DEEP LEARNING APPROACH FOR SUSPICIOUS ACTIVITY DETECTION FROM SURVEILLANCE VIDEO

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ABSTRACT

With the increasing in the number of anti-social activates that have been taking place, security has been given utmost importance lately. Many Organizations have installed CCTVs for constant Monitoring of people and their interactions. For a developed Country with a population of 64 million, every person is captured by a camera 30 times a day. A lot of video data generated and stored for a certain time duration. A 704x576 resolution image recorded at 25fps will generate roughly 20GB per day. Constant Monitoring of data by humans to judge if the events are abnormal is near impossible task as requires a workforce and their constant attention. This creates a need to automate the same. Also, there is need to show in which frame and which part of it contain the unusual activity which aid the faster judgment of the unusual activity being abnormal. This is done by converting video into frames and analyzing the persons and their activates from the processed frame. Machine learning and Deep Learning Algorithms and techniques support us in a wide accept to make Possible.

1 INTRODUCTION

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. In this domain, the two factors which are used for person 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 presence or absence of a person at a specific place and time. In addition, human interactions such as subtle contact among two individuals, head motion detection, hand gesture recognition and estimation are used to devise a system that can identify and recognize suspicious behavior among pupil in an examination hall successfully. This paper provides a methodology for suspicious human activity detection through face recognition.

Video processing is used in two main domains such as security and research. Such a technology uses intelligent algorithms to monitor live videos. Computational complexities and time complexities are some of the key factors while designing a real-time system. The system which uses an algorithm with a relatively lower time complexity, using less hardware resources and which produces good results will be more useful for time-critical applications like bank robbery detection, patient monitoring system, detecting and reporting suspicious activities at the railway station, etc.

Manual monitoring of exam hall through invigilators and manual monitoring of exam hall through surveillance videos is performed throughout the world. Monitoring an examination hall is a very challenging task in terms of man power. Manual monitoring of examination halls may be prone to error during human supervision. Such a system when implemented as an 'automatic suspicious activity detection system' will not only help in detecting suspicious activities but also helps in minimizing such activities. Moreover, the probability of error will be much lesser. This system will serve as a useful surveillance system for educational institutions.

This paper 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.

The Suspicious Human Activity Detection system aims to identify the students who indulge in malpractices/suspicious activities during the course of an examination. The system automatically detects suspicious activities and alerts administration.

2. LITERATURE SURVEY AND RELATED WORK

2.1. Suspicious Activity Detection in Surveillance Footage

Authors: Satyajit Loganathan, Gayashan Kariyawasam.

Abstract: Suspicious activities are of a problem when it comes to the possible risk it brings to humans. With the increase in illegal activities in national and suburban areas, it's necessary to determine them to be suitable to minimize similar events. Early days surveillance was done manually by humans and where a tiring task as suspicious activities were uncommon compared to the usual activities.

2.2. Suspicious Activity Detection from Videos using YOLOv3

Authors: Nipunjita Bordoloi; Anjan Kumar Talukdar; Kandarpa Kumar Sharma

Abstract: Human activity detection for video system is a self-acting way of processing video sequences and making an intelligent decision about the actions in the video. It's one of the growing areas in Computer Vision and Artificial Intelligence. Suspicious activity detection is the process of detecting unwanted human activities in places and situations. This is done by converting video into frames and analyzing the activities of persons from the reused frames.

2.3. Detection of Suspicious Activity and Estimate of Risk from Human Behavior shot by Surveillance Camera

Authors: Miwa Takai

Abstract: In these days, surveillance camera system prevails as a security system at high speed because this system can cover from remote places using Web camera attached to video observer by network. Also, digital stuff similar as Web camera, and hard part drive are mass- produced, and are put up at low price. And, performance gain of these digital stuff improves at a rapid-fire rate. Current surveillance camera system shows dynamic images from some oversight areas shot by multiple Web cameras at the same time. Also, this system makes viewer's mind and body tired because he/she has to watch enormous number of dynamic images been constantly modernized. Also, this system has a serious problem, which is a viewer slips over predictor of crime. Crowd consistence Anal.

