ISSN No. 0976-5697

Volume 5, No. 8, Nov-Dec 2014

International Journal of Advanced Research in Computer Science

REVIWE ARTICLE

Available Online at www.ijarcs.info

A Review on Tracking of Moving Object

Anup O. Fender and Vikrant Chole
Dept. of Computer Science & Engineering
G.H.R.A.E.T, Nagpur, India

Abstract: Object tracking deal with non-stationary objects that change over time. Object tracking in computer vision related to the task of tracking individual movable objects accurately from one frame to another in an image sequence or in video. This paper provides a comparative review of recent tracking methods, in particular with respect to their capability of tracking objects under various problems. In this papers researchers presented different method of object tracking such as binary classification problem, Steiner tree, local sparse model, novel algorithm with AdaBoost method.

Keywords: Binary classification, Steiner tree, AdaBoost, Sparse model.

I. INTRODUCTION

Object tracking particularly deals with non-stationary object that change over time. Tracking an object in video sequences is nowadays a demanding application. Object tracking play key role in many areas such as military applications, visual surveillance, motion analysis, activity recognition, driver assistance system. Any object tracking algorithms or methods depends upon intensity, color, shape, pattern and many other factors of a target object.

Object tracking in video sequences is most difficult because many problems associated with that. Most existing algorithms are able to track object in well controlled environment. However these algorithms fail to handle complex and dynamic scenes.. Many other problems associated with the object tracking are camera motion, occlusion and illumination change, pose variation and shape deformation. The main challenge of any object tracking algorithm is to handle appearance variability of target object

Appearance model is play very important role in object tracking because it represent target object and verify the prediction state of the object in each frame. For an effective appearance model several factors needs to be considered. First, representation of an object is done by different features like intensity, color, texture etc. Usually representation schemes can be based upon holistic templates and local representation. Second, for verifying state prediction generative or discriminative appearance model is needed. In the generative model tracking is done by searching for most similar region as the target object in the neighborhood.

In recent years, several methods have started to deal with problems of object tracking. However, no comparative analysis of such methods has been present to compare the effectiveness of each method under the same level of complexity of the dynamic scene.

II. RELATED WORK

The following sections explain the survey of various papers. Different methods are used for object tracking from image sequences or from video. Following section also explain different methods that are used for distinguishes target object from background.

In [2], S. Wang, Huchuan Lu presents method of object tracking algorithm to handle motion, large change in scale, and shape deformation with occlusion. They used discriminative appearance model based on super pixel for distinguishing object from the background with the help of mid level cues. Mid-level visual cues have been effective representations with sufficient information of image structure and great flexibility when compared with high-level appearance models and low-level features.

In [3], S.Avidan presents tracking of object through binary classification problem, where trained weak classifier distinguish between background and object. In this model weak classifier is combining with strong classifier using AdaBoost technique for efficient object tracking. P.Perez, C.Hue proposed color based probabilistic tracking where trackers used global color reference models. Such trackers are versatile and robust for model cost of computation.

In [4], Xu Jia, Huchuan Lu presents tracking algorithm which is totally depends upon structural local sparse appearance model and adaptive template update strategy. This model exploits spatial information and partial information based on novel alignment pooling. Alignment pooling method improves the accuracy of the tracking of object and also reducing the influence of occlusion. This method helps for locating target object more accurately and efficiently.

In [5], Yuan Li, Haizhou Ai proposing technique for tracking object in low frame rate video. In this paper, they integrate conventional tracking and detection techniques to solve the problems occur in low frame rate video. Various problems associated with the low frame rate video such as processing speed, discontinuity in appearance etc. To overcome such problems authors find out solution in that two very useful techniques used first is conventional tracking and another is detection.

In [6], David Ross, Jongwoo Lim presents method for visual tracking which efficiently learn and update a low dimensional subspace representation of the target object. This method provides compact notion of the "thing" being tracked rather than treating the target object as set of independent pixels and it is facilitates recognition of object.

In [7], Andres Ramirez and mohamed chouikha presents novel algorithm for tracking particular object in video based on method of subtraction of successive frames, where prediction of object movement is being tracked by analyze the changing areas generated as result of the motion of object's specially in region which is defined inside the object being tracked in current as well as next frame.

In [8], Olga Russakovsky and Andrew Y. Ng propose technique of object tracking with the help of Steiner tree approach. Many object tracking algorithms are slow and unsuitable for real life performance. Standard sliding window approach is analyzing large number of image region for object detection which slower the performance. Authors overcome such problem by giving solution of Steiner tree approach. In this technique, classifier is analyzes small subset of promising regions for object detection which increases computational speed without sacrificing accuracy. This method also solves the problem of feature selection of target object for tracking and detection of that object.

