However, due to the scene of the monitor changes over time, the foreground stagnation in the picture for a long time should be re-classified as part of the background; and objects which is belong to the background should be classified as part of the foreground when it starts moving. Background pixel that changes and updates over time, It is the basis of background subtraction method. In this paper, background is updated over time to re-construct the background images.

$$B_k(x,y) = B_{k-1}(x,y), f_{k-1}(x,y)\text{superposition in a certain probability}$$

$$R_k(x,y) = \left| f_k(x,y) - B_{k-1}(x,y) \right|$$

$$Dst_k(x,y) = \begin{cases} 1, \text{background} & R_k > T \\ 0, \text{target} & R_k \le T \end{cases}$$

B is the background of the kth frame image. fk is the kth frame image. The pixel in the image Bk is generated fromthe pixel in the image Fk-1 superposition in a certain degree of probability with the pixel in the background image Bk-1 .With time, the stagnation moving targets of the video again and again as a result of superimposed to the background, in the end it can be a part into the background. And the opposite the movement part of the background eventually separated from the background to become foreground. In this paper, the function GetBackground used to achieve background image with the current frame superposition outputting. Following
introduce the used of the function GetBackground :

The definition of function: GetBackground(Image* background, const Image* src_image, double alpha);Introduce of the parameters： the input image: src_image, background image: background, The weight of the input image: alpha.

Function: Calculation of the input image src_image and the background image background weighted sum，and makes the image background as an average cumulative sum of the frame sequence。

The specific formula is as follows:

background (x, y)=(1-α)background (x, y)+α:src_image(x,y) (4)

And α (alpha) regulates the update rate (how quickly the image background in order to forget the front of the frame).
The following is the screenshots of the background image at the different time used by the new algorithm:

Figure. 3:Result of the background image at the different time

B. Determination of threshold

In order to increase the adjustability of the threshold and the robustness of the background image on the brightness changes slowly. The determination of threshold as follows:

$$\theta = \left\{ mid(\theta_1,\theta_2,\theta_3,\theta_4), \theta_i = \frac{1}{N_{M_i}} \left(c \cdot \sum_{(x,y)\in M_i} R(x,y) \right) \right\} \quad ;)$$

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 8, August 2016

And *c* determined by the experiment, the general admission 3-5; *Mi* is a region of the background, and generally selects the area at the edge; *N* is the area of *Mi*. The algorithm selected the four corners of differential gray image region to be calculated respectively, and makes the mid-value as the final check of the threshold value, and get a better result.

C. Extraction of detailed images of moving targets

This requires the adoption of connectedness analysis to extract the complete moving target. There are two type of connectedness: four-connected and eight-connected.

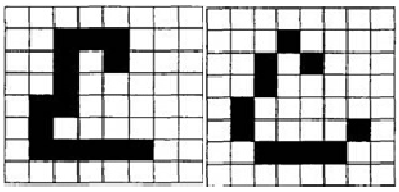


Figure. 4: Extraction of detailed images of moving targets

From the definition of connectedness, we can see the foreground and the background should be using a different connectedness. Marked connectedness algorithm: Recursive marking algorithm. a) Scan image, to find a no marked pixel that its value is 1, and marks it a new distribution L; b) recursive allocate the mark L to its neighbour; c) If there is no point not marked, then stop; d) return step a).

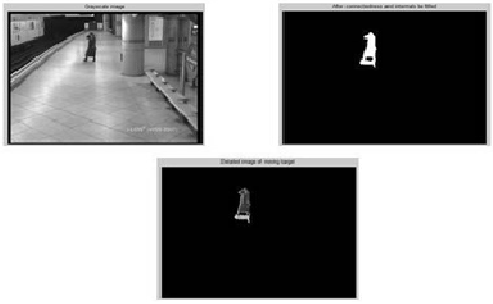


Figure. 5: Result for moving target detection algorithm based on dynamic background

Disadvantages of Existing Method:

(1) Result for moving object detection for dynamic background Shows shadow so result for this is not accurate because in this result person as well as shadow also detected.

It is the main disadvantage of this system. To Avoiding this drawback, we propose a system for shadow removal which is named as shadow removal algorithm.