Abstract: This is not just important for the convenience of the people but also for their security. Understanding a video footage and classifying an activity as normal or suspicious especially in densely packed regions is possible and has been demonstrated in this paper. The proposed system makes use of the YOLOv3 algorithm for object detection. First the features are computed from the image. Then based on the detected features, the classifier makes a prediction. Depending on the object detected, the

algorithm classifies a frame as suspicious or normal. Crowd density has been calculated by detecting the number of people in a frame and suspicion detection has been performed by analyzing a frame for suspicious objects like isolated bags, knives and guns.

3 EXISTING SYSTEM

Advance Motion Detection (AMD) algorithm was used to detect an unauthorized entry in a restricted area. In the first phase, the object was detected using background subtraction and from frame sequences the object is extracted. The second phase was detection of suspicious activity. Advantage of the system was the algorithm works on real time video processing and its computational complexity was low. But the system was limited in terms of storage service and it can also be implemented with hi-tech mode of capturing of videos in the surveillance areas.

4 PROPOSED WORK AND ALGORITHM

The proposed system will use footages obtained from CCTV camera for monitoring students' activities in a campus and send message to the corresponding authority when any suspicious event occurs.

The architecture has different phases like video capture, video pre-processing, feature extraction, classification and prediction. The system classifies the videos into three classes.

1)Students using Mobile phone inside the campus- Suspicious class.

2)Students fighting or fainting in campus-Suspicious class.

3)Walking, running- Normal class.

5 METHODOLOGIES

MODULES

PYTHON

Python is a general-purpose interpreted, interactive, object-oriented, and high-level programming language. An interpreted language, Python has a design philosophy thatemphasizescode readability (notably using whitespace indentationtodelimit code blocks rather than curly brackets or keywords), and a syntax that allows programmers to express concepts in fewer lines of code than might be used in languages such as C++or Java. It provides constructs that enable clear programming on both small and large scales. Python interpreters d development model, as do nearly all of its variant implementations. Python is managed by the non-profit Python Software Foundation. Python features a It supportsmultiple programming\paradigms,including objectoriented, imperative, functional and procedural, and has a large and comprehensive standard library.

DJANGO

Django is a high-level Python Web framework that encourages rapid development and clean, pragmatic design. Built by experienced developers, it takes care of much of the hassle of Web development, so you can focus on writing your app without needing to reinvent the wheel. It's free and open source.

Django's primary goal is to ease the creation of complex, database-driven websites. emphasizes reusability and "pluggability" of components, rapid development, and the principle of don't repeat yourself. Python is used throughout, even for settings files and data models.

Django also provides an optional administrative create, read, update and delete interface that is generated dynamically through introspection and configured via admin models.

RESULTS AND DISCUSSION

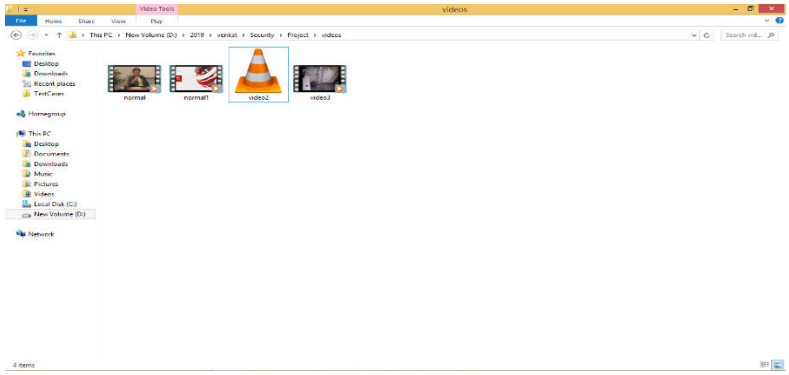

Fig1 : Double click on 'run.bat' file from project folder to start project execution. We will get below screen.

