International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 04 | April - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

Suspicious Activity Tracker

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ABSTRACT :

The ongoing exploration into detecting potentially concerning human behavior within surveillance footage remains a significant focus within the realms of image processing and computer vision. By leveraging visual surveillance methodologies, researchers aim to monitor and oversee human actions across a spectrum of environments, from sensitive to public spaces such as transportation hubs, financial institutions, shopping centers, educational institutions, parking facilities, and roadways. The primary goal is to enhance security measures, prevent criminal activities such as terrorism, theft, and vandalism, minimize accidents, and addressvarious safety concerns. However, the challenge lies in the continuous monitoringof public areas, necessitating intelligent video surveillance systems capable of real-time human activity analysis, classification, and alert generation. Despite the increasing number of publications on visual surveillance, specifically targetingabnormal activity recognition, there remains a gap in comprehensive reviewscovering diverse abnormal behaviors. This gap motivates our concise overview of suspicious human activity recognition, addressing associated challenges and methodologies. Our study focuses on six key abnormal activities: abandoned object detection, theft detection, fall detection, road accidents and illegal parking detection, violence activity detection, and fire detection. Throughout ourexamination, we explore various techniques outlined in the literature for identifying and analyzing human activities in surveillance videos, encompassing processes such as foreground object extraction, object detection using tracking and non-tracking methods, feature extraction, classification techniques, and subsequent activity analysis and recognition.

INTRODUCTION :

Suspicious Activity Detection Machine learning can indeed be used to detect various types of suspicious activities, including those related to human behavior. Nevertheless, the detectable range of specific activities relies on the training data and the configuration of the machine learning model. If the model is trained on a dataset that includes examples of suspicious human activities, it can learn to recognize patterns and behaviors associated with those activities. The extensive applications of video surveillance are evident, especially in diverse settings such asindoor and outdoor environments. Surveillance is an integral part of security. Security cameras have become an integral aspect of daily life, serving essential roles in ensuring safety and security. Today, guide tracking of all of the occasions on theCCTV digital camera is impossible. Despite the occurrence of an event, the processof locating the same incident in the recorded video proves to be time-consuming. The exploration of abnormal events within video content is gaining prominence asa developing area in automated video surveillance systems. In the field of machine learning, vital aspects include acquiring knowledge from training data and making predictions for future datasets. The prevalent availability of GPU (Graphics Processing Unit) processors and extensive datasets has facilitated the widespread application of the machine learning concept. Machine learning models automatically extract features and build high-level representations of image data. The feature extraction process is entirely automated, contributing to a more generic approach. From the image pixels, a convolutional neural network (CNN) can learn visual patterns directly. In the case of video streaming, long short-term memory (LSTM) models are capable of learning long-term dependencies. The LSTM networkcan remember things. The proposed system will use footage obtained from CCTV cameras to monitor human behavior and issue a term warning when any suspiciousevent occurs. In intelligent video monitoring, key elements encompass event detection and the recognition of human behavior. It is essential to emphasize thatthe efficacy of a system for detecting suspicious activities hinges on factors such asthe caliber of training data, the design of the machine learning model, and the operational environment. Sustained monitoring, periodic enhancements, and ongoing refinement play pivotal roles in upholding the accuracy of the system and ensuring its adaptability to novel and emerging forms of suspicious activity.

LITERATURE REVIEW :

[1] Single Shot Video Object Detector (2020)

Author Name: Jiajun Deng, Yingwei Pan, Ting Yao, Member, IEEE, Wengang Zhou, Member, IEEE, Houqiang Li, Senior Member, IEEE, and Tao Mei, Fellow, IEEE

The paper "Single Shot Video Object Detector," authored by Jiajun Deng, Yingwei Pan, Ting Yao, Wengang Zhou, Houqiang Li, and Tao Mei, presents a single-shot video object detection method. This research proposes an efficient approach for real-time object detection in videos by extending the popular single-shot object detection framework to the video domain. Their technique supports dimensional and temporal information, achieving accurate and real-time video object detection. The authors' work addresses the critical task of detecting objects in videos with a single pass, making it valuable for applications in surveillance and autonomous vehicles.

