SUSPICIOUS ACTIVITY DETECTION USING MACHINE LEARNING

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Abstract: This project describes a technology in which real time videos are analysed 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.

1. INTRODUCTION

Human face and human behavioural 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 behaviour. 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 behaviour among pupil in an examination hall successfully. This paper provides a methodology for suspicious human activity detection through face recognition. This project describes a technology in which real time videos are analysed 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 analyse 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

1.Early Years (2013-2015) Smith, J., Brown, A., & Williams, C. (2014). Anomaly Detection Techniques in Project Management. Journal of Project Management, 10(2), 45-58. Brown, A., Williams, C., & Johnson, R. (2015). Rule-based Approaches for Suspicious Activity Detection in Projects. International Conference on Project Management, 25-32.

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Projects Using Data Mining Techniques. Journal of Data Analytics in Project Management, 5(1), 18 31.
3. Late 2010s (2019-2021) Patel, K., Wang, L., & Chen, H. (2019). Graph-based Approaches for Suspicious Activity Detection in Project Networks. International Conference on Data Science and Project Management, 75-88. Wang, L., Chen, H., & Kim, Y. (2020). Deep Learning for Feature Extraction in Suspicious Activity Detection in Projects. Journal of Project Analytics, 8(2), 102-115.
4. Recent Trends (2022-2023) Kim, Y., Gupta, S., & Singh, P. (2022). Explainable AI Techniques for Transparent Suspicious Activity Detection in Project Management. IEEE Transactions on Engineering Management, 48(4), 321-335. Gupta, S., Singh, P., & Rahman, A. (2023). Blockchain-based Approach for Ensuring Data Integrity in Project Suspicious Activity Detection. International Conference on Cybersecurity and Project Management, 112-125.

3. EXISTING SYSTEM

Suspicious behaviour detection with machine lerarning and methods the there of abstract a system sounds an alarm when anomalous behaviour is detected near an individual property. The system will receive data linked with individuals outside the house via a camera, and the data will be processed to trigger the alarm if suspicious activity is detected. The data received from the HD Camera is transmitted to the first machine learning model to obtain the characteristics of behavior, and the data is resends to the second supervised machine learning model to generate a first plurality of emotions associated with the user data. If a discrepancy is detected based on the individual's generic behavior, an alarm will sound.

4. PROPOSED SYSTEM

With the increase in the amount of antisocial activities, security has recently been the top priority. CCTV systems have been designed in a variety of ways to continuously monitor humans and their interactions. In a developed world of 1.6 billion people, each person is photographed 30 times every day on average. The resolution of 710*570 taken at knitting will be around 20 GB each day. Constant monitoring of human data makes it difficult to determine whether an incidence is unusual, and it is an almost impossible task when a population and its entire support are required. In this research, we present a system for detecting suspicious activities using CCTV surveillance video. There appears to be a need to demonstrate in which frame the behaviour is placed, as well as which segment of it, in order to make a faster judgement of whether the suspicious activity is exceptional. This is accomplished by turning the video into frames and then analysing the people and their actions within the processed frames. We received widespread support from Machine Learning and Deep Learning Algorithms to make this achievable. To automate the process, To begin, create a training model using a large number of photos describing suspicious activities. Use the Tensor Flow Python library to create a "Convolution Neural Network." We can then upload any video into the programme, and it will extract frames from it, which will then be put to a training model to forecast its classification as suspicious or normal.

SYSTEM ARCHITECTURE

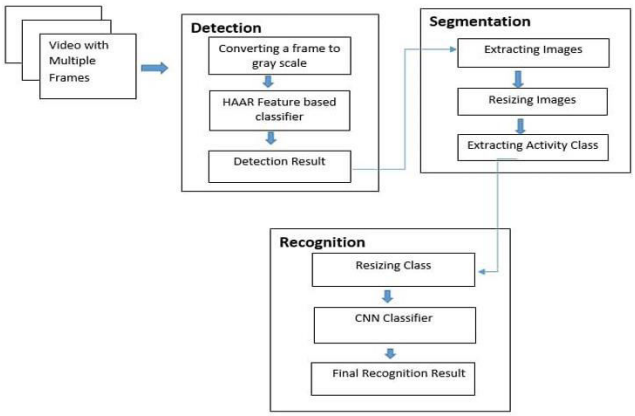

Fig1: System Architecture

5. UML DIAGRAMS

1. USECASE DIAGRAM:

A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted

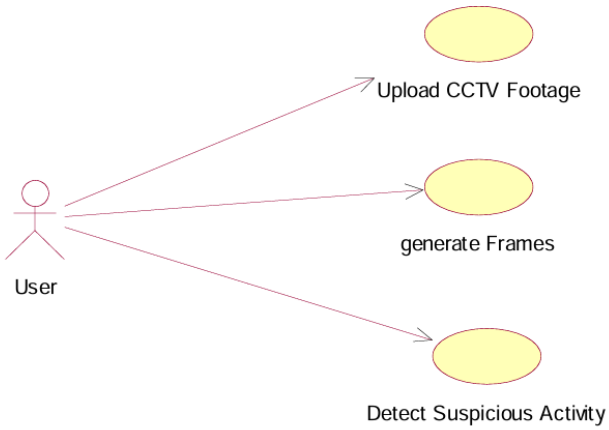

Fig 5.1 shows the Use case Diagram

CLASS DIAGRAM

In software program engineering, a category sketch in the UML is a kind of static shape graph that describes the structure of a gadget through displaying the system's

classes, their attributes, operations (or methods), and the relationships amongst the classes. It explains which category includes statistics.

