ISSN 2249 –5460

INTERNATIONAL JOURNAL OF MATHEMATICAL SCIENCES, TECHNOLOGY AND HUMANITIES

www.internationalejournals.com

Available online at www.internationaleJournals.com

International eJournals

International Journal of Mathematical Sciences, Technology and Humanities 101 (2013) 1099–1105

A ROBUST TRACKING MOTION RECOGNITION WITH COMPLEX BACKGROUND FOR REAL TIME VIDEO SURVEILLANCE

[1]TARUN DHAR DIWAN, [2] FAYAZ AHMAD LONE,[3] UPASANA SINHA

Department of Engineering, Dr. C. V. Raman University, Bilaspur (C.G), India.
tarunctech@gmail.com, fayazmca2009@gmail.com, upasanasinha@gmail.com

Abstract—In this paper, we aim to analyze multi-camera scenes by finding contextual tracking information of objects of interest. The work done until now shows the capabilities of multi-cue approaches: texture features and detection outcomes are used for tracking vehicles in tunnel surveillance. One of those is robustness of these techniques to changes in the environment: illumination, size of the objects and many others. Sometimes, additional video cameras are necessary to complement the surveillance information, especially for large scale applications. We aim to investigate new techniques and design new intelligent algorithms, which have to make use of partial information from several video sources. Effective performance evaluation is deemed important towards achieving successful Smart Video Surveillance Systems intelligent (smart) surveillance systems, which are now watching the video and providing alerts and content based search capabilities, make the video monitoring and investigation process scalable and effective. The programmed that analyze the video and provide alerts are commonly referred to as video analytics. These are responsible for turning video cameras from a mere data gathering tool into smart surveillance systems for proactive security. Smart surveillance systems have been enabled by the advances in computer vision, video analysis, pattern recognition and multimedia indexing technologies over the past decade. Additional video cameras are necessary to complement the surveillance information, especially for large scale applications. We aim to investigate new techniques and design new intelligent algorithms, which have to make use of partial information from several video sources. One of those is robustness of these techniques to changes in the environment: illumination, size of the objects and many others. Sometimes, additional video cameras are necessary to complement the surveillance information, especially for large scale applications. We aim to investigate new techniques and design new intelligent algorithms, which have to make use of partial information from several video sources. Object tracking data for further scene analysis and understanding.

Keywords**:** surveillance information, segmenting, Object tracking, significant percentage, auto-calibration, contextual tracking, pattern recognition.

1. INTRODUCTION

Smart Video Surveillance is the use of computer vision and pattern recognition technologies to analyze information from situated sensors tracking the objects of interest is a crucial step before being able to answer such questions. in this area include shape-base techniques which exploit features like size, compactness, aspect ratio, and simple shape descriptors obtained from the segmented object[1,2].The smart camera delivers a new video quality and better video analysis results, if it is compared to existing solutions. Beside these qualitative arguments and from a system architecture point of view, the smart camera is an important concept in future digital and heterogeneous third generation visual surveillance systems [3]. After revisiting the state of the art of the techniques used in visual object tracking ,we found many issues to be solved. One of those is robustness of these techniques to changes in the environment: illumination, size of the objects and many others. Sometimes, additional video cameras are necessary to complement the surveillance information, especially for large scale applications. We aim to investigate new techniques and design new intelligent algorithms, which have to make use of partial information from several video sources. [4], [5]. The analysis of the sensor data generates events of interest in the environment. For example, an event of interest at a departure drop-off area in an airport is "cars that stop in the loading zone for extended periods of time." As smart surveillance technologies have invited paper on Special Issue of Machine Vision and Applications Journal matured, they have typically been deployed as isolated applications which provide a particular set of functionalities. However, isolated applications While delivering some degree of value to the users, do not comprehensively address security requirements. the system architecture and its basic functions, technologies, data management, and the flexible framework for different applications. Video analysis and video surveillance are active areas of research. The key technologies are video based detection and tracking, video-based person identification, and large-scale surveillance systems. A significant percentage of basic technologies for video-based detection and tracking were developed under a this program looked at several fundamental issues in detection, tracking, auto-calibration, and multi-camera systems [6]. There has also been research on real-world surveillance systems in several leading universities and research labs [7].

