# Motion Detection In Video Using Local Binary Pattern Matching Algorithm

Mandeep Kaur[1], Jyoti Arora[2]

Student, Computer and Science Engineering, Desh Bhagat University, Khanna, India [1]

Assistant Professor, Computer and Science Engineering, Desh Bhagat University, Khanna, India [2]

**ABSTRACT:** Motion Detection is an action of sensing physical motion in a given area. Object Motion can be detected through many techniques which are discussed in this paper. Many intelligent video analysis systems are based on motion detection and tracking techniques. Video Tracking is a process of locating the route of any moving object with the help of a camera. It has a variety of uses in different field such as Traffic Control, Medical Imaging, and Video Communication etc. This paper also presents comparison of Local Binary pattern approach with Normal Subtraction method. Here with feature extraction algorithm (LBP) is used to examine the difference in the frames to detect the minimal motions of the required object.

**KEYWORDS**: Motion Detection; Video Tracking; Object Representation; Feature Extraction; LBP

## I. INTRODUCTION

Motion detection and Video Tracking are playing very essential task in many applications of computer vision such as in Vehicle Navigation, Robot Navigation. Videos comprises of subsequent images i.e., frames which move fast enough so that, human eyes can realize them as continuous. For any Processing on video we need to process the frames. For Analysis of any Video we need three Steps to be followed and that are:

1. Object Detection: First Step is to locate the required object that is going for the task of analysis through the use of object detection techniques such as Background Subtraction Method, Temporal Differencing Method etc.

2. Feature Detection and Extraction Techniques: Different feature type techniques are there to recognize any object such as Local Binary Pattern, Haar Classifier etc.

3. Object Tracking: Tracking of the object means to track down the path or route of the moving object. This can be done through the use of feature type, Region Based etc techniques. Hence, Analysis of the moving Object is done.

There are two types of Cameras which can be used for Video Capturing:
  1. Static Camera ( Fixed viewpoint)
  2. Moving Camera( Moving viewpoint)
But in this Research work, Static camera is used means a fixed viewpoint is taken into consideration.

First and foremost the live scene is recorded as a video with the help of static or movable camera. The recorded video is divided to number of frames i.e., in still images. The frame as window is further divided into number of blocks (3*3 etc block size is used) while using the feature approach one can extract the features from the frames ; feature means a corner, blob , edge etc. With that features, frames can be compared. In this research work, comparison is made on two frames:

1.  One is the Reference frame
2.  Other is the Current frame

Reference frame can be the previous frame which is varying time to time as frames are changing and it can be a background frame which remains still for the whole process.

By comparing both frames (reference &current) one can get the required motion. In LBP feature matching algorithm the frame window is divided to number of block mainly 3*3 block size is used.LBP method is used to calculate the bit-by-bit movement i.e., minor movements rather than the byte movements. In this Block we have 8-neighbours to the centre node while considering 3 X3 pixel neighbourhoods:

1.  2-horizontal neighbors
2.  2-vertical neighbors
3.  4-diagonal neighbors

Normal Subtraction Method: After background image is obtained, subtract the background image from current frame. If pixel difference is greater than the set threshold value T, then determines that the pixels occur in the moving object.

LBP: means Local Binary Pattern i.e., it is combination of 3words Local + Binary + pattern. In this, local means the surrounding neighbours pixels are used for calculation. Binary means the value will be in the form of 0 and 1. Pattern and LBP means it will form the pattern in the form of binary value through the use of neighbour pixels.

Basically feature Extraction defines as to reduce the feature representation of the image and reducing the noise, when the image sizes are large. Reducing Image information without losing any information that is required means the removal of useless data.

## II. RELATED WORK

In [17] author presents the moving object detection and tracking using reference Background Subtraction. In this method, author used Static camera for video and first frame of video is directly consider as Reference Background Frame and this frame is subtract from current frame to detect moving object and then set threshold T value. If the pixel difference is greater than the set threshold T, then it determines that the pixels from moving object, otherwise, as the background pixels. In [21] author has used the subtraction approach for the detection of the motion of the object. In automated videos the detection of the human behavior plays the crucial rule .the movements of the human are detected .the aim of the proposed work is to detect the behavior of the human in the CCTV. The author has designed the system that will works for the surveillance systems for the indoor scenario. It can be placed in the entrance, corridors etc. In this proposed system firstly the by using the background subtraction the foreground objects are obtained. These objects are further used for classifying the people and other object. In this the blobs technique is used for the matching of the features. This technique is used for extracting the properties of the image. In [22] author presents comparison of Two different algorithms for Moving object detection which are simple background subtraction and temporal difference and use dynamic threshold method to obtain a more complete moving object. Simple background subtraction method can detect the moving object from the background better but it also detect stationary objects which become suddenly stop for long time and Temporal difference method not detect stationary object but very sensitive to Threshold. Both methods are very reliable and mostly used in video surveillance applications.

