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Human Activity Recognition in Video on Exploration of Hog

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Abstract: ***The analysis of human activities is one of the most important open issues for the automated video surveillance community. Since few years ago, human activity/behavior has been handled by Computer Vision and Pattern Recognition perspective and contributed more of various fields. This paper is the first review analyzing new trend, proposing a structured snapshot of the state of the art and novel challenges in the surveillance domain with well-known techniques made along with the performances of different distance measures on KTH dataset.***
Keywords: Human Activity; Computer Vision; Video Surveillance HOG; Distance Measures; Benchmark Dataset.

I. INTRODUCTION

Human activity analysis has been one of the most important topics and becoming one of the most active research areas in computer vision. Human behavior analysis in computer vision perspective as an emerging technology towards many video surveillance applications. Automated video surveillance is any technology with principle helps to detect/categorize human behavior in video data under all kinds of context involving diverse actions/body language, variant backgrounds, human poses, occlusions, motion activities and etc. Analyzing activities involved to date the recognition of motion patterns, and the production of high-level descriptions of actions and interactions among entities of interest. Computer Vision and Pattern Recognition perspective, where an activity corresponded to a temporal sequence of explicit actions (run, stop, sit, walk, etc) . More recently, the automated surveillance of human activities has been faced considering a new perspective. The goal is to efficiently extract useful information from a huge amount of videos collected by surveillance cameras by automatically detecting, tracking and recognizing objects of interest, and understanding and analyzing their activities. Video surveillance has a wide variety of applications both in public and private environments, such as homeland security, crime prevention, traffic control, accident prediction and detection, and monitoring patients, elderly and children at home. There is an increasing interest in video surveillance due to the growing availability of cheap sensors and processors, and also a growing need for safety and security from the public. Nowadays there are tens of thousands of cameras in a city collecting a huge amount of data on a daily basis. Researchers are urged to develop intelligent systems to efficiently extract information from large scale data. Interpretation of human behavior is hard to categorize, and even harder to train a computer to interpret. Methods for the motion of body parts, the tracking of human motion using different camera settings and the recognition of activities are reported [1]. Computer vision helps in developing intermediate representation between understanding the low-level image/video content and high level semantics which is almost a replica of human vision [2]. Several applications have been developed to detect human behavior in context with intellectual, professional and social actions [4]. The covered topics include In section II, background work. In section III, proposed method. Datasets and Experimental producers in section IV. Results in V. At the end conclusion.

II. RELATED WORK

The categorization of human actions in video surveillances gained large concern in computer vision society. The most challenging task before activity analysis is mainly to detect and track humans in cluttered video scenes. Many surveys on activity analysis have been proposed in the literature.

A. Pedestrian Detection via Classification on Riemannian Manifolds

Since machine learning techniques are less suitable for learning classifiers, novel approach for classifying Riemannian manifold

points is proposed to detect pedestrian INRIA and DaimlerChrysler datasets.

B. A Survey of Computer Vision-Based Human Motion Capture

Aggarwal give an overview of various methods used prior to 1995, in articulated and elastic nonrigid motion. After a good overview of various motion types the approaches within articulated motion with or without a priori shape models are described. Then the elastic motion approaches are described in two categories with and without a shape model.

C. Detecting Pedestrians Using Patterns of Motion and Appearance

The field of human motion analysis is quite broad and has a history stretching back to the work of Hoffman and Flinch Baugh. Much of the field has presumed that the moving object has been detected, and that the remaining problem is to recognize, categorize, or analyze the long-term pattern of motion. Interest has recently increased because of the clear application of these methods to problems in surveillance.

D. Video Anomaly Detection using Selective Spatio-Temporal Interest Points and Convolutional Sparse Coding

Humans are most repeated and perhaps the most important content in videos and analyzing their activities is even more interesting. Recognizing human activities in complex environments and interpreting those possible actions in different circumstances is not easy. Analysis and classification of human activities in videos (acquired from surveillance cameras) has gained more concern for several applications such as health care, education & research, entertainment, defense, intrusion & abnormal events detection and other related areas.

