

A Survey for Abnormal Activity Detection in Classroom

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ABSTRACT: Visual surveillance is an effective research topic in image processing. Transit systems are actively seeking new or enhanced ways to use technology to deter and respond to accidents, crime, suspicious activities, terrorism, and vandalism. In the current trend, besides analyzing any video for information retrieval, analyzing live surveillance videos for detecting activities that take place in its coverage area has become more essential. Such systems will be implemented real time. In this paper, we had gone through detect Abnormal activities such as entity exchange, entry of a new person, snoopy into other's answer sheet and person exchange from the video Captured by a surveillance camera during examinations. This Requires the process of face recognition, hand recognition and identify the contact between the face and hands of the same person and that among different persons. Automation of 'suspicious activity detection' will help decrease the error rate due to manual monitoring.

KEYWORDS: Image Processing, Video Surveillance, Anomaly detection, face detection.

I. INTRODUCTION

Surveillance is the Observation of the behavior, activities, or other changing information, usually of people for the purpose of influencing, managing, directing, or protecting them. Surveillance is used by governments for intelligence gathering, the prohibition of crime, the protection of a process, person, group or object, or for the inspection of the crime. A useful video surveillance system depends on detection of suspicious activities [1]. In recent times, detecting abnormalities in human behavior using such systems gained more substance as it can provide clues while preventing breaches in security.

Human face and human behavioral pattern play an important role in person identification. Visual information is a key source for such identifications. Surveillance videos provide such visual information which can be viewed as live videos, or it can be played back for future references. The recent trend of 'automation' has its impact even in the field of video analytics. Video analytics can be used for a wide variety of applications like motion detection, human activity prediction, person identification, abnormal activity recognition, vehicle counting, people counting at crowded places, etc [1]. In this domain, the two factors which are used for personal identification are technically termed as face recognition and gait recognition respectively. Among these, two techniques, face recognition is more versatile for automated person identification through surveillance videos. Face recognition can be used to predict the orientation of a person's head, which in turn will help to predict a person's behavior. Motion recognition with face recognition is very useful in many applications such as verification of a person, identification of a person and detecting the presence or absence of a person at a specific place and time [3].

This paper presents a survey on Abnormal Activity Detection, The various methods used for face detection, different recognition and classification techniques.

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II. RELATED WORK

My Survey of various papers describes a technology in which real time videos are analyzed and are used for human activity analysis in an examination hall, thus helping to classify whether the particular person's activity is suspicious or not. The system developed identifies abnormal head motions, thereby prohibiting copying. It also identifies a student moving out of his place or swapping his position with another student. Finally the system detects contact between students and hence prevents passing incriminating material among students. In our research, we have contributed upon a system that will intellectually process live video of examination halls with students and classify their activities as suspicious or not. This research proposes an intelligent algorithm that can monitor and analyze the activities of students in an examination hall and can alert the educational institute's administration on account of any malpractices/suspicious activities.

III. BEHAVIOUR ANALYSIS

1) Preprocessing:

Preprocessing is important before we start a feature extraction process. Normalization of brightness, face detection, noise removal, Activity Recognition, motion detection.[1]

2) Feature extraction:

Two types of features are extracted:

1. Local (Geometric based features)
2. Global(Whole face part instead of features From facial points)

3) Classification:

In this step different classifier is used like SVM (Support Vector Machine), Artificial Neural Network, Adaboost Classifier, hidden Markov models (HMM), Gaussian Mixture Model (GMM).

This paper organized in following manner, Section 1, is about Introduction part. Section 2 presents the Related Work. Section 3 is behavior analysis, Section 4 is scope & motivation of this survey paper, Section 5 is Literature Survey about Abnormal Activity Detection & Face Detection, table 1 describe different techniques used in Abnormal Activity Detection ,Section 6 is about Conclusion

IV. SCOPE & MOTIVATION

This survey paper gives an overview about Suspicious Human Activity Detection system aims to identify the students who indulge in malpractices/suspicious activities during the course of an examination. This survey can help researchers to study various techniques that are used and the results that they get in order to do more advance research in the future.