**Proposed algorithm**

*Description of the Proposed Algorithm:*

Aim of the proposed algorithm is to maximize the minor motion detections in the video. The proposed method consists of six steps and they are as follows:

I.    First Step and the most important step without which this research wouldn't have been started is the video capturing i.e., image acquired with the use of a camera.
II.   For Performing the Video Analysis, numbers of frames are extracted from the captured video.
III.   Now, Reference frame is selected and its features are extracted that are going to be used for comparison between frames to detect motion of the required object.
IV.   Next important step is to perform Local Binary Pattern approach for extraction of features from the frames and perform matching of the extracted features with the features of the reference frame that were selected in the previous step.
V.    Mark the detected object and its movement with some representation technique like any geometrical shape (ellipse).Hence, motion Detection task is completed.
VI.   Finally after detection and tracking of the moving object calculate the Performance Parameters (accuracy like factors).
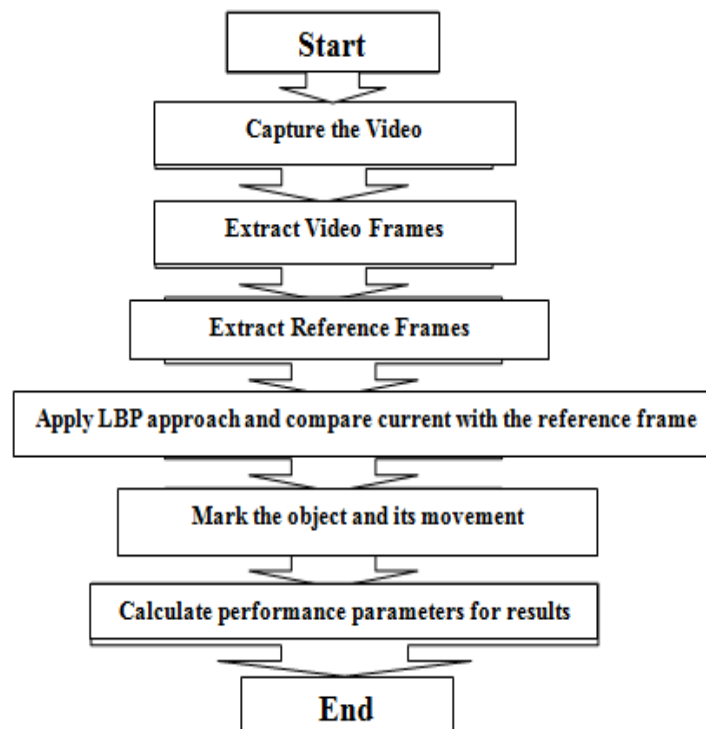


Fig.1. Flowchart of the proposed work

# International Journal of Innovative Research in Computer and Communication Engineering

## III. RESULTS AND DISCUSSIONS

This section describes about the results that were obtained by applying the proposed methodology. This section gives description of the proposed algorithm. In this the LBP technique is used for the detection of the motion from the video. This method is considered to be efficient and better than the traditional method for the motion detection in the video.
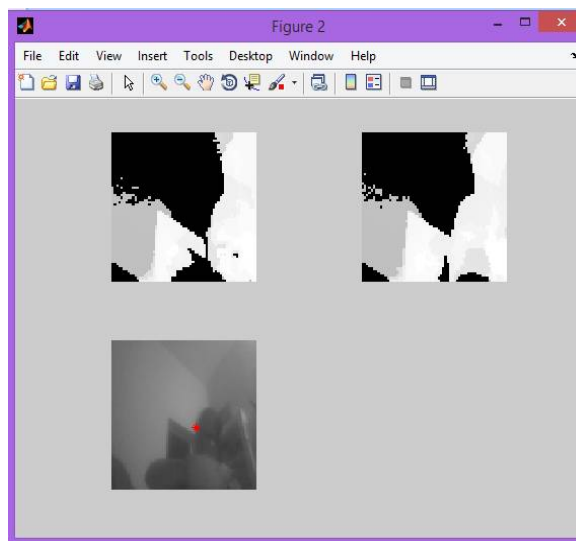


