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Object Tracking Based on Shot Clustering and Joint Color Texture Histogram Method

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Abstract- Object tracking is the process of locating a moving object over a time in video. It has a variety of uses, some of which are: human-computer interaction, security and surveillance in high risk area, traffic management and video editing. In Video object tracking can be a time consuming process due to the amount of data that is contained in video. In our last paper, we briefly review recent researches on object tracking and propose an approach based on color and texture.Color histograms contain very discriminative colorinformation, as an Addition of it further to the complexity is the possible need to use object recognition techniques for tracking. The proposed method will improve greatly the tracking accuracy and efficiency. An object tracking algorithm usingjointly color and texture method is proposed to be presented to represent a target.

Keywords- Human-computer interaction, Security, Objects tracking, Joint color Texture, Histogram.

I. INTRODUCTION

Object tracking has importance in real time environment because it plays an important role in several applications such as *Security and surveillance* to identify suspicious activity of peoples in mob like in bank, railway station and other high risky area.For examplein banking industry to analyze behavior of customers in bank premises And at cash counter during transactions, in Traffic management system on metro cities to analyze flow of traffic that helps to reduce accidents.

As in our first paper we stated that Video scene segmentation provides the most efficient way so far. However, to proceed with the same, we will first apply low level segmentation of the video [1][5]. An object tracking algorithm is proposed to be presented in this paper by using the joint color texture histogram method to represent a target [1].If compared with the traditional color histogram based algorithms that use the whole target region for tracking, the proposed algorithm extracts effectively the edge and corner features in the target region, which characterize better and represent more robustly the target. In various tracking algorithms where separate color and texture method is used to track the targeted object which is used by different authors, but it uses the whole target region for tracking. Where drawback is that if the color of targeted object is make similarly to background color then the data will be lost or shows inaccurate results.

Since background color pattern place new information that the object color histogram does not provide, using the joint color-texture histogram for target representation is simplest than using only color histogram or only texture histogram in targeted object tracking[1]. The proposed target representation scheme will eliminates similar color texture of background and reduces noise in the tracking process.

II. LITERATURE SURVEY

- Huijing Zhao and Jie Sha in the year 2012 proposed "Detection and Tracking of Moving Objects at Intersections Using a Network of Laser Scanners" focuses on an algorithm for moving object detection and tracking, given a sequence of distributed laser scan data of an intersection. In that the data is novel, which provides new possibilities but with great challenges; the algorithm is the first proposal, that uses such data in detecting and tracking all moving objects that pass through a large crowded intersection with focus on achieving robustness to partial observations, some of which result from occlusions, and on performing correct data associations in crowded situations.[4]
- Hidetomo Sakaino in the year 2013 proposed "Video based Tracking, Learning, and Recognition Method for Multiple Moving Objects", focuses on an extended MCMC method for tracking and an extended HMM method for learning/recognizing multiple moving objects in videos with jittering backgrounds.[5]
- Dr. Sunitha Abburu in the year 2010 proposed "Semantic Segmentation and Event Detection in Sports Video using Rule Based Approach" addresses two main problems of sports video processing: semantic segmentation and event detection. The theme is domain specific approach which exploits the typical characteristics of cricket video to design the most effective approach for the semantic segmentation and event detection which supports, efficient and effective retrieval of video scenes. Cricket video has been selected as the primary application, because they attract viewer worldwide and the complexity of the game is high. This paper proposes a novel

hybrid multilayered approach for semantic segmentation of cricket video and major cricket events detection. The approach uses low level features and high level semantics with the rule based approach.[6]

As an improvement in above designed methodology our approach treats better extraction of color and texture features. Existing methods use temporal distance between shots in the definition of the similarity matrix. Joint color texture histogram is intended to use to solve the difficulty of object color close to background color.