Detection And Tracking Of Moving Object Based on Dynamic Background

As per our algorithm for dynamic Background We take different dynamic background videos at different places like Boats, Canoe , Fountain , Fountain 2 , Highway and Person . These different situations have images taking from the stable camera in video surveillance system and it contains peoples ,boat, vehicles etc. and take the results for detection and tracking.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 8, August 2016

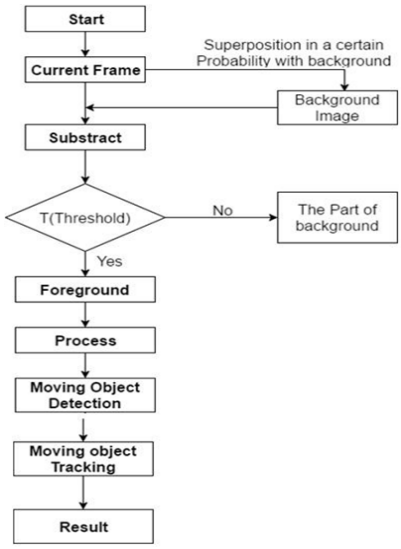


figure 6:Flowchart of moving object detection & tracking based on dynamic background

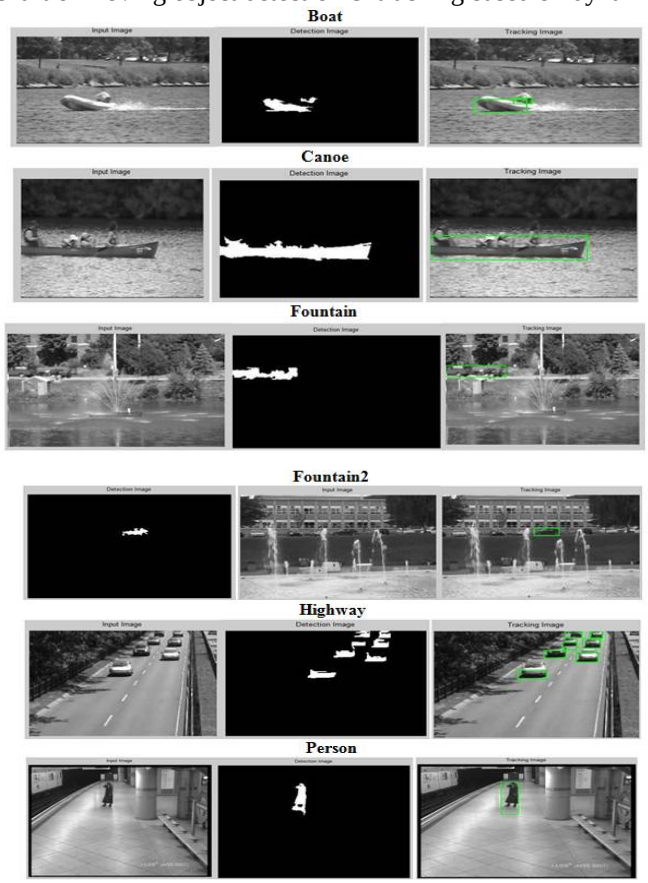


Figure 7: Results of Detection and Tracking for Boats, Canoe, Fountain , Fountain 2 , Highway and Person

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 8, August 2016

Above result shows the Region of detection and tracking of the moving target. In above result we detect and track moving targets like boat, people, vehicles, persons etc.

Application of Intelligent video Surveillance:

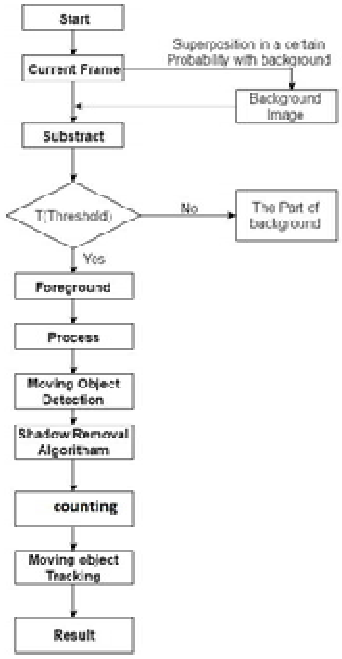


Figure 8 : flowchart for the moving object tracking and counting

Moving object detection and Shadow Removal:

