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Using CNN in Surveillance Videos for Recognizing Human Actions Based on Machine Learning in Examination

Prof. Ashwii Shahapurkar[1], Rushikesh Birajdar[2], Nayan Maindad[3], Akash Pawar[4], Akash Fand[5]

Professor, Department of Computer Engineering[1]

Student, Department of Computer Engineering[2,3,4,5]

Dhole Patil College of Engineering, Pune, Maharashtra, India

Abstract: *Video analytics is the process of processing a video, obtaining data, and analyzing the data to derive domain-specific information. In recent years, examining live surveillance films for recognizing events that occur within its coverage area has become increasingly important, in addition to analyzing any video for information retrieval. Face identification from recordings is easy when training models are used. Estimating skin colour aids hand detection. This study project aims to detect suspicious acts such as object exchange, new person admission, peeping into another's answer sheet, and person exchange using footage captured by a security camera during exam. People are paying greater attention to the fairness of exams these days, therefore detecting anomalous conduct to ensure examination order is important. Most of the current methodologies propose a fraudulent model. We extract the optical flow of video data in this system and present a 3D convolutional neural networks model to solve the problem. Face recognition, hand recognition, and detecting contact between the face and hands of the same person and that of distinct people are all required. The automation of suspicious activity detection' will aid in lowering the mistake rate associated with manual monitoring.*

Keywords: Video Surveillance, Anomaly Detection, ANN-Based Sparsity Learning, Suspicious Activity

I. Introduction

Person identification relies heavily on the human face and behavioral patterns. Such identification depend on visual info. Surveillance videos give such visual information that can be viewed in real time or recorded for future reference. Motion detection, human activity prediction, person identification, anomalous activity recognition, vehicle counting, people counting in congested settings, and other applications can all benefit from video analytics. The two parameters employed for human identification in this domain are technically known as face recognition and gait recognition, respectively.

Face recognition is the more adaptable of the two techniques for automatic human identification in surveillance videos. Face recognition can be used to anticipate a person's head orientation, which can then it used to expect their behavior. Many combine motion detection with face recognition. Identify people and identify them, and detect the presence or absence of a person at a certain location and time. Furthermore, human interactions such as delicate contact between two people, head motion detection, hand gesture identification, and estimation are employed to create a system that can successfully discover and recognise suspicious behavior among students in an examination.

This system provides a way to detect suspicious human activity through facial recognition. Video processing is used in two main areas, such as security and research. One such technology uses smart algorithms to monitor live video. Computational and time complexity are some of the key factors in designing a real-time system. It uses an algorithm that requires relatively little time complexity, consumes less hardware resources, and gives good results. this system provides bank robbery detection, patient monitoring systems, station suspicious activity detection etc.

II. Literature Survey

Bin Zhou, Li FeiFei ,Eric P Xin, "Online detection of anomalous events in video with dynamic sparse coding". The author proposes improved real-time detection of anomalous events in video streams. This is a lack of sufficient training

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information, variability in both normality and anomalous definitions, time constraints, and parametric models. They are fully unsupervised dynamic sparse for detecting anomalous events in video based on the online sparse reconstructability of query signals from atomically learned event dictionaries that form a sparse coding. Based on that common events in a video are likely to be from the event dictionary, but unusual events are not, our algorithm uses both sparse reconstruction code and an online dictionary. It is derived and updated using a large convex optimization formulation that can be used together. Our algorithm is not fully monitored and there are no assumptions about what anomalous events will look like or what the camera is set to. The fact that the base dictionary is updated online as the algorithm monitors more data avoids problems with conceptual discrepancies. Experimental results from hours of real-world surveillance video and some YouTube videos show that the proposed algorithm reliably identifies anomalous events in video sequences and is superior to current state-of-the-art methods.

The Mohammad Sabokrou, Mahmood Fathy, Mojtaba Hoseini, Reinhard Klette, "Real-time anomaly detection and localization in crowded scenes This article proposes real-time anomaly detection and localization methods for crowded scenes. Local and global features are based on the similarity between adjacent patches and features learned unsupervised using a sparse autoecoder. Experimental results show that our algorithm is comparable to the, but is even more efficient. Experiments have confirmed that the system can detect anomalies as soon as they appear in the video.

Cewu Lu. Jianping Shi, Jiaya Jia, "Detection of anomalous events at 150 FPS in MATLAB". Rapid detection of anomalous events meets the growing demand for processing large volumes of surveillance video. Based on the inherent redundancy of the video structure, we propose an efficient learning framework for sparse combinations. Achieve good performance during the recognition phase without sacrificing the quality of the results. The new method effectively transforms an originally complex problem into a problem that contains only a few free small-scale least-squares optimization steps, thus ensuring a short run time. Our method achieves high recognition of benchmark datasets at an average speed of 140,150 frames per second when calculated using MATLAB on a regular desktop PC.