2. LITERATURE REVIEW

We present a smart visual surveillance system with real-time moving object detection, classification and tracking capabilities. The system operates on both color and gray scale video imagery from a stationary camera. In the proposed system moving object detection is handled by the use of an adaptive background subtraction scheme [8] which reliably works in indoor and outdoor environments. We also present two other object detection schemes, temporal differencing [9] and adaptive background mixture models, for performance and detection quality comparison. In adaptive background subtraction method, a reference background is initialized at the start of the system with the first few frames of video and updated to adapt to short and long term dynamic scene changes during the operational period. At each new frame, foreground pixels are detected by subtracting the intensity values from the background and filtering the absolute value of the differences with a dynamic threshold per pixel. The reference background and the threshold values are updated by using the foreground pixel information. The detected foreground pixels usually contain noise due to image acquisition errors, small movements like tree leaves, reflections and foreground objects with textures colored similar to the background. These isolated pixels are filtered by the use of a sequence of morphological operations dilation and erosion. After this step, the individual pixels are grouped and labeled by using a two pass component labeling algorithm to create connected moving regions[10]. These regions are further processed to group disconnected blobs and to eliminate relatively small sized regions. After grouping, each detected foreground object is represented with its bounding box, area, center of mass and color histogram which will be used in later steps. After segmenting moving pixels from the static background of the scene, connected regions are classified into predetermined object categories human, human group and vehicle. The classification algorithm depends on the comparison of the silhouettes of the detected objects with pre-labeled (classified) templates in an object silhouette database. The template database is created by collecting sample object silhouettes from sample videos and labeling them manually with appropriate categories. The silhouettes of the objects are extracted from the connected foreground regions by using a contour tracing. Next, the distance between each boundary pixel and the center of mass point is calculated to create a distance signal starting from the top pixel and continuing clock-wise until reaching the same pixel. The distance signals are first normalized to be of the same length, then smoothed and finally normalized again to cover the same area. The comparison metric used in matching the templates with the detected objects are the L1 distance [11] of normalized silhouette distance signals. The class of the template silhouette with minimum distance from the detected object's silhouette is assigned to the object's class. Temporal tracking information is used to support classification decision.

3.OBJECTIVES

(1) A video surveillance system to analyze offline videos, which can detect the moving objects, track the objects and detect the unusual activity[1,12].
(2) In the presented system, adaptive background subtraction mixture models are used for moving object detection [2].
(3) Which is the learning constant and is the proportion of data that should be maintained for the back ground [4].
(4) A parameter is used with background weight parameter to construct the energy function.

4. SMART SURVEILLANCE SYSTEMS

A typical surveillance system involves large numbers of cameras deployed in the streets with a network that aggregates the camera feeds to a command center. The feeds may be monitored in real time at the command center and archived for investigative purposes. Such networked systems provide "situational awareness over vast urban areas." However, they leave the entire burden of watching video, detecting threats, and locating suspects to the human operator. This process of manually watching video is known to be tedious, ineffective [1], and expensive. Intelligent (smart) surveillance systems, which are now "watching the video" and providing alerts and contentbased search capabilities, make the video monitoring and investigation process scalable and effective. The software algorithms that analyze the video and provide alerts are commonly referred to as video analytics. These are responsible for turning video cameras from a mere data gathering tool into smart surveillance systems for proactive security. Smart surveillance systems have been enabled by the advances in computer vision, video analysis, pattern recognition and multimedia indexing technologies over the past decade. A high-level representation of a smart surveillance system is illustrated in Figure 1, where cameras on the street are connected back to a video encoder that converts the video into an IP stream (no encoders are needed in case of IP cameras). These streams are aggregated and stored onto a server by a video management system that manages the cameras, video archive, and monitors. The video analytics components of the system run on the server and provide two types of functions to the people in the command center.
Real-time threat alerts*:* These alerts are generated when a user defined event occurs within a camera field of view. For example, the system can alert if a package is left static within a camera field of view for more that a specified time (for instance, for 2 min).
Rapid video search*:* The system allows the user to search through multiple cameras for specific types of objects or events. For example an investigator may look for all red cars that passed under a camera over the course of the "last ten days" or for people riding bikes in the area of Time Square (many cameras) over the last week.

5. EXPERIMENT

The characteristics of the video input object you created enter the variable name you assigned to the object at the command prompt. For example, this is the summary for the object.Initiate a basic acquisition using a video input object.

```
% Access an image acquisition device.
vidobj = videoinput('winvideo', 1);
% Use a manual trigger to initiate data logging.
triggerconfig(vidobj, 'manual');
% Start the acquisition.
start(vidobj)
% Trigger the object to start logging and allow the
acquisition to run for
% couple of seconds.
trigger(vidobj)
pause(2);
% Stop the acquisition
stop(vidobj)
```

Viewing Event Information

To view event information for the acquisition, access the `EventLog` property of the video input object. Events are recorded in chronological order.

```
% View the event log.
events = vidobj.EventLog
events =
1x3 struct array with fields:
Type
```