E. Learning and understanding dynamic scene activity and A survey on visual surveillance of object motion and behaviors

In statistical models like Dynamic Bayesian Networks are addressed as one of the most suitable tools for activity recognition. An essay on the different components of a typical video surveillance system, with emphasis on the activity analysis, is reported.

F. Recognizing Human Actions: A Local SVM Approach

The motivation behind classifying human activities in video is based on threefold issue such as data, content & applications. As video data continues to grow, it becomes very cumbersome task to anually annotate/index video according to its content. Hence, it has become very crucial to develop and explore some novel techniques to extract the information content.

III. PROPOSED WORK

Proposed method of human activity analysis can be classified into two stages, i) Feature extraction & ii) Classification.

An assessment of human activity analysis is done by using state-of-the-art techniques for feature extraction and four different distance measure techniques for classification.

A. Feature Extraction

Histogram of oriented gradients (HOG) are considered to extract discriminative features from video frames and are briefed in following section

B. HOG (Histogram of Oriented Gradients)

Edge directions are commonly referred to as distribution of intensity gradients. HOG is type of feature descriptor that typically uses global features to describe and detect humans rather than just a collection of local features [19]. HOG is implemented by dividing image into small cells (usually 3X3 cells) and computed horizontal & vertical gradients without smoothing. Later, histogram is applied to each cells and quantized into 9 bins with smoothing using Gaussian. The oriented edges are obtained using wavelet filters. HOG can be computed with following two steps.

1) *Computing gradients:* Find x & y derivatives and filter masks (obtained by wavelets) in x& y directions. Gradient magnitude and gradient directions are calculated using

$$m(x,y) = \sqrt{x2} + y2 \;\&\; \emptyset = tan - 1\ y/x$$

2) Gradient histograms: For a 3X3 cell, gradient vector at each pixel is computed by considering 9 gradient vectors and put them into 9 histogram bins. The histogram ranges from 0 – 180º considered 20º orientation per bin. Magnitude of the gradient vector obtained will be assigned between two closest bins.

C. Classification

Features obtained from HOG techniques are given to classifiers in order to assign the class value to the query video. Four different distance measure techniques are used as classifiers to classify the test video from learned video samples. Manhattan distance, Euclidean distance, Modified Squared Euclidean distance, Angle-based distance are used.

IV. DATASET

A. Datasets

Benchmark dataset are considered, KTH action dataset [15] in following subsections.

1) KTH Action dataset: KTH action dataset is very popular and widely used dataset for human activity analysis [13, 17 & 18], consists of 6 types of human activities such as boxing, hand clapping, hand waving, jogging, running and walking for some sample images). Each class consists of 100 videos at 25fps (frames per second) with 25 different people performing those respective actions in 4 different scenarios such as outdoor, indoor, variant scales and with different outfits.

B. Experiments & Experimental Procedures

Experiments are carried out in conventional mode by dividing videos of dataset into train and test.

In KTH dataset, all 4 scenarios of one single person in all the classes are considered to be as training data (total no. of frames trained = 4X6X50 frames = 1200) and remaining videos for test (all 50 frames/video are considered).

