

Realtime video surveillance and analytics

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Abstract—Providing smart and intelligent security solutions for home as well as large business is a challenging task, in recent this is a currently a booming topic in the IT industry or in almost every area, where today's challenges are different the end user needs to have a intelligent solution as well as a cheap price to pay. We therefore represent a software system which uses traditional hardware but has new modern features like object recognition, Intrusion detection, video analytics, Real-time video feed over smart phone.

It aims at alerting the user as quick as possible so that the user can stop any unwanted activity going on in the video frame or alert the police. It is believed that using a traditional video surveillance systems a lot of unwanted video data is stored and this causes a lot of memory wastage, and even there is no possible way of use of artificial intelligence and video analytics capability. This decreases the citizen security as well as the capability of the system is not fully used.

We have a feature of real-time broad casting the live suspicious video feed to the authenticated user by use of mobile devices such as PDA, Smart phone, Tablets so the user can access the video feed anywhere, any time on any device. The user can also turn on and off the notification and some features or even increase the resolution, zoom in and zoom out. The system uses mechanisms such as deep learning, artificial intelligence, and video analytics to perform the above tasks.

Keywords-Realtime video surveillance , video analytics ,machine learning, android , citizen security, WAMP,XAAMP;

I. INTRODUCTION

^[1]All Automatic video surveillance systems available today typically comprise passive wide field-of-view (FOV) CCTV cameras. While these systems excel at pedestrian detection and tracking, these systems are unable to capture individual pedestrians at resolutions required to support subsequent biometric analysis. Consequently video surveillance systems comprising both active pan/tilt/zoom (PTZ) and passive wide-FOV cameras have been proposed to provide higher resolution video coverage of large spaces. Here, passive cameras are responsible for frame-to-frame pedestrian tracking (and in some cases, localization via stereo analysis); whereas, active cameras are tasked with capturing closeup videos of objects for further biometric analysis (e.g., facial recognition, gait analysis, etc.). Often there will be more pedestrians in the scene than the number of available PTZ cameras, and the automatic management of PTZ.

Project presents unique Image Processing feature to detect pedestrian in the room - switch mode of the surveillance camera in case of pedestrians count. Android Mobile administrators can Pan/Tilt/Zoom any camera if they want to focus on a specific person. Another interesting feature is to detect intrusion without using motion sensors (hardware+IR), webcam will only record whenever there is an intrusion in the room. Administrator can send commands to control switch on/off of the device through mobile. The entire home surveillance can be made remote using this architecture. It can store mobile numbers for all the administrators/owners who need to be contacted in case of

emergency. Software can manage numbers according to situation or priority. E.g. In case of intrusion, a SMS will be sent to the individual, user can then login to the surveillance web application to view the most recent videos. User should be able to view online streaming of video from another computer.

The system waits for a specified amount of time for response commands (SMS) from any of the owners, after which it takes necessary action itself. E.g. the device starts alarming. The system keeps track/log of all the activities. Hence detailed record of messages sent and received is maintained. Also a detailed track of all the activities (intrusion detection etc.) is also maintained. System receives commands from administrators which are then used to take necessary actions. E.g. a command like "ACT" can be used to activate the camera or DCT to deactivate the camera. The system only responds to owners mobile numbers. SMS received from any other mobiles will be rejected. Moreover the communication is password protected. Hence any other user too cannot control the system from one of the owner's mobile number.

The central PC is equipped with a mobile phone which can be interfaced via AT command set for sending alerts to admin. Complete control of camera like start/stop of the centralized PC/Workstation via SMS is supported.

II. HOW DO IT WORK?

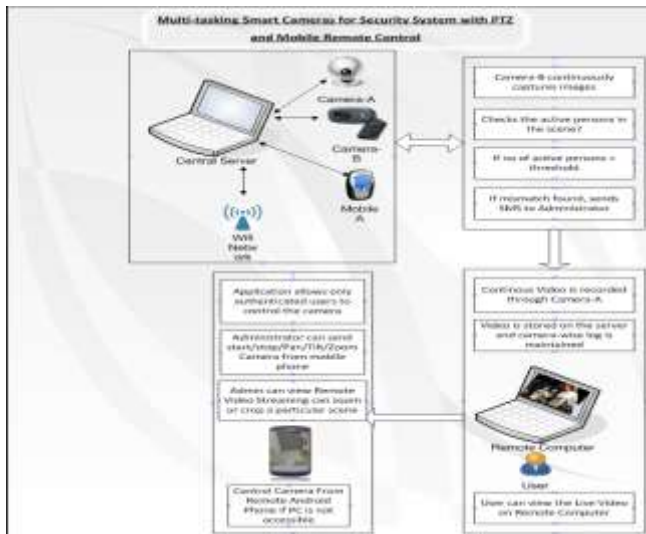


Figure 1: Block Diagram

Figure 1 Shows that the Camera continuously keeps scanning the frames at almost 30 FPS(Frames per second) to 40 FPS and the feed of the camera frames runs under the internal algorithm of the server which checks for the active persons in the frames using background subtractions method , these values are compared to the threshold which the user sets in his smartphone application , the server also maintains a track to active logged in persons in the server , Hence there can be more than one administrators to which can be logged in the system can provide a broadcast to all the logged in users at once.

If any mismatch is found in the frames the alert notification is send to all the logged in users. The machine learning approaches gives various features like motion detection, face recognition, Intrusion detection. These all features all available to user in the Android application itself in form of checklist by which he can turn on and off the features according to his ease.

The video is only recorded if user keeps the recording feature on or keeps the decision on the machine learning algorithm itself again this highlights the extreme control of the user interface which gives us the command over the system.