Fig. 2.This graph shows motion detection in a video

This Shows that there is a motion detection in the video depicted by a small red rectangular shape.
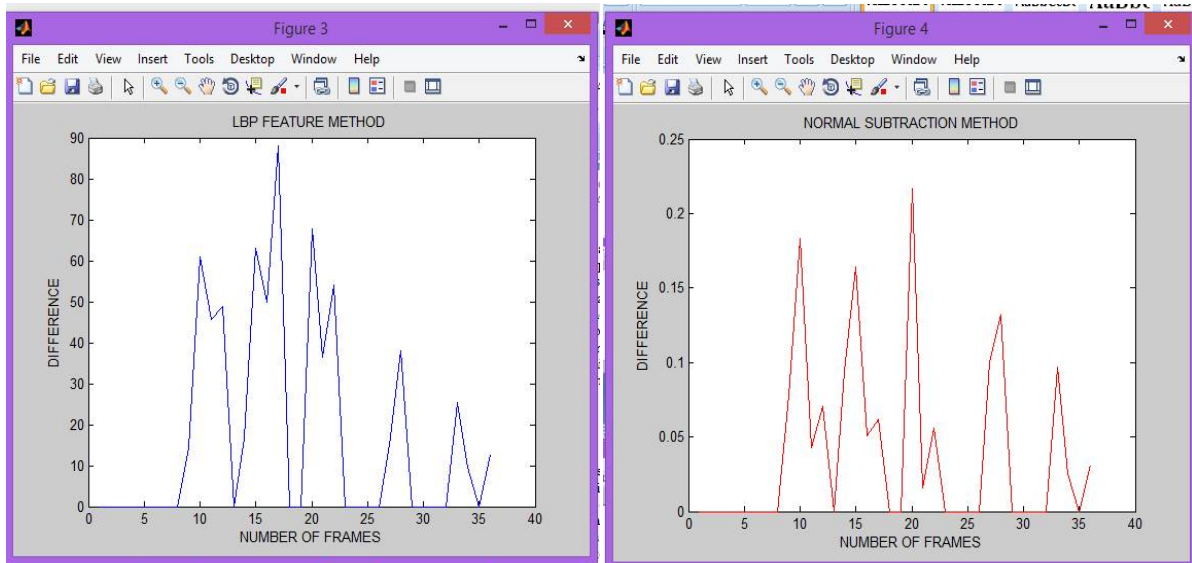


Fig. 3.This graph shows diffrences with the LBP features     Fig. 4.This graph show diffrences with the Normal Subtraction Method

In Fig.3, LBP approach is used to detect the motion of object in video. It shows that LBP technique detects the minor movement of the object. In this, difference is calculated between reference frame and current frame. Fig. 4., depicts that

the normal subtraction method approach is used to detect the motion of object in video. In this, difference is calculated between reference frame and current frame.
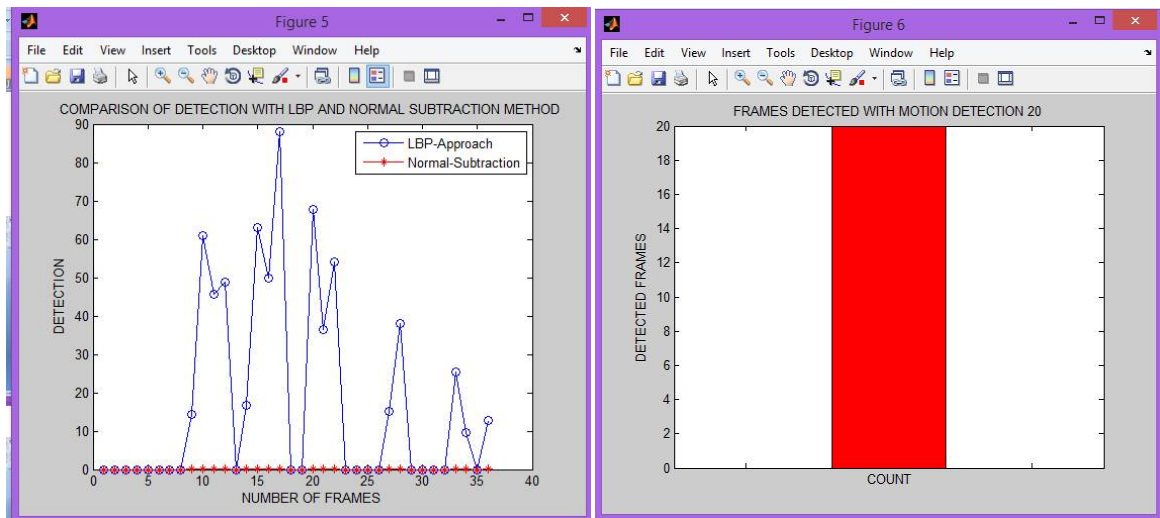


