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AI – POWERED SMART MONITORING CAMERA TO DETECT ANOMALOUS BEHAVIOUR IN ATMS

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Abstract— Video reconnaissance framework has turned into a basic part in the security and assurance arrangement of modem urban areas, since savvy checking cameras furnished with canny video examination procedures can screen and pre-alert anomalous practices or occasions. None the less, with the extension of the reconnaissance arrange, monstrous observation video information postures colossal difficulties to the examination, stockpiling and recovery in the Big Data time. The technique shows a novel insightful preparing and usage answer for enormous reconnaissance video information in light of the occasion recognition and disturbing messages from front-end shrewd cameras. The procedure incorporates three sections: the astute pre-disturbing for strange occasions, keen stockpiling for observation video and fast recovery for confirm recordings, which completely explores the transient spatial affiliation investigation regarding the unusual occasions in various checking locales. Test comes about uncover that our proposed approach can dependably pre-alert security hazard occasions, considerably diminish storage room of recorded video and essentially accelerate the proof video recovery related with particular suspects.

KEYWORDS: ATMs , Machine Learning , Open CV

I.INTRODUCTION

Integrating Machine Learning in video surveillance systems is a challenging task that has been attempted for the past several decades. Despite being susceptible to crime, automated teller machine (ATM) surveillance system has not been fully integrated with Machine Learning application for detecting criminal activity. On the other hand, the conventional state of the art Machine Learning algorithms(shown in Fig1.1) available for occluded and covered face detection, human abnormal behavior analysis and illegal object detection may not work for ATM having different environment (i.e. illumination and camera view), abnormal gestures, and crime devices. Article reviews the previous research works on all possible Machine Learning applications that can be used in the ATM surveillance camera. The review embarks with the aim of categorizing the studies, analyzing their weaknesses and strengths, highlighting significant research findings and providing future research directions. To achieve these goals, this review summarizes the information based on abnormality detection, features, system framework and methodology, image acquisition, sample specification, performance analysis and project funding. Furthermore, the survey evaluates the studies from the point of view of their applicability, suitability, and usage in dynamic environment such as ATM. Viewing as a whole, despite having huge potential, a full-fledged video surveillance system integrated with Machine Learning methods has not been found in the existing literature for ATM. The findings of this review may help the future researchers to

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develop dynamic and multipurpose algorithms for surveillance system that can detect and prevent ATM crime.Machine learning (ML) is the study of computer algorithms that improve automatically through experience. It is seen as a subset of artificial intelligence. Machine learning algorithms build a mathematical model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly programmed to do so.Machine learning algorithms are used in a wide variety of applications, such as email filtering and computer vision, where it is difficult or infeasible to develop conventional algorithms to perform the needed tasks. Machine learning is closely related to computational statistics, which focuses on making predictions using computers. The study of mathematical optimization delivers methods, theory and application domains to the field of machine learning. Data mining is a related field of study, focusing on exploratory data analysis through unsupervised learning.

In its application across business problems, machine learning is also referred to as predictive analytics Machine learning approaches are traditionally divided into three broad categories, depending on the nature of the "signal" or "feedback" available to the learning system:

- Supervised learning: The computer is presented with example inputs and their desired outputs, given by a "teacher", and the goal is to learn a general rule that maps inputs to outputs.
- Unsupervised learning: No labels are given to the learning algorithm, leaving it on its own to find structure in its input. Unsupervised learning can be a goal in itself (discovering hidden patterns in data) or a means towards an end (feature learning).
- Reinforcement learning: A computer program interacts with a dynamic environment in which it must perform a certain goal (such as driving a vehicle or playing a game against an opponent). As it navigates its problem space, the program is provided feedback that's analogous to rewards, which it tries to maximize.

Figure 1 Machine Learning

II. ATMs

ATMs are placed not only near or inside the premises of banks, but also in locations such as shopping centers/malls, airports, grocery stores, petrol/gas stations, restaurants, or anywhere frequented by large numbers of people. There are two types of ATM installations: on- and off-premises. On-premises ATMs are typically more advanced, multi-function machines that complement a bank branch's capabilities, and are thus more expensive. Off-premises machines are deployed by financial

institutions and Independent Sales Organizations (ISOs) where there is a simple need for cash, so they are generally cheaper single function devices. In Canada, ATMs (also known there as ABMs) not operated by a financial institution are known as white-label ABMs.

