ISSN 2395-1621

Real-Time Audio-Video Surveillance System for PTZ Camera

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ABSTRACT

An audio and video PTZ camera sight and localize dangerous thousands of sounds in time period so camera can be ready to direct a PTZ camera to catch a snap image regarding the placement of sound Source instantly.The projected PTZ camera first off detects foreground sound supported adaptive Gaussian mixture background sound model, and classifies it into one in every of pre- trained categories of foreground sounds supported GMM model.

***Keywords*—** Image Processing, (TDOA) Time Difference of Arrivals), SSL (Sound Source Localization), Dual Delay-Line algorithm, PTZ camera surveillance, Video tracking, Object localization, Sound classification, Camera parameters

ARTICLE INFO

Article History

Received 30th March 2016

Received in revised form :

1st March 2016

Accepted : 2nd April 2016

Published online :

4th April 2016

I. INTRODUCTION

Since mounted cameras cannot monitor wide space, it's common to use PTZ cameras for surveillance security work of a way wider space. In intelligent visual surveillance work systems, PTZ cameras will be controlled to alter viewing angle by sleuthing and following the movement of foreground objects. However they cannot find events from outside of current field of read nor beneath poor lighting conditions. The flexibility to purpose a camera at the proper spot solely at the proper time may be a fascinating feature. To the present finish one will analyze the audio surroundings of a camera and verify whether or not sure target sounds have occurred and additionally verify their Originating position so the PTZ camera will pan and tilt to the proper position and record and illuminate just for the required timeframe thereby protective power and information measure and additionally overcoming neck of the woods and temporal constraints of cameras. Detection of attention-grabbing sounds and localization of these attention- grabbing sound sources is actively studied in mobile automaton space yet as camera surveillance work space.

II. LITERATURE SURVEY

A. Audio analysis for surveillance applications [3]:

To provide system security capable of detecting new kinds of suspicious audio events that occurs as outliers against a background of usual activity. Feature one that performs unsupervised audio analysis and another that performs analysis using an audio classification framework.

B. A Survey of Human-Sensing [4]:

Key idea is to extract information regarding the people present in an environment by using five commonly needed spatiotemporal properties namely presence, count, location, track and identity

C. Scream and Gunshot Detection and Localization for Audio - Surveillance System [5]:

Automatically detects anomalous audio events in a public square, such as screams or gunshots, and localizes the position of the acoustic source, in such a way that a video-camera is steered consequently.

D. Limitations:

1. The need of predefined sound in the system

and audio-video matching ambiguity when multiple sounds and multiple moving objects occur at the same time [3]

2. They cannot detect people who are stationary, thus leading to a large number of false negatives [4].
3. The audio matching problem of multiple sounds at same time [5].

III.SYSTEM METHODOLOGY

Security application which will record video and pictures detected by PTZ camera and can store it into hard disk. Additionally it'll give alert message to user, if any suspicious activity happens. In this system, we tend to aim to build security application for user that takes input from Camera mistreatment SSL (Sound Source Localization) rule that ends up in detection of location wherever dangerous sound has occurred. This application helps each admin and users by providing face detection, alert messages and device of camera. The system consists of 4 subsystems; Foreground Sound Detection (FSD) system, Sound Classification (SC) system, Sound Source Localization (SSL) system and PTZ Camera Control (PCC) system. Thus our system can do video surveillance work mistreatment PTZ camera for security purpose.

A. SYSTEM ARCHITECTURE

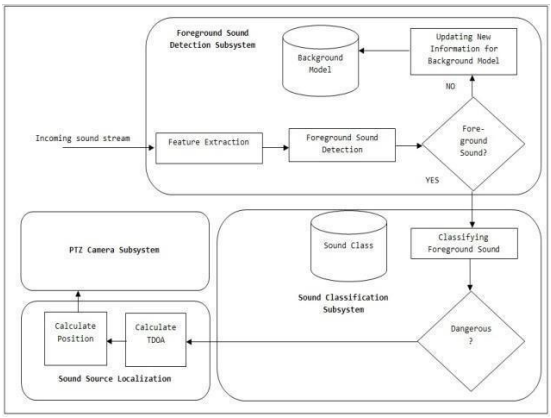


Figure 1: Proposed System Architecture

B. ALGORITHM

1) Foreground Sound Detection (FSD)

•Feature Extraction:

A low-level sound feature vector from incoming sound stream is extracted. As a low-level sound feature vector, Mel Frequency Campestral Coefficients (MFCC) is adopted, that is well-known as a decent sound feature vector.

• Foreground Sound Detection:

A burst of your time series of options from the incoming sound analyzed and compared with the trained adaptive mathematician Mixture Background Sound Model. Once the incoming sound seems to not be a foreground sound, the background adaptive mathematician mixture model is updated by successive perform, change new info for background Model.

• Information for Background Model:

In order to update the background sound model, the progressive learning algorithmic rule of adaptive mathematician Mixture Model is applied. The Background sound model is updated by the new info from the low level options extracted from audio stream knowledge that is known as background sound from the on top of perform, Feature Extraction.

2) Sound Classification (SC) scheme

• Database of Sound Classes:

As within the case of the background sound model, this info stores several mathematician Mixture Models that represent the distribution of feature vectors for every category of foreground sounds. We tend to think about the subsequent half dozen foreground categories, Applause, Breaking Glass, Crying, Talking, Screaming, and Walking. The models are trained from the recorded audio info collected beneath realenvironments. Every category in info is allotted variety for danger level, and that we decide whether or not it belongs to a dangerous cluster or a secure cluster severally.