Fig.5. Comparsion between the LBP and Normal Subtraction method          Fig 6. shows frame detected uisng detection 20

Comparison graph(Fig.5) shows that LBP approach is more accurate than normal subtraction method.It shows that LBP technique can detect small variations. Fig.6 shows the number of frames detected the motion of object by using proposed motion detection approach.Through these results it is concluded that with the use of LBP technique one can detect the minimal movement acting in a video as compare to the NS method.

## IV. CONCLUSION AND FUTURE WORK

In this research paper all the main terminologies of object detection have been included. These include object detection methods, feature selection and object tracking techniques. Different methods for object detection are used such as frame difference, temporal, point based optical flow, segmentation and background subtraction. In visual surveillance system the detection of the human is crucial for several diverse applications. Thus to obtain the minimal change occur in the frame, LBP method has been used. So, linear binary pattern technique is used for the extraction and matching of the feature. This technique will help in the detection of the minor movements of the object. LBP is considered as one of the efficient technique for the feature extraction. As the results obtained depicts that the proposed technique is much efficient than the traditional techniques. Thus it is concluded that proposed technique is helpful in extracting features efficiently and easily.

It is concluded that the proposed technique is much efficient than the traditional techniques. The proposed technique can be used in the future by enhancing different regions in LBP which may improve the detection performance and accuracy of the designed system. One more scope is there, to perform analyses on video shots (frames) with the camera movement (with the use of movable camera). Designed system can be used for various applications like face detection and recognition, vehicle recognition, texture analysis, facial image analysis, biomedical image analysis, motion analysis, and image and video retrieval.

## V. ACKNOWLEDGEMENT

## REFERENCES

[1]  Kloss, G. K. ,  Shin,  H., and  Reyes, N. H. ,"Dynamic colour adaptation for colour object tracking ",Image and Vision Computing New Zealand,IVCNZ '09. 24th International Conference, Page(s):340 – 345m, 2009.

[2]  Zhang,  L., and  Wu,  R.,"Tracking Object Using Object-strips Color Feature ",Information Engineering (ICIE) WASE International Conference on  (Volume:1 ), Page(s):212 - 215 , 2010

[3]  Dawood,  A.  A.," Motion Detection in Real-Time Video Streams Using Moved Frame Background", Journal of Babylon university, VOL no 19,Pp 386,395,2011.

[4]  Kumar,  T.  S.,  and Sivanandam,  S. N. ,"Object detection and tracking in video using particle filter ", Computing Communication & Networking Technologies (ICCCNT) Third International Conference, pp:  1 – 10 ,  2012.

[5]  Prasad,  K.,  Sharma,  R.,  and  Wadhwani,  D., "A Review On Object Detection In Video Processing" in the International Journal of Science and Technology,Vol. 5, Pp.454-463, 2012.

[6]  Shantaiya,  S.,  Verma,  K.,  and  Mehta,  K.," Study and Analysis of Methods of Object Detection in Video",   International Journal of Soft Computing and Engineering (IJSCE), ISSN: 2231-2307, Vol. 2, Pp. 343-352, Issue-6, 2013.

[7]  Hussain, M. A., and Kharat, G. U., "Robust Human Motion Detection and Tracking In Dynamic Background", International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Vol. 2, Pp. 547-556, Issue-6, 2013 .

[8]  Rakibe,  R.  S.," Human Motion Detection using Background Subtraction Algorithm", IJARCSSE, Vol. 4, Issue 2, Pp. 343-351, February 2014.

[9]  Doi,  M.,  Matsumoto, T.,  Kimachi,  A.,  Nishi,  S., and  Ikoma,  N.,"Robust color object tracking method against illumination color Change ",Soft Computing and Intelligent Systems (SCIS) Joint 7th International Conference on and Advanced Intelligent Systems (ISIS), 15th International Symposium , Page(s):718 – 722, 2014.

[10]  Rajput,  P.," New Trends in Object Motion Analysis", ijarcsse, Vol. 4, Issue 4, Pp 185- 189,2014 .