In [9], Helmut Grabner and Horst Bischof give novel on-line boosting method based on the feature selection framework. They focus on the discrete AdaBoost process for classification which increases the accuracy of object selection.

III. ANALYSIS CRITERIA

In the following section describe analysis criteria for comparative review of different methods of object tracking.

1. **Appearance Model.** An appearance model describes the appearance of an object. It can be represented in various ways. It is one of the important criteria for an analysis of different methods.
2. **Handling of occlusion.** The most difficult task of any tracking method is an occlusion handling. Many methods are fails to handle occlusion and also dynamic scenes complexity.
3. **Features of object**. Any object tracking algorithm or method can't be accomplished without feature selection of target object.

IV. CHALLENGES IN OBJECT TRACKING

The most important challenge is appearance change. Because when target object and background do not change over time then tracker performance is excellent but when object and background changes their appearance then tracker must adapt that changes accordingly.

Second challenge is handling of occlusion. When target object hidden from another object or background then tracker should handle that situation. Tracker should know that the target object is hidden from another object. Every time tracker should match the feature of object with another object which may also create another problem of slow processing. Any user does not want slow processing tracker.

Shape deformation, handling of dynamic scenes, illumination changes, pose variation, camera motion are other big challenges in an object tracking.

V. APPLICATION

There are many areas where object tracking play vital role. Physical tracking an object is not feasible in some situation and in that situation we have to use the technology. Due to that object tracking has tremendous scope in the many industries.

In the military application object tracking and detection play key role. In military application target object shape, direction and speed is not constant in many cases. So in that case good tracker is needed for tracking moving target object accurately and efficiently. Many object trackers are often used in the military application.

Activity recognition, driver assistance system, intelligent user interface, motion analysis are the other useful application of the object tracking and detection.

VI. PROPOSED PLAN

We propose an efficient object tracking technique based on a sparse collaborative model with Steiner tree approach. In the sparse collaborative model, sparse discriminative classifier (SDC) and sparse generative model (SGM) are included for object tracking.

In the sparse discriminative classifier (SDC) separate target object from the background and extracting the feature of target object. In sparse generative model (SGM), histogram of each local patch of the image is generated, which gives the spatial information of every patch of the image. Steiner tree approach place the different features of the target object image into binary tree format. Due to that the accuracy of the image is increased and speeding up the tracking of the object.

Appearance change is very big problem of the object tracking. The proposed method efficiently deals with appearance change and also solves the other problems of the tracking.

VII. CONCLUSION

In this paper, we have presented a comparative review on different tracking methods. We presented analysis criteria on which any tracking method or algorithm's performance is evaluated. And we also give challenges in the current object tracking methods and presented proposed method for solving difficulties of object tracking up to some extends.

VIII. REFERENCES

[1] Wei Zhong, Huchuan Lu and Ming- Hsuan Yang "Robust Object Tracking via Sparse Collaborative Appearance Model" IEEE Transaction on Image Processing volume. 23, No. 5, May2014

[2] S. Wang, H. Lu, F. Yang, and M.-H. Yang, "Superpixel tracking," in Proc. IEEE Int. Conf. Comput. pp. 1323–1330Vis., Nov. 2011.

[3] S. Avidan, "Ensemble tracking," IEEE Trans. Pattern Anal. Mach. Intell., vol. 29, no. 2, pp. 261–271, Feb. 2007.

[4] Xu Jia, H. Lu, "Visual Tracking via Adaptive Structural Local Sparse Appearance Model,"

[5] Y. Li, H. Ai, T. Yamashita, S. Lao, and M. Kawade, "Tracking in low frame rate video: A cascade particle filter with discriminative observers of different life spans," IEEE Trans. Pattern Anal. Mach. Intell., vol. 30, no. 10, pp. 1728–1740, Oct. 2008.

[6] D. Ross, J. Lim, R.-S. Lin, and M.-H. Yang, "Incremental learning for robust visual tracking," Int. J. Comput. Vis., vol. 77, nos. 1–3 pp. 125–141, 2008.

[7] Andres Ramirez, M. Chouikha "A New Algorithm for Tracking Object in Videos of Cluttered Scenes," International Journal of Information Technology(IJITMC), Vol.1, No.2, May 2013.

[8] Olga Russakovsky, Andrew Ng "A Steiner tree approach to efficient object detection".

[9] H. Grabner, C. Leistner, and H. Bischof, "Semi-supervised on-lineboosting for robust tracking," in Proc. 10th Eur. Conf. Comput.pp. 234–247, Vis.,Jan. 2008.