V. LITERATURE SURVEY

Researchers have been working on Abnormal Activity Detection and face recognition to create a better and more efficient summary Author at [1], (Gowsikhaa D, Manjunath , Abirami S) described a technology in which real time videos are analyzed and are used for human activity analysis in an examination hall, thus helping to classify whether the particular person's activity is suspicious or not. The system developed to identify abnormal head motions, thereby prohibiting copying. It also identifies a student moving out of his place or swapping his position with another student. Finally the system detects contact between students and hence prevents passing incriminating material among students. In our research, we have contributed upon a system that will intellectually process live video of examination halls with students and classify their activities as suspicious or not.

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Author at [2], (Shermina.J) described a research on an efficient illumination invariant face recognition system using Discrete Cosine Transform (DCT) and Principal Component Analysis (PCA). For processing the illumination invariant image, low frequency components of DCT are used to normalize the illuminated image, odd and even components of DCT is used for compensation in illumination variation and the PCA is used for recognition of face images. A method for face recognition on varying lighting conditions using low frequency components of Discrete Cosine Transform and Principal Component Analysis is proposed.

Author at [3], (Jean-Christophe Terrillon, Arnaud Pilpré, Yoshinori Niwa, Kazuhiko Yamamoto) propose a real-time system called “DRUIDE”, for “Detection-Recognition-Unification- Interpretation-Decision-Evolution”, and that is primarily intended for the robust Concurrent detection or tracking of multiple human faces and for the recognition of multiple hand postures of the Japanese Sign Language (JSL) in color video sequences. The system relies on the three fundamental cues of color, shape and motion, and integrates three mutually complementary sub-systems, in order to achieve high rates of detection, tracking and recognition.

Author at [4], (Caixia Liu) presented a method based on machine learning include artificial neural network technology, support vector machine (SVM), frequency spectrum analysis, the hidden Markov model (HMM), and other species.

Author at [5], (Wei liuliu,liu mingyang) described Multi-pose Face Detection based on Adaboost. Adaboost is a kind of traversal image searching method, which wastes testing time Actively and should be improved. Skin color detection is used to optimize front-end detection that is relatively stable and has fast speed. The proposed face detection algorithm can provide reference for the design of the actual face detection system to some extent.

Author at [6], (Jin-Woo Choi and Jang-Hee Yoo) propose a real-time multi-person tracking system, which is robust to depth variation in the surveillance video. The proposed method efficiently tracks multiple persons without tracker lost by using object size estimation and tracking failure detection technique.

Author at [7], (Huaxun Zhang, Yannan Xie, Cao xu) proposed a machine learning approach for face detection, which is capable of processing images extremely rapid and achieving a high detection rate. Frontal clutter and video face detection system are which achieves a high detection rate and low false positive rates which are bound to zerpa. also they proposed two novel ideas for improved Adaboost cascade face detection. Firstly, through researching the characteristic of weak classifier, we proposed a method of computing threshold which obtained a high detection rate for using fewer weak classifiers. Secondly selecting discriminate weak learners to enhanced the detection performance and employing the number of Haar-like features in the Adaboost training.

Author at [8], (Sugla Vinaayagan Rajenderan, Ka Fei, Thang) described an appropriate algorithm for autonomous suspicious human-movement detection for video surveillance. In proposing system extract human-movement information by detecting and tracking people in real-time using Gaussian Mixture Model (GMM).

Author at [9], (varun chandola, vipin kumar) described This riviews provide a structured and comprehensive overview of the research on anomaly detection. We also provide a discussion on the computational complexity of the techniques since it is an essential issue in real application domains.

Author at [10], (Joshua Candamo, Matthew Shreve) describes the current state-of-the art image processing methods for automatic behavior recognition techniques, with a focus on the surveillance of human activities in the context of transit applications. A list of relevant behavior recognition papers is presented, including behaviors, data sets, implementation details, and results. In addition, algorithm’s weaknesses, potential research Prescription, and contrast with commercial capabilities as advertised by manufacturers are discussed.

Author at [11], (Shian-Ru Ke , Hoang Le Uyen Thuc, Yong-Jin Lee) described review article surveys extensively the current progresses made toward video-based human activity recognition. Here reperesent Three aspects of human

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activity recognition are addressed ,including core technology, human activity recognition systems, and applications from low-level to high-level representative.