III.OPEN CV

Open CV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. Open CV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products. Being a BSD-licensed product, Open CV makes it easy for businesses to utilize and modify the code. The library has more than 2500 optimized algorithms, which includes a comprehensive set of both classic and state-of the-art computer vision and machine learning algorithms. These algorithms can be used to detect and recognize faces, identify objects, classify human actions in videos, track camera movements, track moving objects, extract 3D models of objects, produce 3D point clouds from stereo cameras, stitch images together to produce a high resolution image of an entire scene, find similar images from an image database, remove red eyes from images taken using flash, follow eye movements, recognize scenery and establish markers to overlay it with augmented reality, etc. Open CV has more than 47 thousand people of user community and estimated number of downloads exceeding 18 million. The library is used extensively in companies, research groups and by governmental bodies .Along with well-established companies like Google, Yahoo, Microsoft ,Intel, IBM, Sony, Honda, Toyota that employ the library, there are many startups such as Applied Minds, Video Surf, and Zester, that make extensive use of Open CV. Open CV's deployed uses span the range from stitching street view images together, detecting intrusions in surveillance video in Israel, monitoring mine equipment in China, helping robots navigate and pick up objects at Willow Garage, detection of swimming pool drowning accidents in Europe, running interactive art in Spain and New York, checking runways for debris in Turkey, inspecting labels on products in factories around the worl the user. So it reduces the storage device. In this system first set the time for each activity in the ATM. When the user enters and the camera detects the user, then it starts the time of the particular event. The user finish the activity within the time the camera only monitors the user. It start recording only when the user take the overtime compare to set time. The recorded video is first converted to the frames and it tracks or Extract the edges (region of the object) by using canny edge detection algorithm. After that, it constructs the feature vectors from the extracted objects. Compare to the training actions, to implement the SVM Classification for detect the abnormal actions.

In the recent years, SVM classifiers have established excellent performance in a variety of pattern recognition troubles. The input space is planned into a high dimensional feature space. Then, the hyper plane that exploits the margin of separation between classes is constructed. The points

that lie closest to the decision surface are called support vectors directly involves its location. When the classes are non-separable, the optimal hyper plane is the one that minimizes the probability of classification error. Initially input image is formulated in feature vectors. Then these feature vectors mapped with the help of kernel function in the feature space. And finally division is computed in the feature space to separate out the classes for training data. A global hyper plane is required by the SVM in order to divide both the program of examples in training set and avoid over fitting. This phenomenon of SVM is higher in comparison to other machine learning techniques which are based on artificial intelligence. Here the important feature for the classification is the width of the vessels. With the help of SVM classifier we can easily separate out the vessels into arteries and veins. The SVMs demonstrate various attractive features such as good generalization ability.

Advantages

- It is used to reduce the storage space
- The intelligent pre-alert for abnormal events.
- It Reduce the classification time.

Use case diagramare usually referred to as behavior diagram used to describe as to factions that some system should or can perform incollaboration withone or more external users of the system.