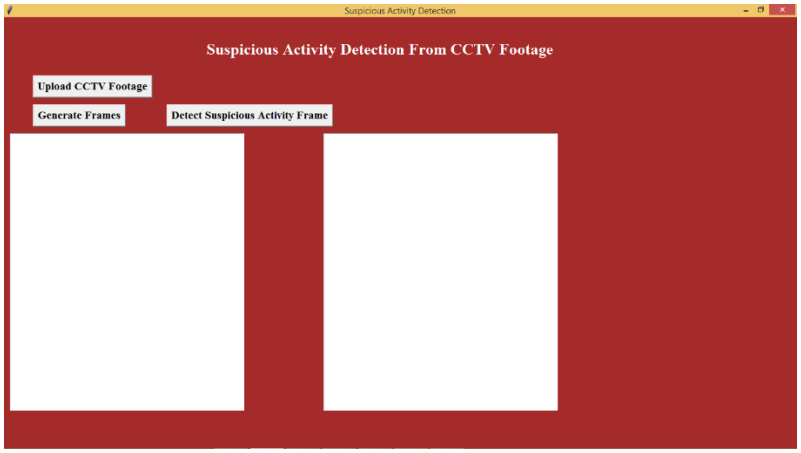

Fig 2: Click on 'Upload CCTV Footage' button to upload video.

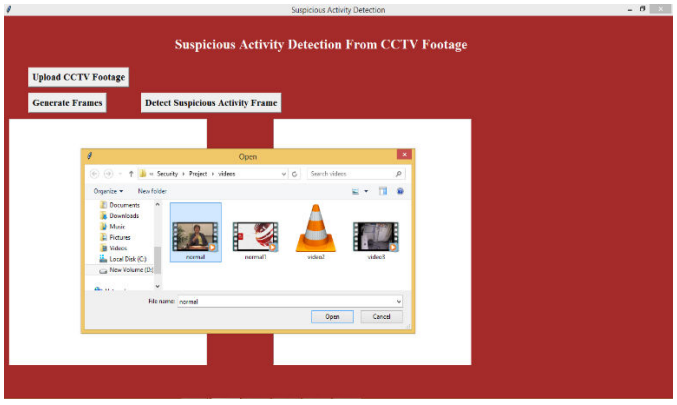

Fig 3: In above screen I am uploading one normal video. After uploading video click on 'Generate Frames' button to generate frame.

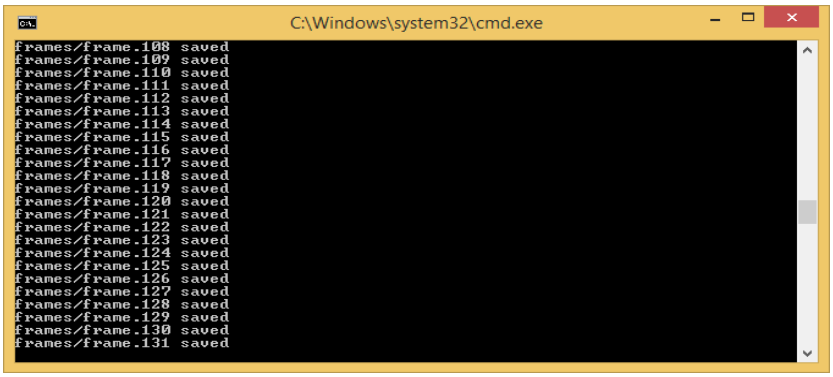

Fig 4: In above

black screen we can see extracted frames are saving inside 'frames' folder frame no. Now we see frames folder below which has images from video