III. PROPOSED WORK

The main steps of our method can be depicted by the block diagram as shown below

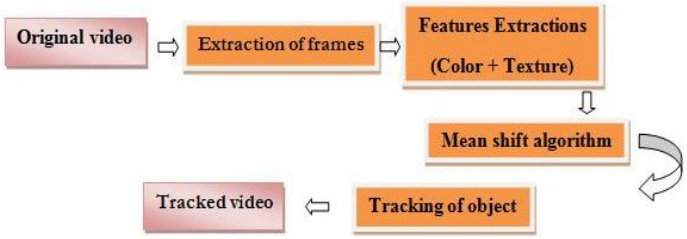

Fig. 1 Main block diagram

General steps in object tracking system as depicted in above figure are discussed below:

- First we will read any .avi video file for our reference.
- Then secondly, Key frame extraction is done, in which numbers of key frames are extracted and will label all the key frames with certain title.
- Then by finding their frame similarities we will make different group of some frames. In those key frames we will then select first frame to represent the target whose movement we have to track during complete video.
- Then we will find out color as well as texture feature of target object by applying color and texture histogram method. Same will be done for all consecutive frames up to end, by using mean shift algorithm. After that we will find co-ordinate of next frame and plot it on image.
- And then finally by applying joint color texture histogram method tracking of the specified defined object is done.

A. Challenges

The main challenges during object tracking is presented in Figure

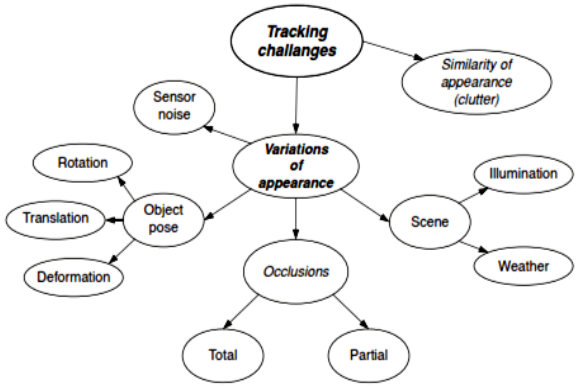

Fig2. - Main challenges in object tracking.

The main challenges in object tracking are due to variations in the target appearance and similarity with other objects in the video near to targeted object.The main challenges that occur when designing and operating with tracking an object are related to the similarity of appearance between the target and other objects in the scene, and to appearance variations of the target itself.

With the example of vehicles parking, where parked objects in the parking lots may share similar color or shape properties with the target and therefore distract the tracker from the desired targeted object of interest. The appearance of other objects and the background color may be similar to the appearance of the target and therefore may interfere with its observation. This phenomenon is known as clutter.

Figure shows an example of color ambiguity that can distract a tracker from the real target.

In Above figure we can see the example of Table Tennis, if the color of ball is green which is same as the color of player's t-shirt, when that ball come across the t-shirt then it becomes difficult to track that ball. This challenge can be dealt with by using multiple features (e.g. color and texture) weighted by their reliability.

In addition to the tracking challenges that occurs due to clutter, object trackingis made difficult by changes of the target appearance in the image plane that are due to one or more of the following factors:

- Changes in pose.
- Ambient illumination.
- Noise.

The texture patterns, which reflect distinct structure of the object, are very effective features to represent and recognize targeted objects [11]. Since the texture features introduce better information that the color histogram does not, using the joint color-texture histogram for target representation [1] is more reliable than using only color histogram or only texture histogram method in tracking. The idea of combining color and texture for object representation has been proposed to be presented here in paper.

The local binary pattern (LBP) technique is very effective to describe the image texture features [11]. LBP has many advantages for example fast computation and rotation invariance [11], which provides the betterresults in the fields of texture analysis, face recognition, image segmentation. LBP was successfully applied in various researches to the detection of moving objects via background subtraction. In LBP, each pixel is assigned a texture value, which can be naturallycombined with the color value of the pixel to represent targets [10] [11].

The method we proposed in our paper, we adopt the LBP scheme to represent the target background texture and then propose a joint color-texture histogram method for better andeffective objecttracking results.