Once the foreground object identified, each foreground pixels are checked whether they are part of a shadow or the object. This process is necessary, since, shadow of the some of the background object may get combined with the foreground object. This causes the object tracking task as a complicated task. For pixel (x, y) the shadow can be detected and removed as given below, Firstly current image should be subtracted from background image. The resultant image then be converted into gray level using rgb2gray function. Now, the gray level image contents whose values greater than threshold value are filled with holes in the binary image. If threshold is low, several foreground pixels corresponding to moving objects may be misclassified as shadows. So we take the accurate threshold value to remove the shadow originating in the foreground image

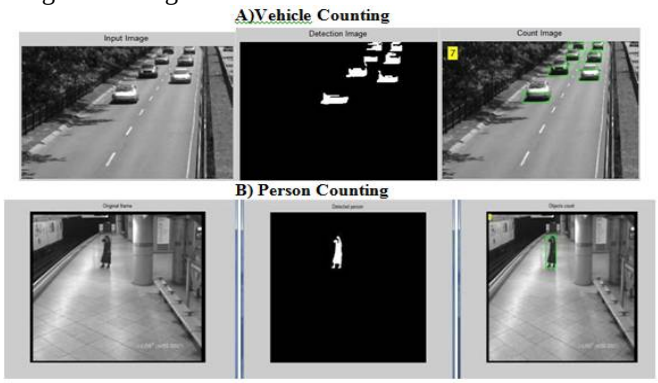


Figure 7: Results of Detection , Tracking and counting

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 8, August 2016

Above result show the inputs on the Highway and on Railway platform and this shows the result of detection , tracking and Counting and also shadow removal of moving target.

IV. SYSTEM ARCHITECTURE

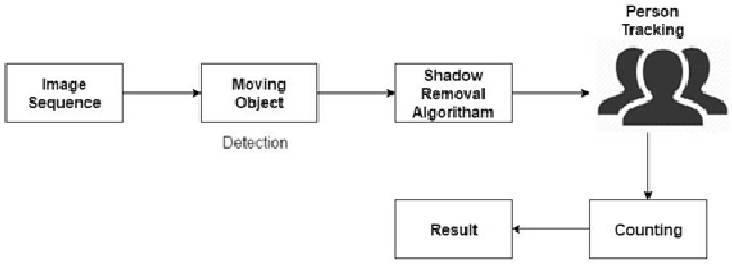


Figure 10: System Architecture

Tracking and counting people in visual surveillance Systems:

The greatest challenge on monitoring characters from a video scene is to track targets under occlusion conditions. In this work, we present a scheme to automatically track and count people in a surveillance system.First, a dynamic background subtraction module is employed to model light variation and then to determine pedestrian objects from a static scene.To identify foreground objects as characters, positions and sizes of foreground regions are treated as decision features.
Moreover, the performance to track individuals is improved by using the modified overlap tracker, which investigates the centroid distance between neighbouring objects to help on target tracking. On the experiments of tracking and counting we count the people on Railway platform and also count the Vehicles on Highway.

Calculation of Different Parameter for Different Dynamic Background:

