ISSN: 2278 – 1323
International Journal of Advanced Research in Computer Engineering & Technology (IJARCET)
Volume 1, Issue 10, December 2012

Tracking of Moving object in Video scene using Neural Network

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ABSTRACT
Real-time object tracking is recently becoming more and more important in the field of video analysis and processing. Applications like traffic-control, user-computer interaction, online video dispensation and production and video surveillance need reliable and economically reasonable video tracking tools. We have an algorithm which uses motion vector as well as color for tracking objects from MPEG video Here we explain a new approach for object tracking in compressed domain. Instead of using a single indication to solve this problem, we unite motion vector as well as color for tracking objects from MPEG video. Further we will trained neural network for each feature of object (colour,texture,shape etc) so that feature extraction of any object can be done in suitable way after that tracking of that moving object can be done every easily for any domain.

Index Terms **- MPEG (Moving Picture Experts Group), DCT (Discrete Cosine Transform), GOP(Group Of Pictures), MB(Macro Block).**

I. INTRODUCTION

In the last decade object tracking in video scenes has become very popular because of its applicability to daily problems and ease of production, e.g. surveillance cameras, adaptive traffic lights with object tracking, plane detection etc. The tracking algorithms operating in the uncompressed pixel domain has the potential to estimate object boundaries with pixel accuracy but demands that the processed sequence be fully decoded, before segmentation can be performed.. Here we describe a new approach for object tracking in compressed domain. Instead of using a single cue to solve this problem, we combine them and perform the task. We are using an algorithm which uses motion vector as well as color for tracking objects from MPEG video. For P and B frames, we use the motions vectors as the cue and correct the accumulated errors by performing histogram comparison in Cb and Cr plane of I frames. We made a system which empowers users to upload MPEG video files and track the object using the web based front end.

A. Object Tracking

Object tracking has been an area of intensive research in the field of video analysis and processing. The first step in video processing is to identify the objects present in a scene. The next step is to see how these detected objects move with respect to each other. The above two problems combined, can be termed as "Object Tracking". The two major sources of information in video that can be used to track objects are visual features (such as color, texture and shape) and motion information. Extraction of these two types of information can be done either in the pixel domain or in the compressed domain.

II. LITERATURE SURVEY

Many researchers have tried various approaches for object tracking. Nature of the technique used largely depends on the application domain. Some of the research work done in the field of object tracking includes:In this paper [1] *A. Gyaourova, C. Kamath, S. and C. Cheung* has studied the block matching technique for object tracking in traffic scenes. A motionless airborne camera is used for video capturing. They have discussed the block matching technique for different resolutions and complexities .In this paper [2] *Yoav Rosenberg and Michael Werman* explain an object-tracking algorithm using moving camera. The algorithm is based on domain knowledge and motion modeling. Displacement of each point is assigned a discreet probability distribution matrix. Based on the model, image registration step is carried out. The registered image is then compared with the background to track the moving object .In this paper [3] *A. Turolla, L. Marchesotti and C.S. Regazzoni* discuss the camera model consisting of multiple cameras. They use object features gathered from two or more cameras situated at different locations. These features are then combined for location estimation in video surveillance systems.In this paper [4] One simple feature based object tracking method is explained by *Yiwei Wang, John Doherty and Robet Van Dyck.* The method first segments the image into foreground and background to find objects of interest. Then four types of features are gathered for each object of interest. Then for each consecutive frames the changes in features are calculated for various possible directions of movement. The one that satisfies certain threshold conditions is selected as the position of the object in the next frame .In this paper [5] *Çi˘gdem Ero˘glu Erdem and Bülent San* have discussed a feedback-based method for object tracking in presence of occlusions. In this method several performance evaluation measures for tracking are placed in a feedback loop to track nonrigid contours in a video sequence . Literature [6] provides a important analysis of the compressed domain indexing techniques. The method in [7] proposes a tracking mechanism based on pixel features in the wavelet domain. Two-stage object tracking [8] is performed by combining region-based method and contour-based method.