MahmudulHasan, Jonghyun Choiy, Jan Neumanny, Amit K. Roy Chowdhury, Larry S. Davisz, "Learning Temporal Regularity in Video Sequences". Identifying meaningful activity in long video sequences is a difficult problem because the definition of "meaningful" is ambiguous and the scene is distorted. to tackle this problem, we use multiple sources with very limited monitoring to learn a generative model of regular movement patterns (called regularity). In particular, we propose two methods based on the autoencoder. This is because it works with little or no monitoring. First, learn about autoencoders that are fully connected on top of traditional handmade spatiotemporal local features. Then build a fully convolutional feedforward autoencoder to train both local features and classifiers as an end-to-end learning framework. Our model can capture regularity from multiple datasets You assess our process qualitatively and quantitatively, demonstrating its consistency. Create videos on many fronts for competitive performance on anomaly detection datasets application.

III. Architecture Of Proposed Model

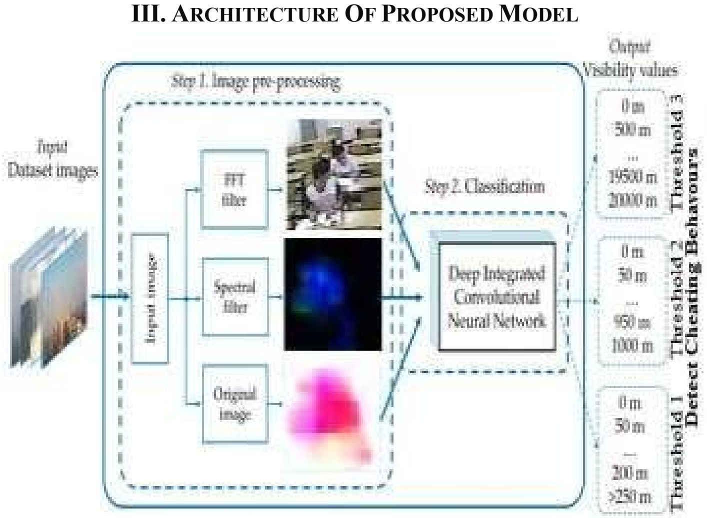

Figure 1: Proposed System Architecture

In this system, we extract the optical flow of video data and propose a Convolution Neural Networks model to deal with the problem. The proposed system extracts the spatial and temporal features from video data and these features can be directly feed into the classifier for model learning or inference. Experiments on our own dataset demonstrate that the suggested model outperforms current methods.

Abnormal Behaviour

Abnormal behavior can be identified as irregular behavior from normal. During the exam, you will mainly pay attention to unusual behaviors such as leaning, reaching out, turning, and going in and out of the classroom. Frequent anomalous behavior over a period of time is likely to cause problems during the investigation. For example. In the meantime, the electronic monitor detects anomalous behavior and notifies the supervisor to address the issue in time.

Learn that 3D-CNN can extract spatial and temporal information from video clips. In this article, we have proposed a new C3D model for detecting anomalous behavior in surveillance video. Table I shows the architecture of the 3DCNN model. Since the CNN model is a binary classification, accuracy and recognition are the usual scoring indexes. Compare our method with other methods. Way 1 uses the first method to obtain the "flow image," while method 2 employs the second method.

Experiments have shown that our method performs better than other methods. Method 2 is more accurate and accurate, and Method 1 is more reproducible. In summary, our model can handle many types of anomalous behavior and outperforms current methods. Four types of actions are recognized. If the subregion sample prediction is positive, it will be marked with a red box in the corresponding test clip and the system will save the test clip.

IV. Result and Discation

The result of the proposed system is a neural network that uses image processing (CNN) to identify human behavior, detect and identify anomalous behavior in the research section, examine the optical flow of video data, and solve problems. It is to propose a convolutional model.

methods	Accuracy	Precision	Recall rate
Motion blob[4]	-	-	82%
Template matching[5]	-	86%	-
Skin+SVM[7]	84%	-	-
Our method1	87.6%	80.4%	**84.3%**
Our method2	**89.8%**	**86.5%**	83.2%

Figure 2: Performance of Different Methods

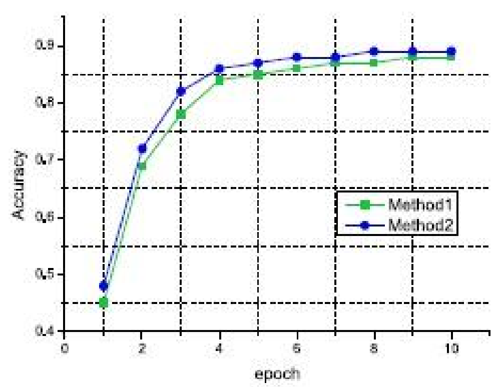

Figure 3: The performance of two “flow image” on 3D CNN

V. Conclusion

We propose a unified framework based on deep learning and detect anomalous events from the test site. The proposed system consists of three blocks designed to implement the three keys for detecting neural network anomalies. In short, Motion Fusion blocks are designed to maintain a temporal and spatial connection between motion and appearance cues.

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Feature transfer blocks are used to extract characteristic features by leveraging the portability of neural networks from different tasks / domains. Coding blocks are new LSTMs for fast sparse coding, where you can enjoy fast inference and end-to-end learning. Extensive experiments show the promising performance of our method in detecting anomalous events in image reconstruction and monitoring.

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