USE CASE DIAGRAM

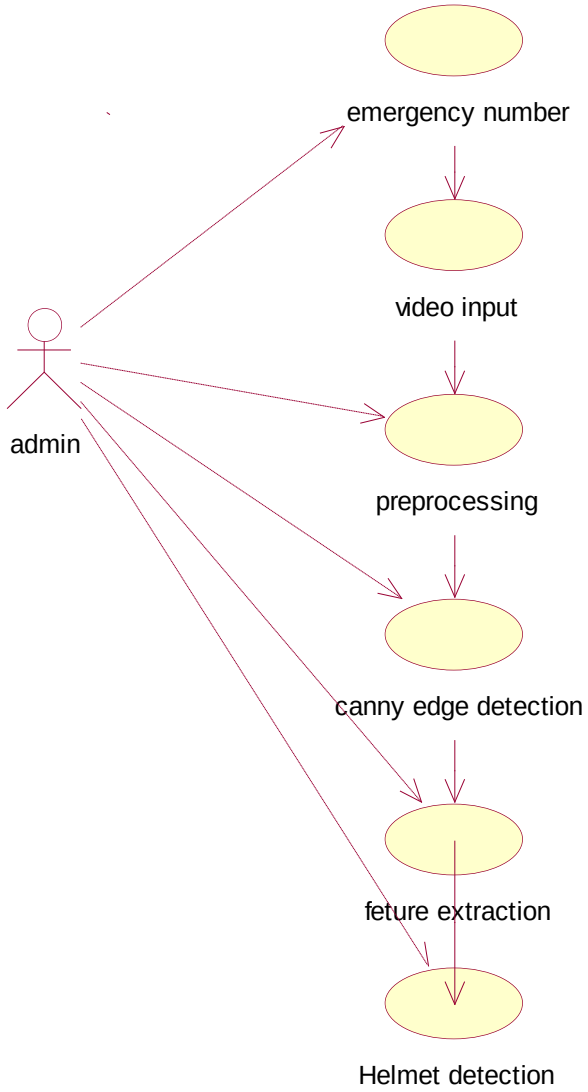

Figure 2 UML Diagram

IV.MODULES

- Video Acquisition
- Preprocessing
- Edge Detection
- Classification
- Send Intimation
- Evaluation Criteria

A. VIDEO ACQUISITION:

Video Acquisition is a “quick and dirty” way of localizing moving objects in a video shot by a static camera. In this perspective, object detection is often the first step of a multi-stage computer vision system (car

tracking, person recognition, wild-life monitoring, etc.). In this project we can upload the videos. The user uploads the video. The Video can be obtained for lesions of any size, shape, and composition in an acceptable amount of time and then filtration the Video to remove the noise and segment the video based on similarities. In this module, we can convert the videos into frames. Using video file reader we separate the whole videos into frames in specific size. Each frame is known as realistic moving images based on standard size using video File reader.

B. PREPROCESSING:

The aim of pre-processing is an improvement of the image data that suppresses unwanted distortions or enhances some image features important for further processing The frames are converting the RGB color to grayscale conversion for noise removal.

C. EDGE DETECTION:

The Canny edge detector is an edge detection operator that uses a multi-stage Algorithm to detect a wide range of edges in images. Canny edge detection is a technique to extract useful structural information from different vision objects and dramatically reduce the amount of data to be processed. It has been widely applied in various computer vision systems. Canny has found that the requirements for the application of edge detection on diverse vision systems are relatively similar. Thus, an edge detection solution to address these requirements can be implemented in a wide range of situations

D. CLASSIFICATION:

In this module, is used to classify the abnormal behavior in ATM. To implement the SVM classification for detect the abnormal behaviors. It take the input from the previous step edge detection output. The edges are converted to the feature vectors, and its matching to the training dataset. The SVM algorithm Perform the classification in parallel manner. In machine learning, support vector machines are supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis. Given a set of training examples, each marked as belonging to one or the other of two categories, an SVM training algorithm builds a model that assigns new examples to one category or the other, making it a non-probabilistic binary linear classifier.

E. SEND ALERT MESSAGE:

In this Module, is used to check the user actions and it detect the irrelevant actions are performed in the inside of the ATM. And it compares the user actions and stored action templates if it is match to send the alert message immediately to the admin and nearest Police station.

F. EVALUATION CRITERIA:

In this module, we can extract the matched objects in database. Then provide the matched objects with frames. Then evaluate the performance of the system using false positive rate metrics. Proposed approach provides reduce number of false positive rates. The SVM is used to reduce the time complexity of the classification.

V. CONCLUSION AND FUTURE ENHANCEMENT

1) CONCLUSION

In this video surveillance system, the proposed solution contributes to make full use of detected and alarmed events by smart monitoring cameras. In contrast to the traditional video surveillance system, the proposed solution contributes to make full use of detected and alarmed events by smart monitoring cameras, which thus effectively improves the performance of intelligent surveillance system, promotes the ability to danger pre-alarming, and greatly saves the storage space for surveillance video data. Meanwhile, the surveillance video data relevant to specific cases will be scaled down, which will greatly improve the efficiency for discovering valuable investigation clues. Several practical cases demonstrate that our approach outperforms the existing solutions. An effectively improves the performance of Surveillance System in ATM.

2) FUTURE ENHANCEMENT

- In future, To Implement the surveillance system in other public places.
- To implement the different types of classification Algorithm analyze the performance.

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