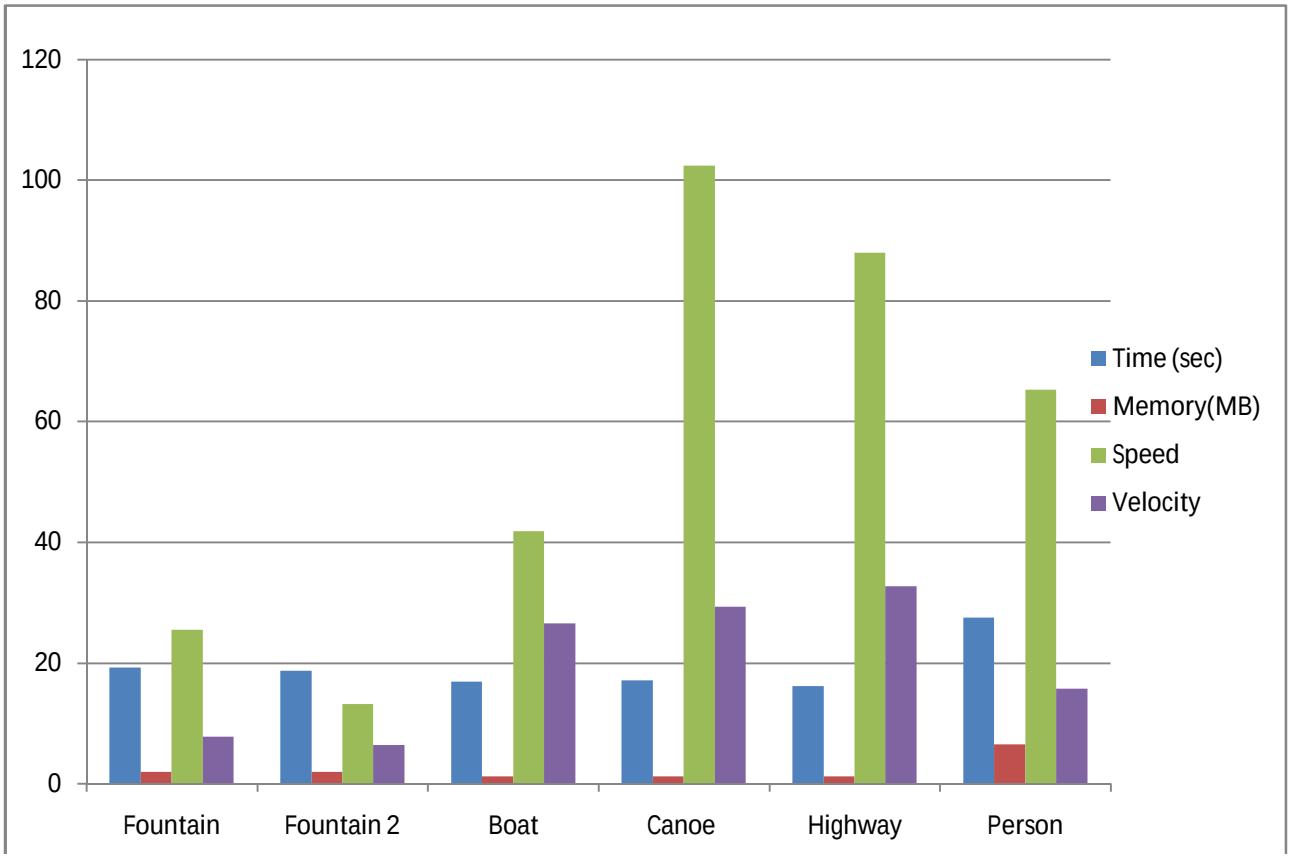
Input video	Time (sec)	Memory(kb)	Speed	Velocity	Frame size
Boat	16.8828	1203	41.8500	26.5610	240*320
Canoe	17.1255	1203	102.3644	29.2947	240*320
Fountain	19.1797	1947	25.4393	7.7000	288*432
Fountain 2	18.6318	1947	13.1063	6.3819	288*432
Highway	16.0941	1204	88.0090	32.7262	240*320
Person	27.4763	6483	65.2736	15.6792	576*720

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 8, August 2016



IV.CONCLUSION AND FUTURE SCOPE

In this proposed system, background is updated over time to re-construct the background images. In this system first we take the picture for detection then we extract the background so we can detect the object then threshold image is created which is in black and white it helps the system to detection then we remove the shadow from image for detection then counting and tracking is performed for accurate detection. so the result of our proposed system is more accurate than the existing system. And our system despite the fact that the moving target location calculation in view of the dynamic foundation can better meet the set execution necessities. In any case, to plan a flawless astute visual observation framework, we ought to advance enhance the framework strength and expansion target recognizable proof capacities. we will increase the accuracy of system and also improve the shadow removal method for vehicle also.