V. IMPLEMENTATION

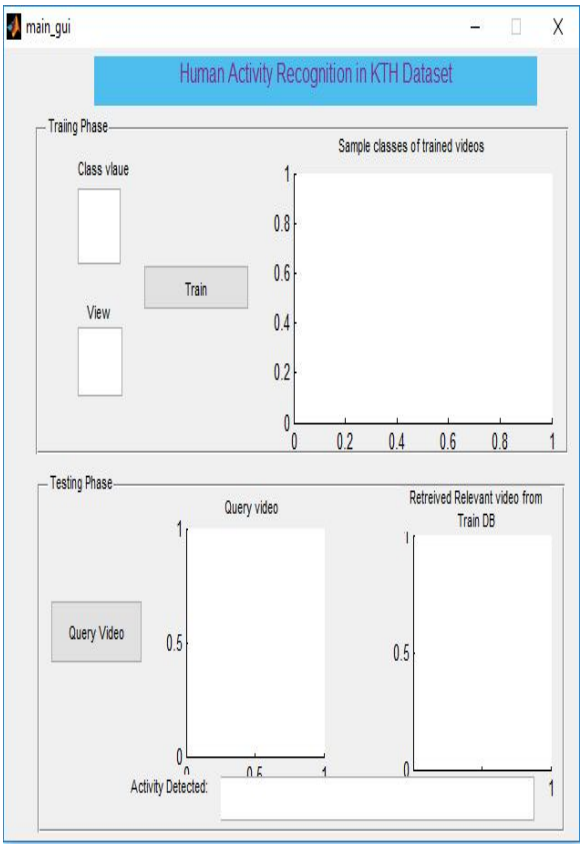

Fig: Initial GUI form of Human activity in KTH dataset

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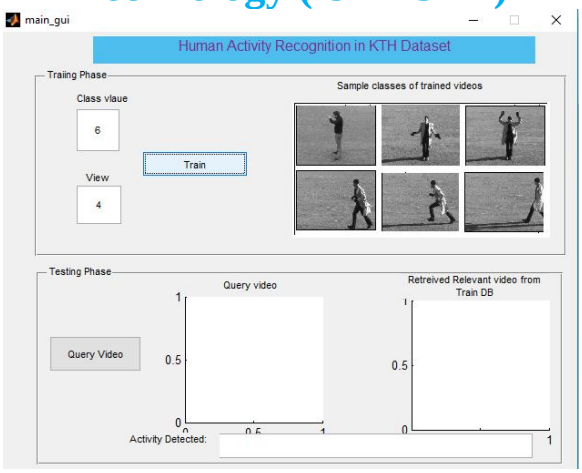