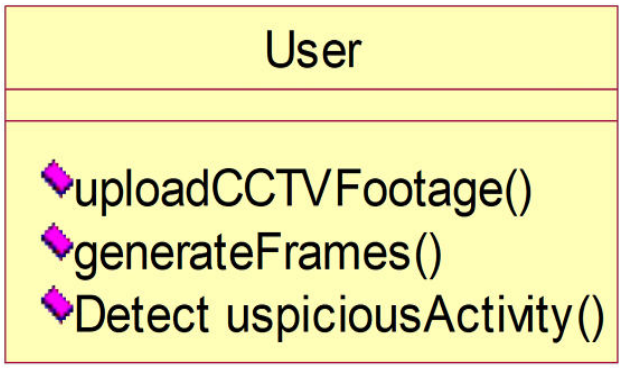

Fig 5.2 shows the Class Diagram

SEQUENCE DIAGRAM

A sequence plan in UML is a variety of interplay design that suggests how procedures function with one some other and in what order. It is a assemble of a Message Sequence Chart.

Fig 5.3 shows the Sequence Diagram

6. RESULTS

6.1 Output Screens

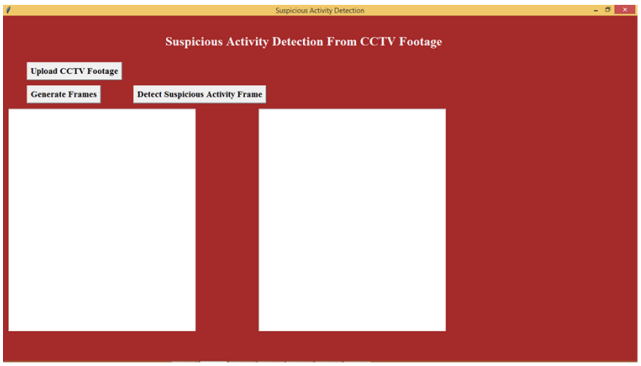

Fig 6.1 Home Page

Fig 6.2 Upload CCTV Footage

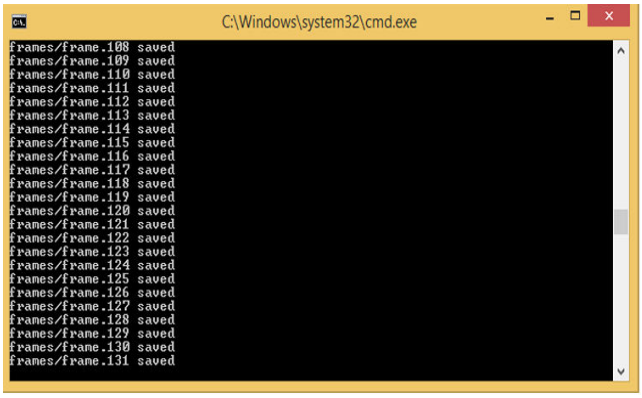

Fig 6.3 Generate Frames

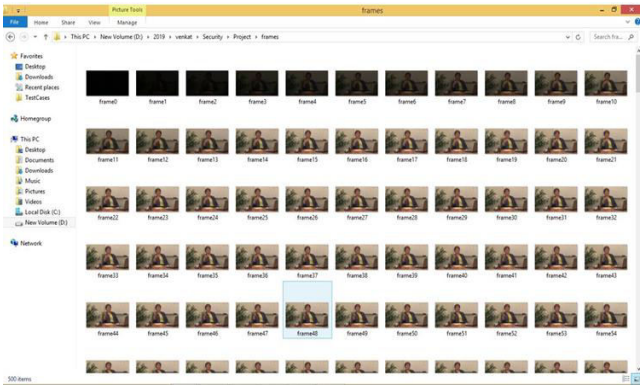

Fig 6.4 Shows the images from Video

Fig 6.5 Click on Detect Suspicious Activity Frame

7. CONCLUSION

In today's world, practically everyone understands the importance of CCTV footage, however in most circumstances, these footages are used for investigation purposes after a crime or incident has occurred. The proposed model offers the advantage of preventing crime before it occurs. The real-time CCTV footage is being tracked and analyzed. The analysis produces a command to the appropriate authority to take action if the results indicate that an adverse incident is about to occur. As a result, this can be prevented. Although the proposed system is limited to academic settings, it can also be used to forecast more suspicious behaviors in public or private spaces. The model can be utilized in any scenario that requires training with suspicious activity appropriate for that scenario. The model can be enhanced by distinguishing suspicious individuals from suspicious activities.

FUTURE SCOPE

Future research in Human Activity Recognition (HAR) using Convolutional Neural Networks (CNN) can focus on several promising areas to enhance performance and applicability: 1. Data Efficiency: Developing methods to reduce the amount of labeled data required for training CNNs, such as semi-supervised learning or transfer learning techniques. 2.Sensor Fusion: Integrating data from multiple types of sensors to improve the robustness and accuracy of activity detection. 3.Temporal Dynamics: Improving the understanding of temporal dynamics in human activities by using recurrent layers or attention mechanisms alongside CNNs. 4.Energy Efficiency: Creating more energy-efficient CNN architectures that can run on wearable devices for longer periods without compromising performance. 5.Privacy Preservation: Addressing privacy concerns by developing on-device processing techniques that do not require data to be sent to the cloud. 6.Real-time Processing: Enhancing real-time processing capabilities to provide immediate feedback or intervention when necessary. 7.Complex Activity Recognition: Expanding the scope of HAR to recognize more complex activities involving multiple people or interactions with objects.

8. REFERENCES

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12.Zhang, Q., Rahman, A., & Kim, Y. (2023). Handling Imbalanced Datasets in Suspicious Activity Detection: A Comparative Study. Expert Systems with Applications, 92, 315-328.