Data Each event provides information on the state of the object at the time the event occurred.

```
% Display first event.
event1 = events(1)
event1 =
Type: 'Start'
Data: [1x1 struct]
data1 = events(1).Data
data1 =
AbsTime: [2005 6 5 23 53 14.1680]
FrameMemoryLimit: 341692416
FrameMemoryUsed: 0
FrameNumber: 0
RelativeFrame: 0
TriggerIndex: 0
% Display second event.
event2 = events(2)
event2 =
Type: 'Trigger'
Data: [1x1 struct]
data2 = events(2).Data
data2 =
AbsTime: [2005 6 5 23 53 14.7630]
FrameMemoryLimit: 341692416
FrameMemoryUsed: 0
```

FrameNumber: 0
RelativeFrame: 0
TriggerIndex: 1
% Display third event.
event3 = events(3)
event3 =
Type: 'Stop'
Data: [1x1 struct]
data3 = events(3).Data
data3 =
AbsTime: [2005 6 5 23 53 16.9970]
FrameMemoryLimit: 341692416
FrameMemoryUsed: 768000
FrameNumber: 5
RelativeFrame: 5
TriggerIndex: 1
% Once the video input object is no longer needed, delete
% it and clear it from the workspace.
delete(vidobj)
clear vidobj

6. RESULT

The technologies that go into making surveillance system “smart, useable, and scalable” draw on many fields of science and engineering. While the technologies today provide significant value, several of the underlying challenges are open scientific problems and will continue to evolve over the next few decades, promising to provide better tools to homeland security and law enforcement.

Visualize Results Get the frame rate of the original video and use it to see "taggedCars in implay".
frameRate = get(trafficObj,'FrameRate');
implay(taggedCars,frameRate);

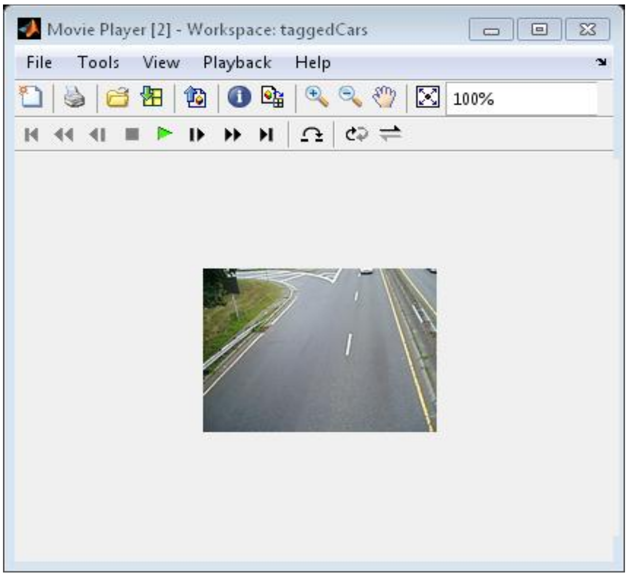

Figure.1 The Frame Rate Of The Original Video

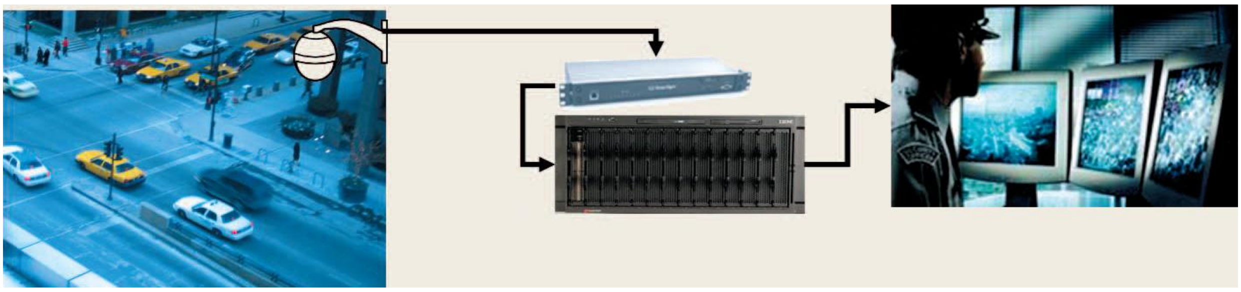

Figure.2 Smart Surveillance Technologies

7. DISSCUTATION AND CONCLUSATION

We develop and adopt the concept of matlab programming for different object detection and compared their detection quality and time-performance. The adaptive background subtraction scheme gives the most promising results in terms of detection quality and computational complexity to be used in a real-time surveillance system with cameras. However, no object detection algorithm is perfect, higher level semantic extraction steps would be used to support object detection step to enhance its results and eliminate inaccurate segmentation. the proposed whole-body object tracking algorithm successfully tracks objects in consecutive frames. our tests in sample applications show that using nearest neighbor matching scheme gives promising results and no complicated methods are necessary for whole-body tracking of objects. also, in handling simple object occlusions, our histogram-based correspondence matching approach recognizes the identities of objects entered into an occlusion successfully after a split. However, due to the nature of the heuristic we use, our occlusion handling algorithm would fail in distinguishing occluding objects if they are of the same size and color. Also, in crowded scenes handling occlusions becomes infeasible with such an approach, thus a pixel-based method, like optical flow is required to identify object segments accurately.