Fig: Human activity recognition by giving values to train videos

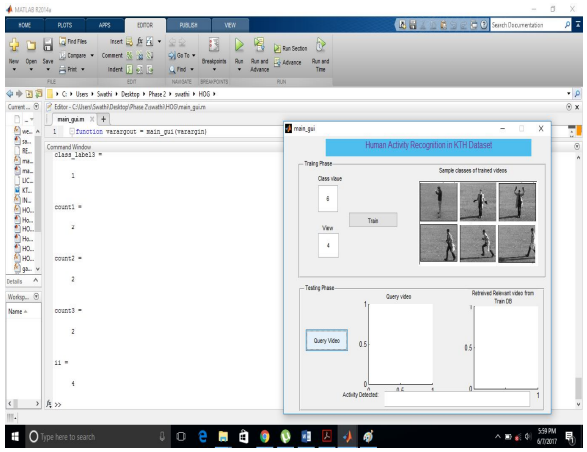


Fig: Recognition of count values to train video

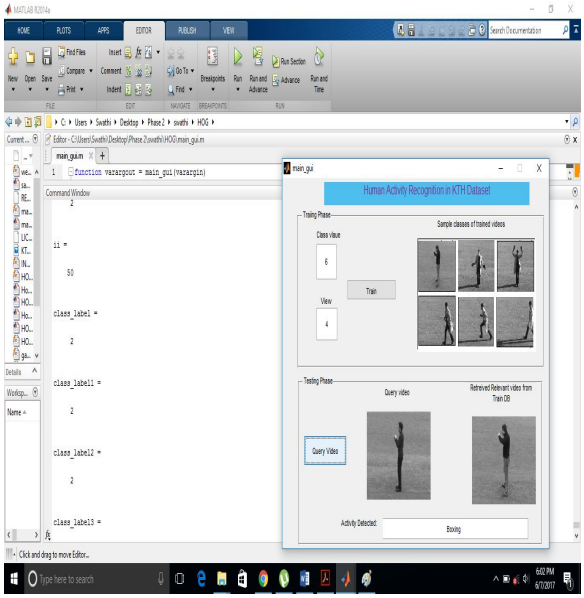


Fig: Activity recognition by query video to detect the activity

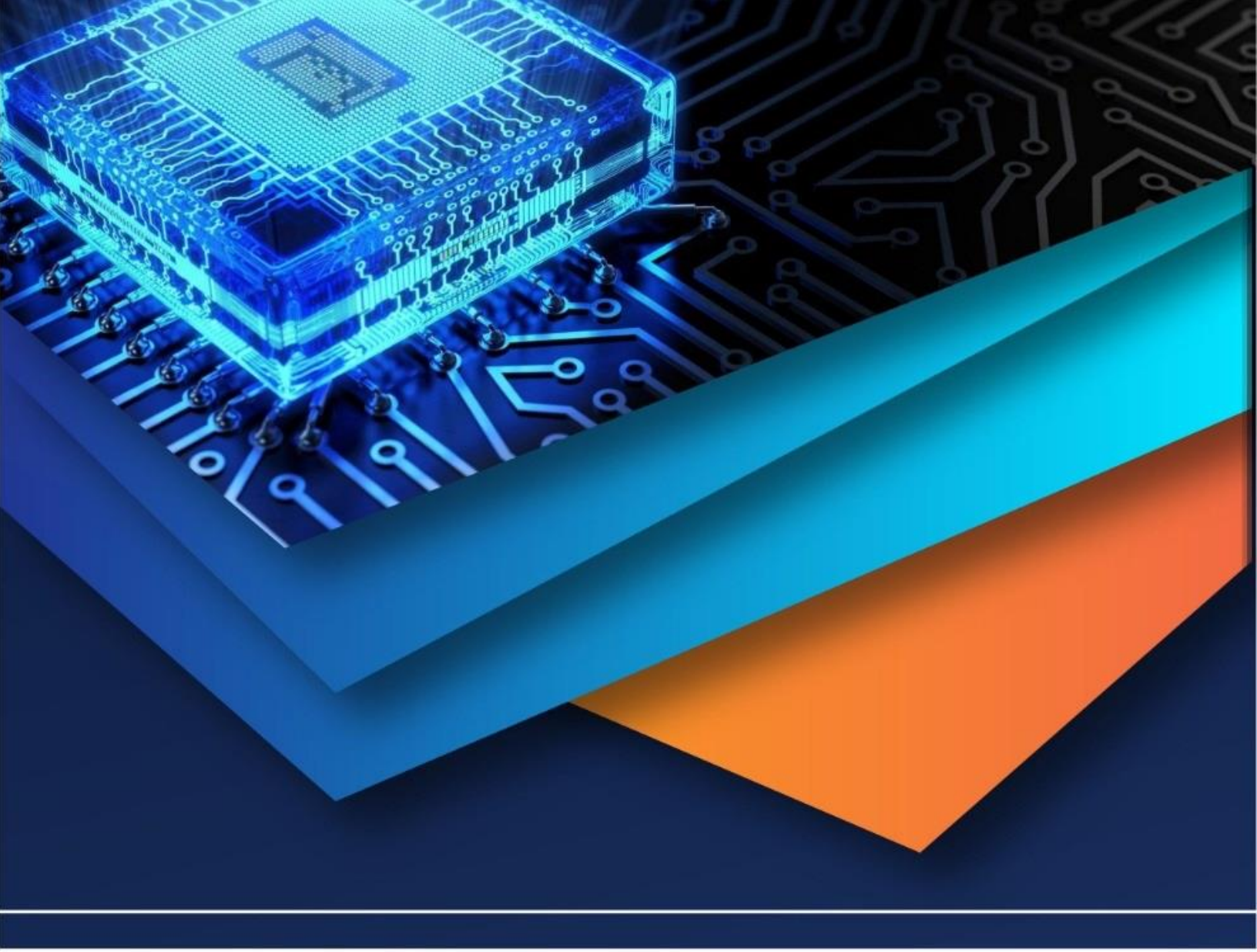
VI. CONCLUSION

The technical quality of the classical modules that compose a surveillance system allows nowadays to face very complex scenarios.

Discussed computer vision and pattern recognition technologies are closely related to each other. Several techniques addressing the core problems in human activity analysis can be witnessed in the literature, but rarely being noticed the highlights of contributions made and benchmarking the algorithms considering standard test procedures. The goal of this review is to support comprehensive analysis of HOG towards human activity analysis in video surveillance systems in computer vision perspective.