The system can consist of multiple cameras where the algorithm runs in parallel each camera is given a id and the whole network is connected through wireless technology in LAN or WAN. . Mobile web service provisioning can be classified based on architecture as SOA (Service Oriented Architecture) or SOAP based Mobile web service provisioning and ROA (Resource Oriented Architecture) or REST based Mobile web service provisioning and are used to provide web service access to end-user. SOAP is designed for a fixed network environment where high end servers are used, but REST is alternative to SOAP for the fixed network

environment as well as mobile network environment and resource constrained devices. Representational State Transfer (REST) is also called Resource Oriented Architecture (ROA).

Most other schemes for PTZ camera control assume that a PTZ camera can only carry out a single task at any given time, which is restrictive and may lead to catastrophic observation failures. Consider, for example, the simple case of two PTZ cameras swapping two pedestrians. Camera selection and handoff schemes that assume that each camera can only carry out a single observation task simply cannot? Switch the roles of the two cameras without interrupting one of the observation tasks. A PTZ camera that can observe multiple pedestrians simultaneously on the other hand can gracefully deal with situations such as these.

III. METHODOLOGY

A. Downloading Application from playstore and setting up

First, you have to download the application from the play store and install the software on the system to make it to server and as per the documentation you have you make connections

B. Maintaining and using :

After installation the user will be prompted to register, after registering, you can log in through the application and enjoy using the smart surveillance system.

IV. GENERIC ALGORITHMIC PROCEDURE

1. Continuously capture the frames from available cameras.
2. Evaluate the frame integrity using internal algorithms
3. If Suspicious send user notification.
4. Use user settings to activate only those algorithms user wish
5. Repeat

V. ANALYSIS

Analysis about all requirements to realize the project in detail, identify and solve possible problems and overview system concepts. Analyzed about tools and techniques which fits to actualize the project in pocket friendly budget and gives an overview of the project timeline and schedule.

Figure 2 Activity diagram shows the flow of activities in a flow chart and depicts the different level of execution of activities and operations.

Figure 3 Shows the use case diagram and involves actors, use cases and their relationships. The diagram is used to model the system/subsystem of an application. A single use case diagram captures a particular functionality of a system. The purpose of use case diagram is to capture the dynamic aspect of a system.

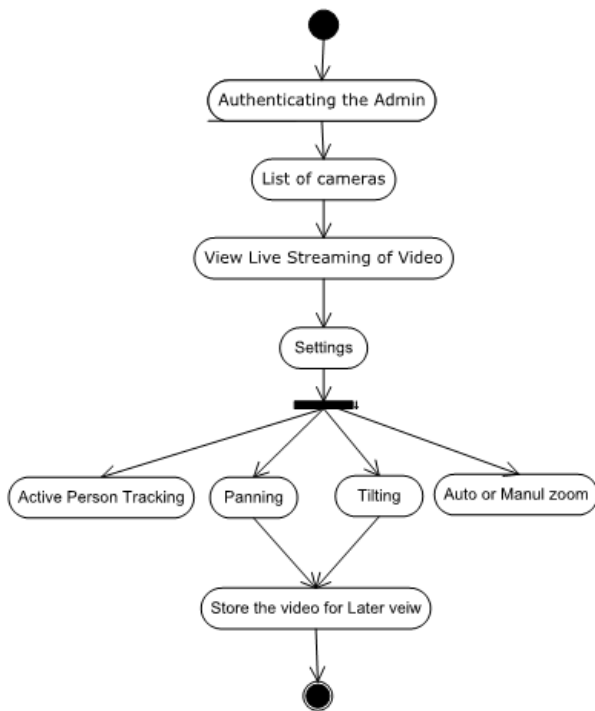
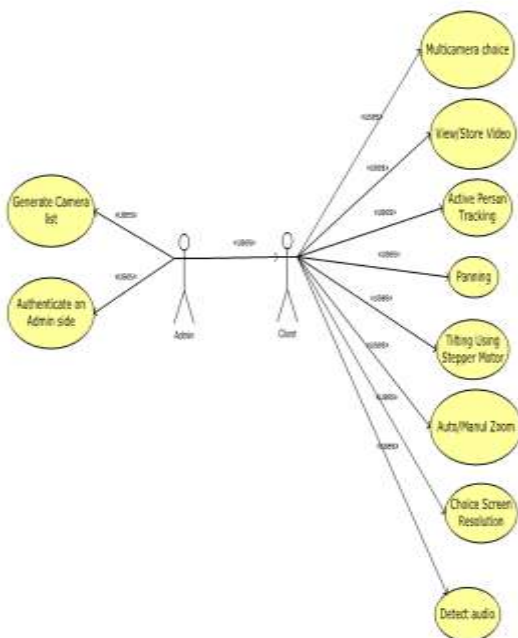


Figure 2: Activity Diagram

This diagram is depicting the flow with which system will work, based on the provided settings camera will track, pan, and tilt or zoom all this activities of camera will be streamed in real time for security check and analysis.



Two actors in the use case diagram namely user client and admin. Client could adjust the settings as per requirement which will enable the various functions of the camera such as panning, tilting, zoom in/out, active person tracking. While on

the admin's end administrator will control camera list and the authentication of the users

VI. CONCLUSION

In this paper, we make brief survey of existing system that is cctv cameras and challenges related to them. We have provided an idea as to how the proposed system will function.

Our work will focus on deeper study in the field of artificial intelligence, machine learning, and image processing and android to lace our proposed system with modern features like object recognition, Intrusion detection, video analytics, Real-time video feed over smart phone, with the sole aim of concluding the current situation of the field and promoting further development in the field of real time video surveillance and analytics.

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