REFERENCES

1. Wang Ying-li, Dai Jing-min, "Moving Targets Detection and Tracking Based on Nonlinear Adaptive Filtering," 2007 International Conference on Computational Intelligence and SecurityWorkshops (CISW 2007), pp. 691-694, December 2007.
2. Yang Shu-Ying , Zhang Cheng , Zhang We-Yu , He Pi-Lian, Unknown Moving Target Detecting and Tracking Based on Computer Vision, Fourth International Conference on Image and Graphics (ICIG 2007), pp 490-495, August 2007.
3. Tan Jiyuan, Wu Chengdong, Zhou Yun, Hou Jun, Wang Qiaoqiao, "Reasearch of Abnormal
4. Target Detection Algorithm in intelligent Surveillance System", Proceedings of the 2009 International Conference on Advanced Computer Control, IEEE Computer Society, 2009.
5. Fa-quan Zhang , Yong Zhang , Li-ping Lu , Li-ying Jiang , Guang-zhao Cui, "Speedy Detection Algorithm of Underwater Moving Targets Based on Image Sequence," 2009 International Conference on Computer Engineering and Technology, pp. 230–233, January 2009.
6. Mayur D. Jain, S. Nalin Pradeep. A video surveillance system under varying environmental conditions. Proceedings of the 24th IASTED international conference on Signal processing, pattern recognition, and applications,ACTAPress, February 2006.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 8, August 2016

7. By M. A. ZerafatPisheh , A. Sheikhi, “Detection and Compensation of Image Sequence Jitter
8. Due to an Unstable CCD Camera for Video Tracking of a Moving Target,” Second International Symposium on 3D Data Processing, Visualization and Transmission (3DPVT'04), pp. 258- 261, September 2004.
9. M.-C. Tsai, K.-Y. Chen, M.-Y. Cheng, K. C. Lin, “Implementation of a real-time moving object tracking system using visual servoing” Cambridge University Press , Volume 21 Issue 6, December2003.
10. RupaliS.Rakibe, BharatiD.Patil, “Background Subtraction Algorithm Based Human Motion Detection”,International Journal of Scientific andResearch Publications, May 2013.
11. RupaliS.Rakibe, BharatiD.Patil, “Background Subtraction Algorithm Based Human Motion Detection”,International Journal of Scientific and Research Publications, May 2013
12. J.JoshanAthanesious, P.Suresh, “Systematic Survey on Object Tracking Methods in Video”,International Journal of Advanced Research in Computer Engineering & Technology(IJARCET) October 2012, 242-247.
13. M.Sankari, C. Meena, “Estimation of Dynamic Background and Object Detection in Noisy Visual Surveillance”, International Journal ofAdvanced Computer Science and Applications, 2011, 77-83.
14. [12]Greg Welch, Gary Bishop,” An introduction to the Kalman Filter”, In University of NorthCarolina at Chapel Hill, Department of ComputerScience. Tech. Rep. 95-041, July-2006.
15. Hitesh A Patel, Darshak G Thakore,“Moving Object Tracking Using Kalman Filter”,International Journal of Computer Science and Mobile Computing,April 2013, pg.326 – 332. [14]Jae-Yeong Lee; Wonpil Yu, "Visual tracking by partition-based histogram backprojection and maximum support criteria," Robotics and Biomimetics (ROBIO), 2011 IEEE International Conference on , vol., no., pp.2860,2865, 7-11 Dec. 2011
16. Mr.JoshanAthanesious J; Mr. Suresh P,”Implementation and Comparison of Kernel and Silhouette Based Object Tracking”, InternationalJournal of Advanced Research in ComputerEngineering & Technology, March 2013, pp 1298-1303.
17. J.JoshanAthanesious, P.Suresh, “Systematic Survey on Object Tracking Methods in Video”,International Journal of Advanced Research in Computer Engineering & Technology(IJARCET) October 2012, 242-247
18. Yangquan Yu, Chunguang Zhou, Lan Huang*, Zhezhou Yu “A Moving Target Detection Algorithm Based on the Dynamic Background” IEEE 978-1-4244-4507-3/09/