• Classifying Foreground Sound:

It decides that category the foreground sound belongs to. during this perform, the chance of foreground sound is calculated over the models of pre-defined and off-line trained categories of foreground sound, and compared to see one in every of categories. supported the danger levels of every category, this abstract thought perform returns whether or not the foreground sounds analyzed is dangerous or not.

3) Sound Source Localization (SSL) scheme

• Calculating TDOA between microphones:

TDOA (Time Difference of Arrival) is one in every of the foremost fashionable ways in sound Source localization. This perform utilizes twin delay- line based mostly technique to calculate TDOA between microphones. TDOA approach simply computes the Difference in distances between the sound Source and also the pairs of microphones.

• Calculating Position of Sound Source:

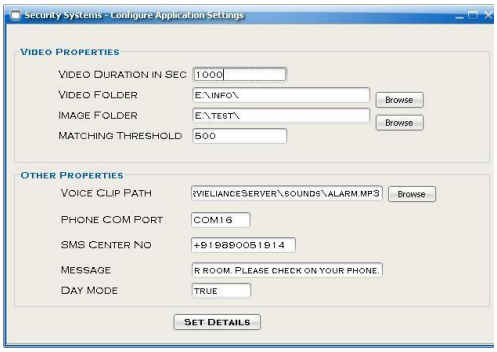
The input to the present perform is that the Difference in distances from sound Source to pairs of microphones. Exploitation pure mathematics calculation, the situation of sound Source may be calculated accurately.

4) PTZ Camera Control (PCC) scheme when a dangerous sound is detected and its position is found, PTZ camera management scheme orients PTZ camera

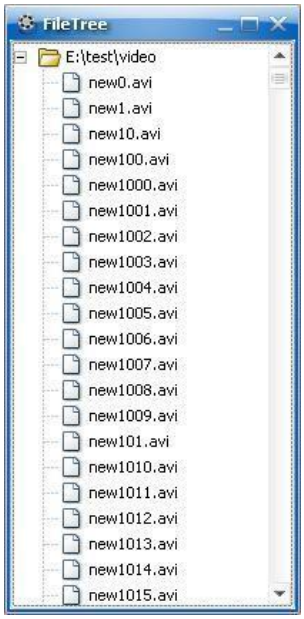
towards position of the sound Source.

User Interface

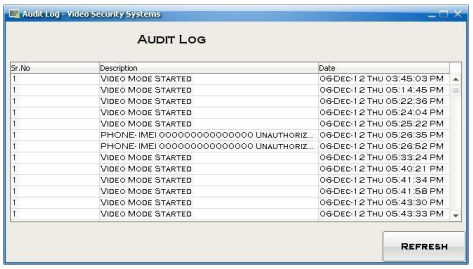
Interface 1: Main Screen



Interface 2: Configuration Setting

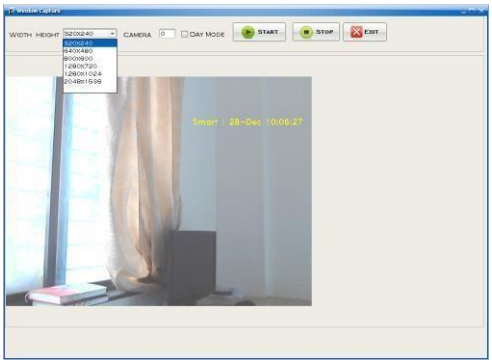


Interface 3: View pre-stored videos



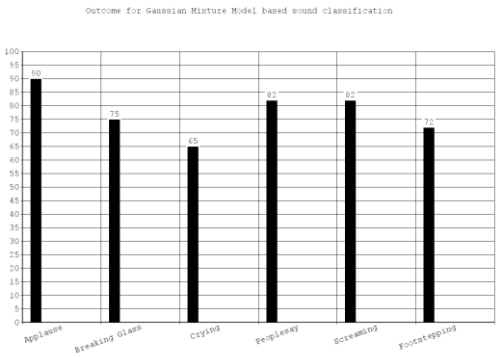
Interface 4: Add user screen (Purpose user authentication for Android phone)

Interface 5: Login



Interface 6: Home Screen

EXPECTED RESULT



IV. CONCLUSION

An audio video closed-circuit television for time period motion detection and localization of dangerous sound to manage PTZ camera. By victimization progressive learning algorithmic program for Gaussian Mixture Model, the

projected system is in a position to adapt background sound model consistent with the amendment of environments so it will find foreground sound a lot of stably. Utilization of the twin delay-line primarily

Based methodology instead of GCC-based ways as previous work may considerably decrease the gap between the microphones in PTZ camera, and use low rate to capture sound so it may save computation time. Within the future, a lot of intensive experiments beneath real environments are applied and therefore the projected system is improved for exploitation.

V. FUTURE SCOPE

In future, face detection and motion following options may be more to enhance level of security. The Audio and Video based mostly closed-circuit television may be used expeditiously in more ways that to attain high level of security. This idea may be extended by adding latest security technologies, GPS sensors, software system up gradations to create best security system. More intensive experiments below real environments are going to be administered and therefore the projected system is going to be improved for development.

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