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SUSPICIOUS ACTIVITY DETECTION FROM VIDEOSURVEILLANCE

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ABSTRACT

In India, an average of 380 million criminal activities is recording yearly. With the rise in criminal activity in urban and suburban areas, it is more important than ever to prevent them and detect them. Because it's nearly impossible for humans to keep an eye on these surveillance cameras all the time. It necessitates a workforce and their constant attention in order to determine whether the captured activities are unusual or suspicious. The most recent research aims to incorporate computer vision, image processing, and artificial intelligence into video surveillance applications. Even though there have been many advances in the acquisition of datasets, methods, and frameworks, there are few papers that provide a comprehensive picture of the current state of video surveillance systems. This paper provides a Deep learning algorithm of suspicious activity detection. This algorithm displays which frame and part of unusual activity, which aids in the quicker assessment of that unusual action as unusual or suspicious. The goal is to detect signs of aggression and violence in real time, allowing irregularities to be distinguished from normal patterns by utilizing deep learning models in identification or classification of high movement frames, where we can set off a detection alert in the event of a threat, alerting us to suspicious activity at a specific point in time.

Keywords: *Unusual human activity, Detection, Face recognition, CNN, Deep Learning, Image processing.*

1. INTRODUCTION

Now a day's human behavior and activity pattern research are more important in surveillance. Detection and tracking the object of behavior is important factor in video surveillance system. Over a last decade it has been seen the rapid growth and an extraordinary improvement in real- time video analysis. Main goal of video analytics is to identify the potential threaten events with less or no human intervention. Video surveillance is a prominent area of research which includes recognition of human activities and categorization of them into usual, unusual or suspicious activities. The primary goal is to find unexpected events in videos using a surveillance system that might be human, semi-automatic, or fully automated. Humans are completely reliant on the manual surveillance system. Analyzing behavior or distinguishing abnormal from regular conduct required physical labor. Semiautomatic systems require less human interaction, whereas fully automatic video surveillance systems do not require human intervention to make decisions. Face recognition is another approach for detecting intrusions. A criminal dataset is built and saved in the system. Python's OpenCV package is used to recognize faces. This recognition procedure involves internal picture processing and deep learning. The system becomes more accurate as a result of such advanced technology.

2. PROBLEM STATEMENT

For activity-based analysis, activity detection is a critical component of video surveillance systems. Traditionally, human operators evaluated the video stream from CCTV cameras. These operators keep an eye on numerous displays at once, looking for unusual activity. This is a tedious and ineffective method of monitoring. Because humans are likely to make mistakes, this method is inefficient. Multiple screens cannot be monitored by a human operator at the same time. As a result, obtaining timely and reliable activity data becomes extremely challenging. This is why we require an automated method, and the suspicious activity detection system has provided us with the ideal option. Suspicious activity detection systems based on video can either replace or assist human operators in monitoring odd behavior. They get a quick and precise answer from the system.

3. OBJECTIVE

The Objective is to create a system to automate the task of analyzing video surveillance.We will analyze the video feed in real-time and identify any abnormal activities like theft or robbery and tracks objects within existing CCTV systems and automatically detects suspicious behaviors and other violations of established security policies and procedures. An additional intention of this system is that it reduces people's cost with advanced technology.

4. RELATED WORK

Activity recognition is a broad phrase that refers to a variety of actions that require different detection methods. Crowd behavior, such as crowd movement, for example, necessitates methodologies that capture the crowd's overall features rather than the individuals inside it. Short-term human behaviors, on the other hand, such as gymnastic exercises and gestures, are frequently simpler and even periodic. These are of a different type, requiring separate detection approaches that include body models and space–time forms. This method focuses on detecting suspicious behavior in systems automatically. This type of conduct might happen over a long length of time. They frequently involve several objects, necessitating the consideration of issues such as finding paths, identification tracking, and object classification.

5. EXISTING SYSTEM

A semantic based approach was proposed in [1]. Background subtraction was used to identify foreground objects in the collected video data. Using a Haar-like method, the objects are identified as living or non-living after subtraction. The Real-Time blob matching technique was used to track the objects. This paper also discovered fire detection.

Based on the analysis of movement information from video sequences, a method was created to discriminate abnormal events from regular events. The HMM approach was used to train the histograms of the video frame's optical flow orientations. It compares the acquired video frames to the existing normal frames and determines their resemblance [2].

People tracking could be used to discover unexpected happenings in video footage. Using the background subtraction method, human persons are spotted in the footage. CNN was used to extract the features, which were then fed into a DDBN (Discriminative Deep Belief Network). The DDBN is also given labelled footage of some questionable situations, and their features are extracted. Then, using a DDBN, features derived using CNN were compared to features recovered from a labelled sample video of categorized suspicious behaviors, and numerous suspicious activities were discovered from the video [3].