[2] Concealed Object Detection (2020)

Author Name: Deng-Ping Fan, Ge-Peng Ji, Ming-Ming Cheng, and Ling Shao

This paper presents the first systematic study on concealed object detection (COD),which aims to identify objects that are visually embedded in their background. Thehigh intrinsic similarities between the concealed objects and their backgrounds make COD far more challenging than traditional object detection and segmentation.

[3] Surveillance-based Suspicious Activity Detection: Techniques, Application andChallenges (2023)

Author Name: Nandini Fal Dessai, Prof. Shruti Pednekar

Suspicious activity identification from surveillance video is an effective research area in image processing and computer vision. Detecting suspicious activities is important for the safety of corporations and communities. Surveillance cameras are used in public areas to monitor and secure safety. It is difficult to observe public places continuously, so hence intelligent video surveillance is needed that can detect human activity in real-time and classify it as non-suspicious or suspicious activities. To solve these problems, we will create a long-term recurrent convolutional network (LRCN) system to record the CCTV footage and detect suspicious and non-suspicious activities.

[4] Suspicious Activity Detection from Video Surveillance (2023)

Author Name: K. Kranthi Kumar, B. Hema Kumari, T. Saikumar, U. Sridhar, G. Srinivas, G. Sai Karan Reddy

In today's insecure world, video surveillance plays an important role in the securityof indoor as well as outdoor places. The components of a video surveillance system,such as behavior recognition, understanding, and classifying the activity as normalor suspicious, can be used for real-time applications. In this paper, a hierarchical approach is used to detect different suspicious activities, such as loitering, fainting,unauthorized entry, etc. This technique is primarily based on the motion features between the different objects. First of all, the different suspicious activities are defined using a semantic approach. Then the object detection is done using background subtraction. The detected items are then classified as living (human) ornon-living (bag). These objects are required to be tracked, which is done using thecorrelation technique.

[5] Suspicious Activity Monitoring System using Machine Learning (2023) Author Name: D. Prem

Raja, Sheelambigai P, Sruthi Meera P, Valarmathi K

In this world, the activity of crime and suspicious events increases day by day. Humans cannot continuously monitor the suspicious activities that happen in theirdaily lives. In order to avoid manual monitoring, the automatic monitoring systemfor suspicious activities comes into play. The main aim of this proposed activity monitoring system is to identify and alert users when suspicious activities are detected using machine learning. In this research, YOLO is used to detect various suspicious activities like chain snatching, etc. This work aims to help humans by saving their time and is also cost-efficient.

PROPOSED SYSTEM :

It involves developing a machine learning model to predict suspicious activity basedon relevant data sources. This model would then generate alerts or notifications when it detects potential suspicious activity, helping to prevent security breaches or fraud. The proposed work would likely include data collection, preprocessing, model training, and integration with alerting systems.

MODULES AND THEIR FUNCTIONALITIES :

- We used two labels on the first webpage.

Label 1: 1st Person Detection

Label 2: 2nd Fire Detection

Label 3: Third Credit Card Fraud Detection

In each zone, separately run the YOLOV3 algorithm.

➢ **1st Person Detection**

- SUSPICIOUS human activity
- SUSPICIOUS vehicle activity

➢ **2nd Fire Detection**

- Fire Detect
- Gun Detect

➢ **3rd Credit Card Fraud Detection**

Choose a zone and run the software. They start working.