III. PROPOSED METHODOLOGY

In this paper, we use a differential image of region-based tracking method for the detection of multiple moving objects. There are two method which can be used to obtain a differential image between frames.we use a background image to obtain a differential image. In other to make sure accurate object detection in unconstrained environment, we also use a technique of background image update.

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When multiple objects were detected by using a differential image, we select particular object. And then selected object is tracked. During tracking, the tracked object can be located by maximizing the similarity between a reference window and a candidate window. The most can be realized through either a deterministic way or a stochastic way.In MPEG compression the motion compensation and motion estimation module is integral in the decoder and the encoder modules respectively. These could be used directly to carry out tracking based on motion vectors. In the same way, the DCT coefficients are also available equal to luminescence and color components of a video frame. In MPEG, however, they are more predominant in **I** frames only.

Basic steps in object tracking can be listed as:

- Segmentation
- Foreground / background extraction
- Feature extraction and tracking
- Training Of Neural Network based on feature extracted.

A. Segmentation

Segmentation is the process of identifying components of the image. Segmentation involves operations such as boundary detection, connected component labeling, thresholding etc.We are using Boundary detection that finds out edges in the image. Any differential operator can be used for boundary detection. Thresholding is the process of reducing the grey levels in the image.

B. Foreground/Background extraction

This is the process of separating the foreground and background of the image. Here it is assumed that foreground contains the objects of interest.There are many method available for Foreground extraction we are using *Kalman filtering***[**9-11**]** method employs 'kalman filter' for predicting the image at t_{i+1} based on some noise model. The difference between predicted and actual intensities is thresholded to classify the image pixel as foreground or background. One advantage of this method is it considers effect of noise, which is very important feature in real world applications.

C.Background Extraction

Once foreground is extracted a simple subtraction operation can be used to extract the background. Another method that can be used in object tracking is *Background learning*. This approach can be used when fixed cameras are used for video capturing. In this method, an initial training step is carried out before deploying the system. In the training step the system constantly records the background in order to 'learn' it. Once the training is complete the system has complete (or almost complete) information about the background. Once we know the background, extracting the foreground is matter of simple image subtraction.

D. Feature extraction and object tracking

Compressed domain object tracking

This tracking method uses compressed domain MPEG video as the source. In the method described by Radhakrishna Achanta, Mohan Kankanhalli, phillipe Mulhem[12] user selects the object of interest. The bounding rectangle of object R is then traced in the compressed domain I frame. This ^{c}region is projected onto the predicted P and B frames. The histogram matching operation is preformed to track the object. For histogram matching clipped DCT coefficients for Cb and Cr are used. A measure called diffused sum defined by is used for histogram comparison. Here *HDiffCr and HDiffCb* are histogram bin differences and Wt[n] is weight factor of particular histogram bin. Higher weights are used for DC and low frequency AC values and lower weights are used for relatively higher AC values.In this, we describe a new approach for object tracking in compressed domain. We combine more than one cue for this purpose. For tracking in P and B frames we use motion vectors, whereas in I frames we use motion vector as well as the color feature. We have seen that using one feature only does not provide adequate information to track an object reliably. We use both the parameters color and motion vector. We take two different strategies for the two cases:

1. Intra-GOP Tracking: *Using motion vectors*

2.Inter-GOP Tracking: *Using motion vectors*

Tracking within the Group of Pictures (GOP) is done using forward motion vectors of P and B pictures taking I or P frame as the reference frame. Upon getting a new P or B frame we take a projection of the last object position (window) to the new frame. We use the motion vectors in this region and calculate the *median* of all the motion vectors in this area. As we proceed from one predicted frame to the next we keep getting the '**Median Motion Vector**' of the complete set of forward motion vectors for all MBs corresponding to the object.