REFERENCES

[1] J.K. Aggarwal, Q. Cai, Human motion analysis: a review, Comput. Vision Image Understanding 73 (3) (2000) 428–440
[2] K. Mahantesh. IReS: Image Retrieval Systems – Some Novel Approaches. Ph.D Thesis submitted to VTU, Belgaum, India. 2015.
[3] Albert Ali Salah, Theo Gevers. Computer Analysis of Human Behavior. ISBN 978-0-85729-993-2, Springer, 2011.
[4] T. B. Moeslund, A. Hilton, V. Kruger, A survey of advances in vision-based human motion capture and analysis, Comput.Vision Image Understanding vol. 104, no. 2, pp. 90–126, 2006.
[5] J. Aggarwal, M. Ryoo, Human activity analysis: a review, ACM Comput. Surv. 43 (2011)1-43.
[6] W. Hu, T. Tan, L. Wang, S. Maybank, A survey on visual surveillance of object motion and behaviors, IEEE Trans. Syst. Man Cybern. 34 (2004) 334–352.
[7] L. Zhang, S. Li, X. Yuan, S. Xiang, Real-time object classification in video surveillance based on appearance learning, in: Proceedings of IEEE Conference on Computer Vision and Pattern Recognition, (CVPR 2007), 2007, pp. 1–8.
[8] P. Scovanner, M. Tappen, Learning pedestrian dynamics from the real world, in: Proceedings of International Conference on Computer Vision, 2009, pp. 381–388.
[9] Deva Ramanan, David A. Forsyth, Andrew Zisserman, Tracking People by Learning their Appearance, Ieee Transactions on Pattern Analysis And Machine Intelligence, Vol. 29, No. 1, pp. 65 – 81, 2007.
[10] S. Tellex, D. Roy, Towards surveillance video search by natural language query, in: Proceedings of International Conference on Image and Video Retrieval, 2009, pp. 1–8
[11] P. Viola, M. J. Jones, D. Snow, Detecting pedestrians using patterns of motion and appearance, Proceedings. Ninth IEEE International Conference on Computer Vision, vol. 2, pp. 734 – 741, 2003
[12] J. Berclaz, F. Fleuret, P. Fua, Robust People Tracking with Global Trajectory Optimization, IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'06), pp. 744 – 750, 2006.
[13] Christian Schuldt, Ivan Laptev & Barbara Caputo, Recognizing Human Actions: A Local SVM Approach, Proceedings of the 17th International Conference on Pattern Recognition (ICPR˝04), vol. 3, pp. 32-36, 2004
[14] Ivo Everts, Jan C. van Gemert, Theo Gevers, Evaluation of Color Spatio-Temporal Interest Points for Human Action Recognition, IEEE Transactions on Image Processing, Vol. 23, issue 4, pp. 1569-1580, 2014
[15] http://www.wisdom.weizmann.ac.il/~vision/SpaceTimeActions.html\
[16] Ivan Laptev and Tony Lindeberg, Local Descriptors for Spatio-Temporal Recognition, ECCV Workshop "Spatial Coherence for Visual Motion Analysis".
[17] I. Laptev and T. Lindeberg, Space-Time Interest Points, in Proc. ICCV'03, pp. 432-439, 2003
[18] C. Stauffer, Estimating tracking sources and sinks, in: Proceedings of Computer Vision and Pattern Recognition Workshop (CVPRW), 2003, pp. 35–35
[19] An Investigation of Combining Gradient Descriptor and Diverse Classiers to Improve Object Taxonomy in Very Large Image Dataset, in the proceedings of International Conference on Contemporary Computing and Informatics (IC3I), IEEE, pp. 581-585, 2014
[20] Mahantesh K, Anushree T R, Hemavathi N, An Investigation of Combining Gradient Descriptor and Diverse Classifiers to Improve Object Taxonomy in Very Large Image Dataset, in the proceedings of International Conference on Contemporary Computing and Informatics (IC3I), IEEE, pp. 581-585, 2014.



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