To prevent audience or player violence in sports, a real-time violence detection system based on deep learning was developed. Frames from real-time videos were retrieved in a spark environment. If the system detects football violence, security personnel will be notified. The system recognizes video behaviors in real time and warns security forces, preventing violence from occurring in the first place. For detecting violence at football stadiums, the VID dataset was employed, and it had a 94.5 percent accuracy. [4].

Different components for visual data processing make up anomalous event detection. Human behavior was detected by using deep architectures. The UT Interaction dataset was used for the proposed CNN and LSTM models. One of the system's flaws was that it was difficult to distinguish between human activities such as pointing and punching. [5].

Using a deep spatiotemporal approach to crowd behavior, the films are divided into three categories: pedestrian future path prediction, destination estimation, and holistic crowd behavior. There are three distinct categories. With the help of a convolutional layer, spatial information from video frames was retrieved. The sequence of temporal motion dynamics was learned or understood using LSTM architecture. PWPD, ETH, UCY, and CUHK were data sets used in the proposed system. By employing deeper architectures, the system's accuracy can be increased. [6].

An unauthorized entry into a restricted location was detected using the Advance Motion Detection (AMD) method [7]. The object was discovered using background subtraction in the first phase, and the object was retrieved from frame sequences in the second phase. Suspicious activity was discovered in the second phase. The system's advantage was that the method worked in real time and was computationally simple. However, the system's storage capacity was restricted, and it could be used in surveillance regions with a high-tech form of video capture.

For recognizing human behavior analysis from movies, the majority of the publications described above used computer vision employing various algorithms or neural networks. To extract the motion pattern and interpret the evolution of characteristics in a video series, computer vision technologies require a lot of pre-processing. In addition, background removal is based on a static backdrop hypothesis that is frequently inapplicable in real-world circumstances. The majority of problems in the actual world arise in crowds. When it comes to crowd management, the approaches mentioned above are inefficient. Based on the literature review, a deep architecture for suspicious activity prediction can be modelled using CNN and DDBN, improving the system's accuracy. In deep learning approach, most of the papers detect only the suspicious activity. So,an efficient mechanism is needed to alert the security in the case of any suspicious behavior.

6. PROPOSED SYSTEM

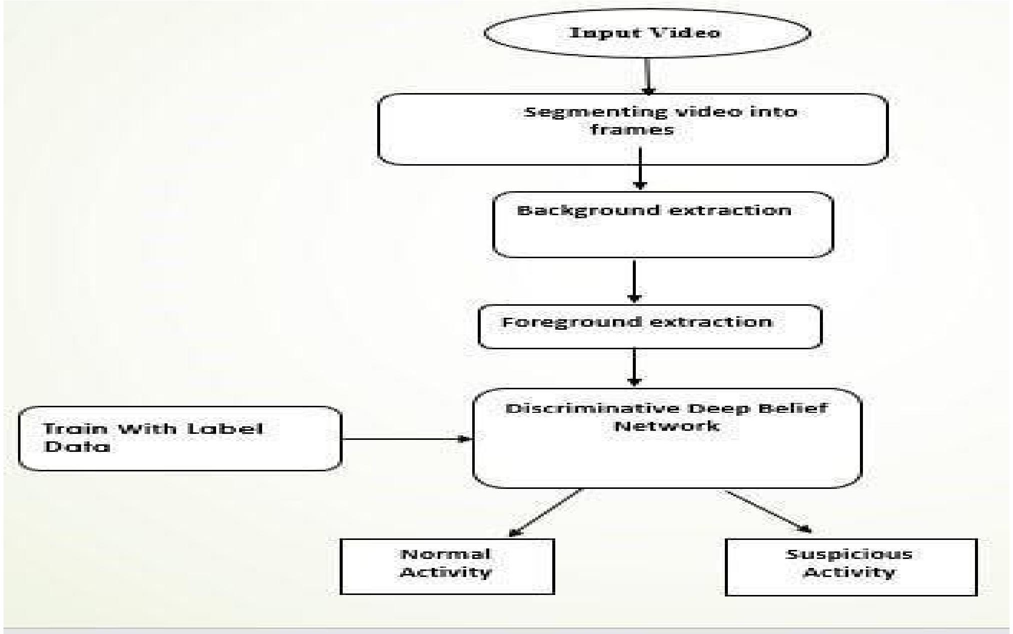
Introduction:

Detection of suspicious human activities in automated video surveillance applications is of greatpractical importance. Trusted classification of suspicious human movements can be very difficult due to the random nature of human movements. The Manual surveillance system is very much dependent on human. It requires manual labor to analyze behavior or to make difference between abnormal and normal behavior. The Semi-automatic system required less human intervention while fully automatic are intelligent and smart video surveillance system which doesn't require human intervention and burden of analyzing the footage to detect unusualactivities in a huge set of surveillance footage and make a normal or abnormal and provide the results with the best accuracy. Surveillance cameras have been installed everywhere today. Even though we are able to monitor the activities of the people through those cameras, we may not find the unusual activities directly by looking at them. Hence, we propose an automated system that can detect any unusual activities that happen at any point of time in the surveillance footage. The basic approach of this project is to create a machine learning model which gets trained with the pictures of suspicious activities like people carrying guns or wearing masks, etc. After the model has been properly trained, the video which is to be analyzed is given as theinput. The video will get divided into a number of images called frames and these frames will now be analyzed to decide which image contains unusual activities.