E. Training of Neural Network

Different method have been using to track moving object in video scene but the same method which has been using for traking moving person cannot be used for tracking moving vehicle or tracking of moving ball. We can proposed a system in which same technique can be used for tracking any moving object. We will trained neural network for large number of characteristic of an object .Once neural network gets able to extract feature of any moving object after then tracking of that moving object can easily be done

IV. PROPOSED RESULT

From the discussion, it can be seen that object tracking has many useful applications in the robotics and computer vision fields. Several researchers have explored and implemented different approaches for tracking. The success of a particular approach depends largely on the problem domain. In other words, a method that is successful in robot navigation may not be equally successful in automated surveillance. Further there exists a cost/performance trade off. For real time applications we may need a fast high performance system on the other hand offline applications we may use a relatively cheap (and slower in performance). It can also be seen from the

diverse nature of the techniques used that the field has a lot of room for improvement.

V. CONCLUSION

From the discussion, it can be seen that object tracking has many useful applications in the robotics and computer vision fields. Several researchers have explored and implemented different approaches for tracking. The success of a particular approach depends largely on the problem domain. In other words, a method that is successful in robot navigation may not be equally successful in automated surveillance. Further there exists a cost/performance trade off. For real time applications we may need a fast high performance system on the other hand offline applications we may use a relatively cheap (and slower in performance).

VI. SCOPE FOR FUTURE WORK

For future we will trained neural network in such a way that it can tracked any object with great accuracy and deal occlusion. In that system we will trained neural network for every domain so that it can successfully tracked any object irrespective size,shape it means any moving object in video can be tracked without dealing with different method.

REFERENCES

[1] A. Gyaourova, C. Kamath, S. and C. Cheung - Block matching object tracking - LLNL Technical report, October 2003

[2] Y. Rosenberg and M. Werman – Real-Time Object Tracking from a Moving Video Camera: A software approach on PC - Applications of Computer Vision, 1998. WACV '98. Proceedings.

[3] A. Turolla, L. Marchesotti and C.S. Regazzoni – Multicamera object tracking in video surveillance applications.

[4] Y. Wang, J. Doherty and R. Van Dyck – Moving object tracking in video - *Proc. Conference on Information Sciences and Systems*, Princeton, NJ, March 2000.

[5] Çiˇgdem Eroˇglu Erdem and Bülent San - Video Object Tracking With Feedback of Performance Measures - IEEE Transactions on circuits and systems for video technology, vol. 13, no. 4, April 2003

[6] M. K. Mandal, F. Idris and S. Panchanathan, "A critical evaluation of image and video indexing yechniques in the compressed domain," Image and Vision Computing Journal, Vol. 17, Issue 7, pp. 513-529, May 1999.

[7] M. Khansari, H. R. Rabiee, M. Asadi and M. Ghanbari1, "Object tracking in crowded video scenes based on the undecimated wavelet features and texture," EURASIP Journal on Advances in Signal Processing, vol 2008, pp. 692-698.

[8] Qiang Chen, Quan-Sen Sun, Pheng Ann Heng and De-Shen Xia,"Two-stage object tracking method based on kernel and active contour," IEEE Trans. Circuits and Systems for Video Technology,vol. 20, no. 4, April 2010.

[9] Xiaoqin Zhang, Weiming Hu, Zixiang Zhao, Yan-guo Wang, Xi Li and Qingdi Wei,"SVD based kalman particle filter for robust visual tracking," IEEE 2008, 978-1-4244-2175-6.

[10] Li Ying-hong, Pang Yi-gui, Li Zheng-xi and Liu Ya-li, "An intelligent tracking technology based on kalman and mean shift algorithm," IEEE Second Intl. Conf. on Computer Modeling and Simulation 2010.

[11] Madhur Mehta, Chandni Goyal, M.C. Srivastava and R.C.Jain, "Real time object detection and tracking: Histogram matching and kalman filter approach," IEEE 2010, 978-1-4244-5586-7.

[12]R.Achanta, M.Kankanhalli, P.Mulhem - Compressed domain object tracking for automatic indexing of objects in MPEG home video - Proc. IEEE International conference in Multimedia and Expo (ICME 2002), Lausanne, August 2002.

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