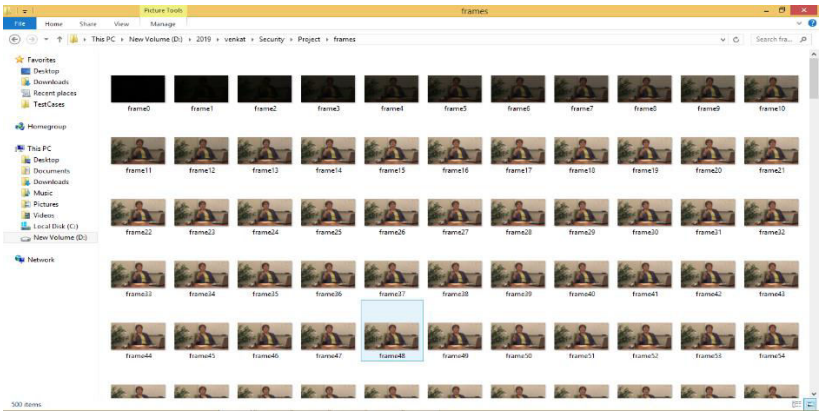

Fig 5: In above folder screen we can see all images from video extracted. After frame extraction will get below screen.

Fig 6: Now click on 'Detect Suspicious Activity Frame' button to start monitoring frames for suspicious activity.

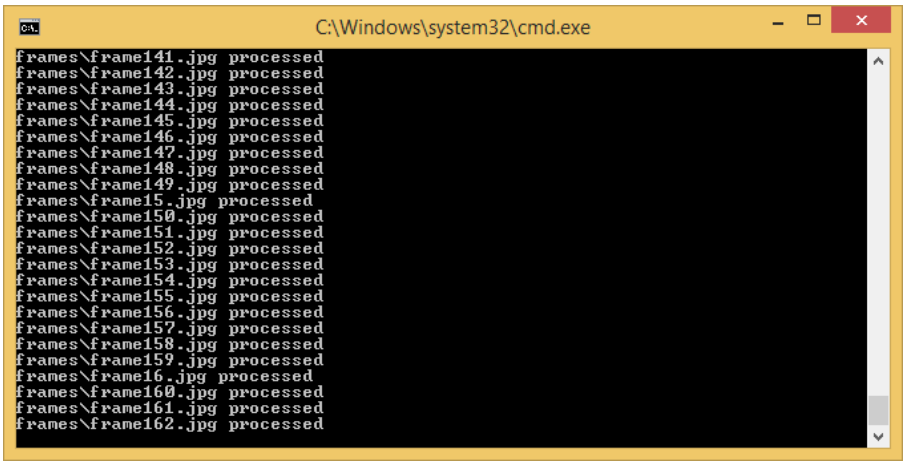

Fig 7: In above black console window, we can see processing of each frame to detect suspicious activity.

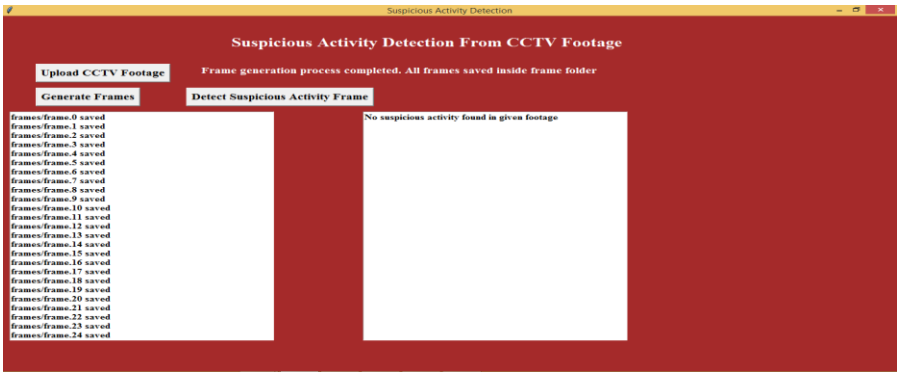

Fig 8: In above screen we can see frames scanned and no suspicious activity found. Now we will upload another video and check status.