IV. EXPERIMENTAL RESULT

Following fig. shows the simulation result of different reference videos

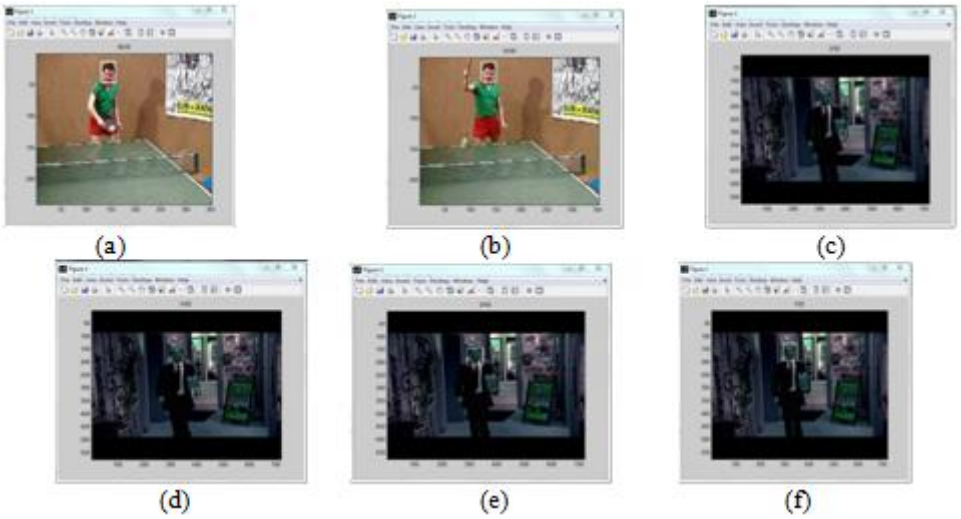

Fig.3 snap shot of simulation result of different reference videos

A. Flow chart :-

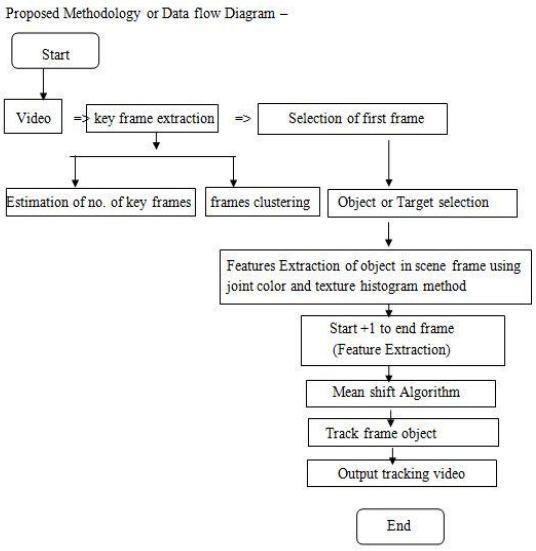

Fig.4 data flow diagram

V. RESULT AND DISCUSSION

Here we reviews and evaluates several object tracking algorithms. Notwithstanding decades of efforts, object tracking remains a challenging problem due to factors such as illumination, pose, scale, deformation, motion blur, noise, and occlusion. To account for appearance change, most recent tracking algorithms focus on robust object representations and effective state prediction. We analyze the components of each tracking method and identify their key roles in dealing with specific challenges. The qualitative and quantitative comparative results demonstrate the strength and weakness of these algorithms. Object tracking quality usually depends on video context (e.g. object occlusion level, object density).
Advantages over Previous Work

1) Much more versatile algorithm in terms of detection capabilities. In addition, the better frame Extraction technique.
2) The technique developed allows detection of objects at greater speeds specially who are mobile.
3) The detection capability of the system has been improved

VI. CONCLUSION AND FUTURE WORK

We have proposed an object tracking algorithm for video picture, based on shot clustering and joint color texture histogram of the segmented object between frames in simple feature space. Simulation results for frame sequences with moving ball and tennis video sequences verify the suitability of the algorithm for the reliable moving object tracking.

We also have confirmed that the algorithm works very well for more complicated video pictures including rotating object and occlusion of objects. In order to extract color features of segmented objects, we used the gray value at the centre pixel of an object. Gray value turns out to sufficiently represent the object's color features for tracking purpose. A multi colored object would be segmented into several parts by the image segmentation algorithm. It would be recognized as a more complicated object through the identical movement this parts. We have tried our best to provide researchers a comprehensive review in the field of object tacking in video.

The work can be extended in such a way that it can have various future applications. The Project can be extended for multiple objects tracking in videos. Since videos comprises was a sequence of frames. And each frame can be considered as an image. Therefore this algorithm can be extended to extraction of a series of images which form a video. The project can also be made more robust and secured by using different color as well as texture features extraction. And in future we can use this color texture histogram for real time moving objects in surveillance. And multiple moving object tracking will be on preference.

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