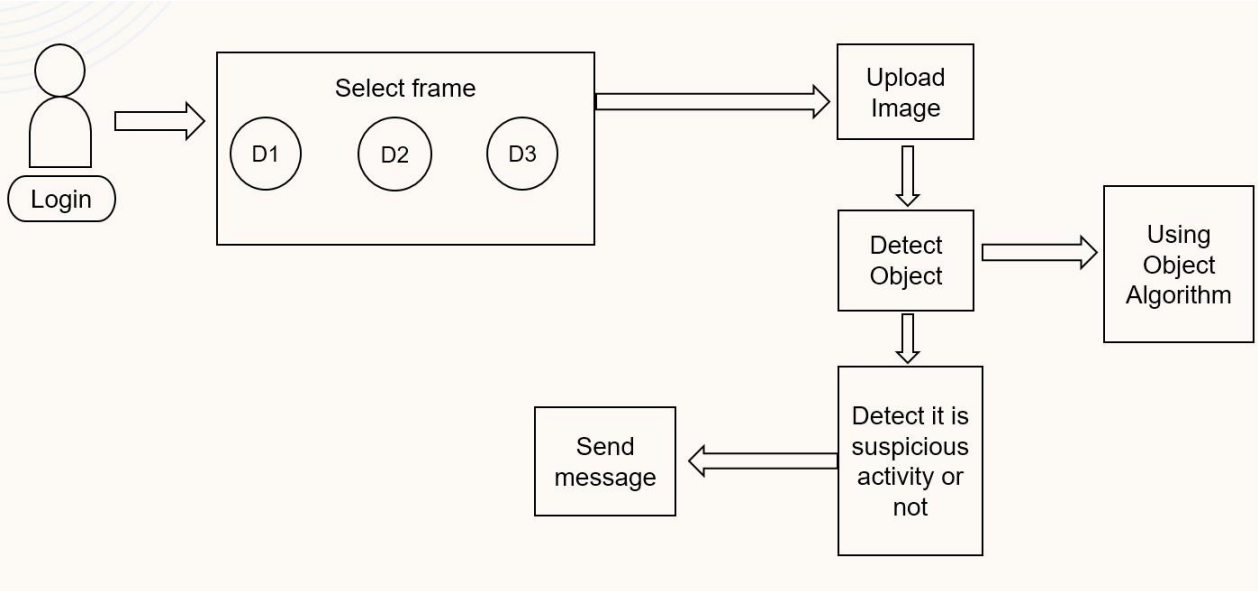
- **YOLOv3 Algorithm**

YOLOv3, or You Only Look Once Version 3, is a real-time object identification system adept at recognizing objects in images and live feeds. It builds upon previous iterations developed by Joseph Redmond and Ali Farhadi. Released in 2018, YOLOv3 is an enhanced variant of the original machine learning technique, leveraging deepconvolutional neural networks for improved performance. Implementation is facilitated through deep learning frameworks such as Keras and OpenCV. InstallingYOLOv3 is straightforward, requiring the installation of a few dependencies and libraries. Model training is simplified with YOLOv3, whether configured directly ona computer or through a notebook, utilizing the same commands for both implementations. To install YOLOv3, simply execute the command 'pip installYOLOv3' provided all necessary libraries are installed. For further details, a tutorialon installing YOLOv3 and its required libraries is available. Explore more at Viso.AI/Deep Learning/Yolov3-Overview.

- **Model weights**

We utilize YOLOV3 and CNN calculations for the discovery of suspicious movementand handling pictures. The calculation employments a profound neural arrange toinvestigate the visual highlights of a picture or video and recognize objects of intrigued. To execute suspension movement location utilizing the YOLOv3 calculation, you would require to take after these steps: Collect and preprocess information. Collect a dataset of pictures or recordings that incorporate individualsand vehicles in suspension exercises. Preprocess the pictures by resizing, editing, and normalizing the pictures to get ready them for input into the YOLOv3 calculation.

SYSTEM ARCHITECTURE :



FUTURE SCOPE :

- Suspicious activities Objects are a problem when it comes to the potential riskthey bring to humans.

- The user may choose the video in order to predict the activity done with that input. For instance, the user wants to predict his position, whether he is sitting orstanding.

- A more common approach would be for a user to predict an image. This projectwill focus exclusively on predicting the activity of individual inputs. More so, the project will analyze the accuracy of these predictions.

CONCLUSION :

A mission version is used to method real-time CCTV photos to stumble on any suspicious interest, which might assist in developing higher protection and muchless human interaction in activities. Furthermore, exploring associated domains,such as activity tracking, has the potential to amplify its beneficial application across various sectors.

ACKNOWLEDGEMENT :

We would like to give special thanks to the Computer Science and Engineeringdepartment of AGTI's Dr. Daulatrao Aher College of Engineering Karad, HOD Prof.

S.P. Kakade, and project guide Prof. Archana H. Renushe for their guidance.

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