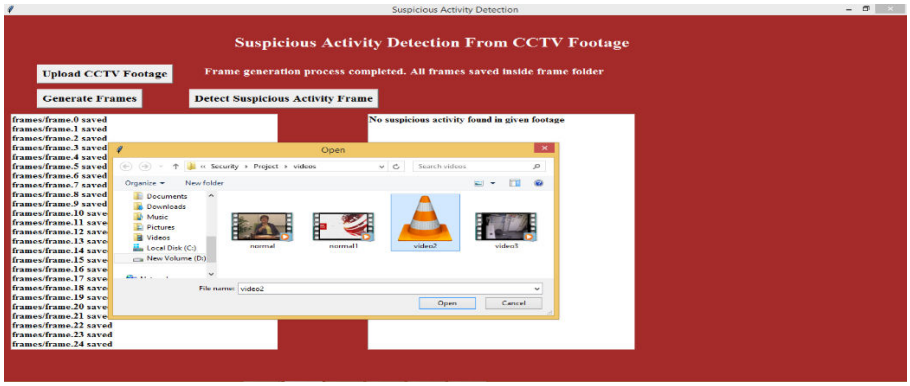

Fig 9: In above screen I am uploading 'Video2' and then extract frames.

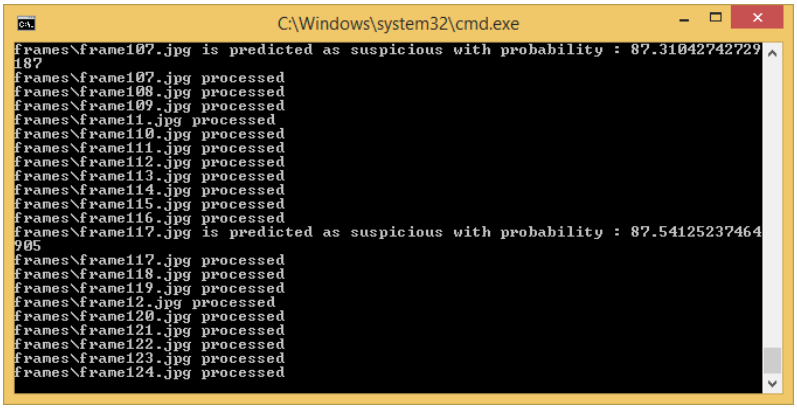

Fig 10: In above screen for uploaded video, we can see suspicious activity found at farme117.jpg. After scanning all images, we will get below details screen. Now in below screen we can see frame117.jpg image from frames folder.

Fig 11: In above screen frame117 showing one image of a person with face covering. Similarly, we can see all frames details in below screen which has such activities

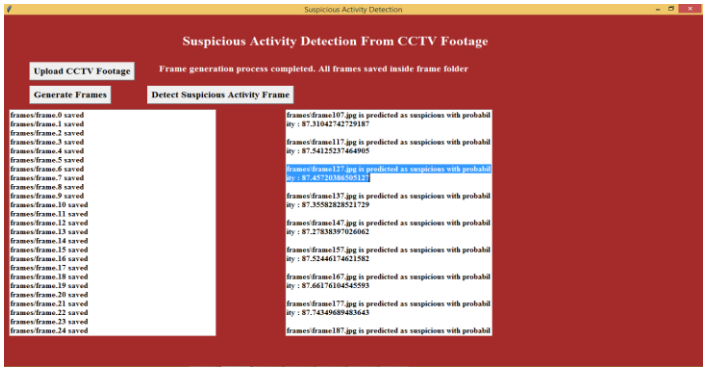

Fig 12: In above screen in right text area, we can see details of all frames which has such activities.

Note: you too can upload your own videos and check but your videos must have person covering their faces or doing shop lifting robbers videos. Your videos must be like similar one which I used in this project

6.CONCLUSION AND FUTURE SCOPE

In present world, almost all the people are aware of the importance of CCTV footages, but most of the cases these footages are being used for the investigation purposes after a crime/incident have been happened. The proposed model has the benefit of stopping the crime before it happens. The real time CCTV footages are being tracked and analyzed. The result of the analysis is a command to the respective authority to take an action if in case the result indicates an untoward incident is going to happen. Hence this can be stopped.

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7 REFERENCES

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