Compared to the existing systems discussed above the proposed system has this additionality:

- Data processed capacity will be from 15-20 Gb per day
- Motion Estimation for Human Activity Surveillance
- Automated real time detection of suspicious behavior in public transport areas.
- Fast Anomaly Detection and Localization in Crowded Scenes. • It has accuracy rate of 70 to74%

7. ARCHITECTURE

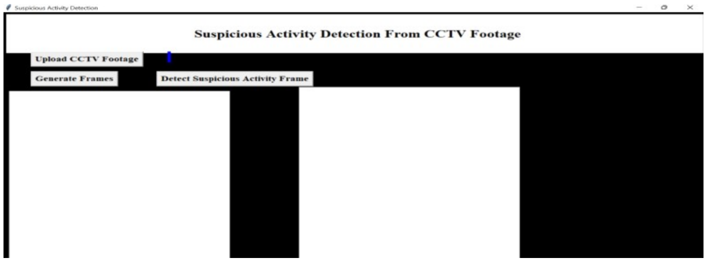


8. WORKING

The proposed system will use footages obtained from CCTV camera for monitoring suspicious activities in a public and private environment when any suspicious event occurs. And it's working goes like this:

Run the Application:

We are going to run designed and developed code firstly. And it looks like this


Suspicious Activity Detection
Suspicious Activity Detection From CCTV Footage
Upload CCTV Footage
Generate Frames
Detect Suspicious Activity Frame

EXECUTION STEPS:

Upload Surveillance Video: Upload complete footage of particular event or date into theapplication.

Segmenting Video into Frames: Then, that video is converted into frames using OpenCV, Grabcut algorithm and Gaussian mixture model and using h5py module generated are stored in afolder

Background Extraction: From above extracted frames using OpenCV and Grabcut features likepersons, things and their motions were acquired.

Foreground Extraction: From above extracted frames using OpenCV and Grabcut features likepersons, things and their motions in the foreground were acquired.

Comparison & Classification: Here, we use Discriminative Deep Belief Network Algorithm. Itwill be trained with anomalies activities in prior and also it remembers past experiences for future. Based on them, it will classify the normal and abnormal activities once system provides features acquired using CNN from Surveillance.

9. RESULT

After clear understanding and execution of the project. It has classified normal and suspicious activities. These were the Suspicious Activities detected fromthe uploaded CCTVvideo Surveillance

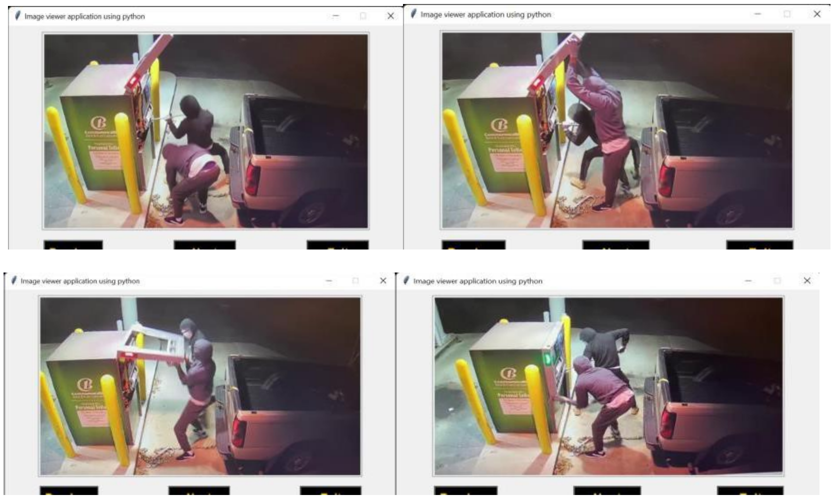


Image viewer application using python
Image viewer application using python
Image viewer application using python
Image viewer application using python

10. CONCLUSION

The research suggests employing a convolutional neural network for feature extraction and a discriminative deep belief network for action classification to detect suspicious behavior from surveillance video. By using a deep-learning-based model, the suggested approach achieves better categorization than earlier efforts. To begin, we divided video into frame segments and used CNN to extract features from the background and foreground. The output is then input into a trained DDBN, which classifies the recognized behaviors as normal or suspicious. The deep learning model guarantees more precision and fewer false positives.

11. FUTURE SCOPE

As part of the project's future work, our research advises experimenting with other structures and comparing them in order to enhance speedier detections. Due to a lack of time and resources, we were only able to complete the research to the level described in this report, allowing for more research into how to improve the identification of suspicious activities in real time. Other features, other than surveillance films, could be used to improve real-time detections. The method to detect suspicious activities described in this paper does not address the issue of explosives detection. As a result, more research on this topic can be done to advance the field.

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