Author at [12], (Manoj D, Nethra N, Manjunatha D, Girish Kumar L, Jyothi S Nayak)The proposed system involves three main steps: Detection of multiple faces in the images acquired by the instructor, Recognition of faces detected and marking attendance of the same. Face detection implicate detecting candidate regions in an image that are possible faces. It is a challenging task because of differences in shape, illumination, lighting conditions, size, orientations, complex background occlusions and skin tone.

Author at [13], (Namrata Vaswani) describe the term “*shape activity*” to denote a continuous-state hidden Markov model (HMM) for the shape deformation and motion in the activity. We treat the objects as point objects.A continuous-state hidden Markov model is describe for landmark shape dynamics in an activity.

Author at [14], (Xinyu WU, Yongsheng OU, Huihuan QIAN, and Yangsheng XU) describe a real time video surveillance system which detects human abnormal behaviors. This system is to analyze human behaviors and detect human abnormal behaviors. The System can recognize the abnormal behaviors using learning algorithms in a crowded environment, such as running people in a crowded environment, bending down movement while most are walking or standing, a person carrying a long bar and a person running and waving a hand in a very crowded Surrounding.

Author at [15], (Yufeng Chen,Guoyuan Liang,Ka Keung Lee,Yangsheng Xu) propose a method which integrates the Bayesian framework with the SVM method, which largely improves the recognition rate using historical information. It is used to multi-SVM recognition method to recognize human actions, which is accomplished from the mix of predefined normal action types and randomly inserted abnormal action data.

Author at [16], (Chang Liu, Guijin Wang, Wenxin Ning, Xinggang Lin) propose an anomaly detection system based on low-level features. Dense motion field and statistics are computed in each frame. Then motion directional PCA technique is presented to extract useful principle features in time-span. Finally,one-class SVM discriminates the anomaly from normal events.

Author at [17], (Oluwatoyin P. Popoola) propose for conceptual human behavior , detection,especially in video surveillance applications. It is desirable to have systems that perform intelligent real time detection of “interesting behavior” to the human agent. This review provides a much more in-depth and extensive Coverage.

Author at [18], (Dongping Zhang, Jiao Xu, Yafei Lu, Huailiang Peng) propose an analysis method for small groups’ scenario abnormal state detection. We use HMM to detect abnormal behaviors.

Author at [19], (B.F.Momin, V.M.Fanase) propose To detect abnormal behavior in local as well as global Contexts and to localize regions showing abnormalities, model of Regular crowd behavior is used. We use a LE based approach to analyze video sequences which embeds video by using local spatiotemporal patches. This embedded space is used to model the regular behavior of a crowd. Thus, it is possible to detect and localize abnormal events in local as well as global context.

Author at [20], (Ms. K. Pavithradevi, Ms. S. Aruljothi) describe Detection of suspicious activities of human crowd Scenes in public areas using video surveillance has attracted an increasing level of care. It is based on the histogram of gradient and Gaboralgorithm to form in the order of historical sequence by using recorded dataset and local features of human crowd Scenes public area.

Author at [21], (Divya J) describe the automatic detection of abnormal behavior in surveillance videos. We have targeted to create a system for the recognition of human activity and behavior, and extract new information of interest for end-users in highly assure indoor surveillance system.In their review the two main components of the event understanding process: Abstraction and Event modeling has been explained.

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In Table 1 Different 21 paper is described Modeling framework, learning Algorithm& Techniques used for implementation in each paper.

**TABLE I
COMMON TOOLS AND PARADIGMS IN THE LITERATURE**

Modeling framework, learning Algorithm& Techniques	References
Artificial Neural Network	[1]
PCA & LDA	[2],[12],[14],[16]
DCT & DFT	[2],[11]
SVM	[3],[4],[6],[9],[12], [14],[15],[20],[21]
One-class SVM	[16]
HMM	[4],[11],[13],[17],[18], [19]
Adaboost	[5],[7]
Gaussian Mixture Model (GMM)	[8],[10],[11]
Bayesian Framework	[15]

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VI. CONCLUSION

In this survey paper we have studied about different Abnormal Activity detection and studied various types of different activity. Furthermore, it also includes the survey & different techniques.

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