[11]  Deepika,  T.,"Motion detection in real time video surveillance with movement frame capture and auto record", International Journal of Innovative Research in Science, Engineering and Technology, 2014.

[12]  Kuriakose,  I.  M. , "Survey on Human Motion Detection In Static Background" American Journal of Engineering Research (AJER) , Vol. 03, pp-144-146,2014 Shantaiya S, Verma K and Mehta K," Study and Analysis of Methods of Object Detection in Video",   International Journal of Soft Computing and Engineering (IJSCE), ISSN: 2231-2307, Vol. 2, Pp. 343-352, Issue-6, 2013.

[13]  Buksh,  R. ,  Routh,  S.,  Mitra,  P.,  Banik, S.,  Mallik,  A.,  and  Gupta  S.  D.**,** "  MATLABbased Image Editing and Color Detection  " International Journal of Scientific and Research Publications, Volume 4, Issue 1, 2014.

[14]  Parekh,  H.  S.,  Thakore,  D. G., and Jaliya, U. K., "A Survey on Object Detection and Tracking Methods" International Journal of Innovative Research in Computer and Communication Engineering Vol. 2, Issue 2, 2014.

[15]  Senthamaraikannan,  D.,  Shriram,  S.,  and William,  J.**,** "Real time color recognition" International journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering *Vol. 2, Issue 3, 2014.*

[16]  Rawat,  A.,  and  Saxena,  A.**,** "A Review and Comparison of Well-Known Methods for Object Detection and Tracking in Videos " International Journal of Advanced Research in Computer Science and Software Engineering (IJARCSSE) Volume 4, Issue 5, 2014.

[17]  Jadhav,  J.  J.,"Moving Object Detection and Tracking for Video Survelliance", International Journal of Engineering Research and General Science, Vol. 2, Issue 4, 2014.

[18]  Abdelali,  H.  A . ,  Essannouni,  F. ,  Essannouni,  L., and Aboutajdine,  D., "Algorithm for Moving Object Detection and Tracking in Video Sequence Using Color Feature", Complex Systems (WCCS)  Second World Conference , Page(s):690 – 69,2014.

[19]  Pham,  I., and Polasek,  M.,''Algorithm for military object detection using image data'' , Digital Avionics Systems Conference (DASC) IEEE/AIAA 33rd , pp :3D3-1 - 3D3-15 , 2014.

[20]  Bhawale,  P. S., and Kabra,  R. R. , " *Object Detection and Motion Based Tracking of Moving Objects a Survey*" International Journal of Advance Research in Computer Science and Management Studies ,Volume 2, Issue 12, 2014.

[21]  Patil,  S.," Suspicious movement detection and tracking based on color histogram", IEEE, Pp 1-6, 2015.Rakibe R S," Human Motion Detection using Background Subtraction Algorithm", IJARCSSE, Vol. 4, Issue 2, Pp. 343-351, February 2014.

[22]  Jadhav,  J., and Patil,  Y.," Moving Object Detection for Video Surveillance System", International Journal of Computer Applications (0975 – 8887), National Conference on Emerging Trends in Advanced Communication Technologies (NCETACT), 2015.

[23]  Lowry,  S., "Visual Place Recognition: A Survey", IEEE, Vol. 32, No. 1, Pp. 1-19, 2015.

[24]  Hurtado,  F. , Alejandro,  A. , Gomez,  J. , Penenory,  V. M. ,  Cabezas,  I. M.,  and Garcia,  F.  E.,''Proposal of a Computer Vision System to Detect and Track Vehicles in Real Time Using an Embedded Platform Enabled with a Graphical Processing Unit'', Mechatronics, Electronics and Automotive Engineering (ICMEAE) International ConferencePage(s):76 – 80, 2015.

[25]  Sukanya,  C. M. ,  Gokul,  R., and Paul,  V.," A Survey on Object Recognition Methods", International Journal of Computer Science & Engineering Technology(IJCSET) , 2016.

[26]  Wady,  S.  H.,  and Ahmed,  H.  O.," Ethnicity Identification based on Fusion Strategy of Local and Global Features Extraction" International Journal of Multidisciplinary and Current research, Vol.4 , 2016 .

[27]  Baitule,  M. A. , "Result Analysis of Object Detection and Tracking for low vision video "Imperial Journal of Interdisciplinary Research (IJIR) Vol-2, Issue-6,Pp 619-622, 2016.