REFERENCES

[1] A.Senior, A.Hampapur, Y-L Tian, L. Brown, S. Pankanti, R. Bolle, “Appearance Models for Occlusion Handling,” in proceedings of Second International workshop on Performance Evaluation of Tracking and Surveillance systems in conjunction with CVPR'01 December 2001.

[2] A. W. Senior, “Tracking with Probabilistic Appearance Models,’ ECCV workshop on Performance Evaluation of Tracking and Surveillance Systems 1 June 2002 pp 48--55.

[3] Unpublished IBM Technical report, “Multi-view face detection by Harr and optimized wavelets features,” 2006.

[4] C. S. Regazzoni, V. Ramesh, and G. L. Foresti, “Distributed Embedded Smart Cameras for Surveillance Applications”, Proceedings of the IEEE, 39(2), Oct 2006.

[5] L. Brown, “View Independent Vehicle/Person Classification”, VSSN’04, October 15, 2004,New York, USA.

[6] B. Bose and E. Grimson, “Improving object classification in far-field video”, CVPR, 2004.

[7] Case Study by Seagate, "Smart Surveillance Systems Tap Reliability and Performance of Seagate SV35 Series Drives." CS509, October 2006.

[8] L. Chen et al, “An Integrated System for Moving Object Classification in Surveillance Videos”IEEE Fifth International Conference on Advanced Video and Signal Based Surveillance.2008.

[9]. Tian, Y.l. Hampapur, “A Robust Salient Motion Detection with Complex Background for Real-Time Video Surveillance”, In: IEEE Computer Society Workshop on Motion and Video Computing, Breckenridge, Colorado, January 5 and 6, 2005
[10]A. Yilmaz, O. Javed, and M. Shah, "Object tracking: A survey," ACM Computing Surveys (CSUR), vol. 38, 2006, Article 13.
[11] B. Antic, J. Niño, D. Culibrk, A. Pižurica, and W. Philips, "Robust detection and tracking of moving objects in traffic video surveillance," Advanced Concepts for Intelligent Vision Systems, 2009, pp.494-505.
[12] Tarun Dhar Diwan "Real Time Eye Template generation system in an image sequence",CIIT International Journal Of Digital Image Processing, June2012, ISSN: 0974-9586, DOI: DIP062012013.
[13] Tarun Dhar Diwan "personal identification system ", CiiT - International Journal of Data Mining Knowledge Engineering, June2012, and ISSN: 0974-9578, DOI: DMKE062012004.
[14] Tarun Dhar Diwan, Rajesh Tiwari “Automatic Eye Blink Tracking & Detection in an Image Sequence" International Journal of Computer Science and Information Technology, Vol- 2 , pages 2348-2349 .2011, ISSN 0975 – 9646.
[15] Tarun Dhar Diwan, Nilmani Verma “Developing Face Recognition using Principal Component Analysis and Radial Basic Function Netwok”, CiiT - International Journal of Artificial Intelligent Systems and Machine Learning, 2010, ISSN: 0974–9543, DOI: AIML022010002.
[16] “Introduction to MATLAB-7 for Engineers”, Palm, William J, Mc Graw Hill, 2005.

AUTHOR BIOGRAPHIES

TARUN DHAR DIWAN RECEIVED HIS MASTER OF ENGINEERING (COMPUTER TECHNOLOGY AND APPLICATION) DEGREE FROM CHHATTISGARH SWAMI VIVEKANANDA TECHNICAL UNIVERSITY –BHILAI, INDIA, AND MASTER OF PHILOSOPHY (GOLD MEDAL LIST) FROM DR. C.V. RAMAN UNIVERSITY. HE IS CURRENTLY AN HOD & MTECH CO-ORDINATOR DEPTT. OF ENGINEERING AT THE DR.C.V.RAMAN UNIVERSITY-BILASPUR, INDIA. HIS CURRENT RESEARCH WORK ARTIFICIAL INTELLIGENT, IMAGE PROCESSING AND SOFTWARE ENGINEERING.