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Crime Monitoring and Controlling System by Mobile Device

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***Abstract*—**The Closed Circuit Television (CCTV) have been used at very large scale for monitoring, recording and getting popular in whole world. The major goal of Closed Circuit Television system is monitoring or observing crime and tracking the objects. The smart phone Mobile world is also expanding at a rapid scale since the technology was invented. Most of smart phones users live in those countries where usage of CCTV system is very common in life. This project studies a monitoring system for smart phone mobile users based on CCTV system, where information will be sent from mobile phones to server so that CCTV system can work more specifically and accurately by monitoring and tracking objects. A safety assurance approach is proposed, in which a user can inform his location for close observation. If he/she feels like a potential threat. In that case of emergency situation, location, problem and all possible difficulties can be determined in comparatively less time by concern authorities like police as they have already monitoring the situation.

Keywords- *Close Circuit Television, Smart Mobile phones,Controlling, Observation, Monitoring.*

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I. INTRODUCTION

In the last decade, there has been proliferation in CCTV systems installations for security surveillance in public places, government buildings, and private firms. A common goal of most CCTV systems has been the prevention of crime and disorder by tracking and monitoring. It is assumed that CCTV will aid detection through its surveillance capability. Claims are also made that CCTV provides public reassurance and therefore reduces fear of crime. CCTV is used as a site management tool, for example, to monitor traffic patterns or for crowd control at crowded places. The use of mobile phone has become an essential part of our lives. Statics show that 80% of the world's population now has mobile phone. There are more than 5 billion mobile phones in the world, out of which more than 1.08 billion smart mobile phone are users. As a result of use of CCTV systems, there is a need of intelligent video surveillance technologies for CCTV systems to automatically monitor the scenes for important events and behaviours. One of the most important technologies for intelligent video surveillance is to track objects over time in natural busy scenes and to keep a consistent identity for each target object through the sequence. CCTV object tracking system provides crucial information about a person's behaviour, situation, reactions, interactions and relationship between objects. Automated systems for real-time intelligent video surveillance comprises various level of processing, e.g., object tracking, detection, classification and event detection. Here the efficiency and the robustness are the two particularly important issues for the deployment of intelligent video surveillance technologies in the existing CCTV systems there are many mobile applications which are being used for tracking purposes.

As technology has been touching to new horizons by every passing day so many ideas are also popping up to the surface for betterment of mankind. So here, an idea also is being proposed which may help the user to secure his security when being in dangerous situation. Information about location of mobile user can be getting by using GPS. In proposed idea, location information of a mobile' user can coupled with CCTV system in this that CCTV cameras can monitor one particular chain of events. By using this application, a user can inform his/her location when it is needed and then at that location existing CCTV cameras can focus on given parameters. The best use of this application might be in that case when a user feels danger around or not sure about the security of surroundings. In that case, user will turn on the application which will calculate the location parameters of the user. These parameters will be sent to server which will issue commands for CCTV cameras for focusing that particular location. This way, our system inherently provides two core services identification, since the people detected in the video streams can be recognized and localization, as each phone learns its own location in the process.

II. RELATED WORK

These days, CCTV systems are using a variety of well-established methods for detection of people. In general, any object detection algorithm can be used which may vary its complexity depending on its features and use. Moreover this fact can be used that the object is moving. Thus the motion detection techniques may be used. The mentioned methods must be supported by additional algorithms to distinguish between the types of objects, and to select people only.

A. An Efficient Approach to Tracking

In general, for automatic surveillance following techniques are used:

1) Background subtraction

Adaptive background subtraction method is also used for motion segmentation, especially under those situations with a relatively static background to extract foreground regions from the incoming frames.

2) Temporal differencing

Temporal differencing makes use of the pixel-wise differences between two or three consecutive frames in an

image sequence to extract moving regions. Using these techniques, tracking isolated objected is relatively simple but tracking can be very challenging when it comes to moving objects especially in a crowded place. There have been an increasing number of literatures which deals with tracking multiple objects through crowded places. Over the years, many tacking techniques have been presented and been used in relative situations and fields. Multi object tracking has always been a challenge for the researchers to develop an approach with maximum detection proficiency [1][2].

B. Tasking Networked CCTV systems

With the development of the Internet network, the network based CCTV is now widely used in our society. In particular, CCTV is used for crime prevention, and the scope of utilization is gradually expanding. The CCTV system transmits and receives image data via a wire/wireless communication channel, as is composed of various components, such as the surveillance camera, image monitoring control server, authentication and access control server, smart mobile phone, desktop computers, and laptop. Communication between the surveillance camera and the image monitoring and control server is established via the wire/wireless network. The surveillance camera takes images and encrypts them before sending them to the image monitoring control server in a safe manner. Image information sending and receiving, and image information processing between surveillance cameras and image monitoring control servers are conducted over several steps. These steps include sending the encrypted image data, decryption of the received image data, facial area detection, creation of the image with privacy protection, and image saving. Secure image transmission should be guaranteed between CCTV cameras and image monitoring control servers [3].

These days, CCTV systems are using a variety of well-established methods for detection of people. In general, any object detection algorithm can be used which may vary its complexity depending on features and its use. Moreover this fact will be used that the object is moving. Thus the motion detection techniques can also be used. The mentioned methods must be supported by additional algorithms to distinguish between the types of objects, and to select people only.

There is no such system for centralized monitoring and controlling of live CCTV surveillance by using mobile devices.

III. EXISTING SYSTEM

Surveillance in dynamic scenes attempts to recognize, detect and track certain objects from image sequences, and more generally to understand object behaviours. The aim is to develop intelligent visual surveillance to replace the traditional passive video surveillance that is proving ineffective as the number of cameras exceeds the capability of human operators to observe them. The goal of visual surveillance is not only to place cameras in the place of human eyes, but also to accomplish surveillance task as automatically as possible.

Visual surveillance in dynamic scenes has a wide range of potential applications, such as a security guard for communities and important buildings, traffic surveillance in cities expressways, detection of military target objects, etc. We focus in this paper on applications involving the surveillance of people, vehicles, as they are typical of surveillance applications and include the full range of surveillance methods. Surveillance applications involving people or vehicles include the following.

a) Access control in special areas.

In some security-sensitive locations such as military bases and important governmental offices, only people with a special identity are allowed to enter. A biometric feature database including legal visiting members is built beforehand using biometric techniques. When somebody is about to enter, the system could automatically obtain the visitor's features, such as height, facial appearance and walking gait from images taken in real time situation, and then decide whether the visitor can be cleared for entry.

b) Person-specific identification in certain scenes.

Personal identification at a distance by a smart surveillance system can help the police to catch suspects. The police may build a biometric feature database of suspects, and place visual surveillance systems at locations where the suspects usually seen, e.g., subway stations, casinos, etc. The systems automatically recognize whether or not the people in view are suspects. If yes, alarms will be given immediately. Such systems with face recognition have already been used at public sites, but the reliability is too low for police requirements [4][9].

c) *Crowd flux statistics and congestion analysis*.

Using techniques for human detection, surveillance systems can automatically compute the flux of people at important public areas such as stores, and then provide congestion analysis to assist in the management of the people. In the same way, visual surveillance systems can monitor expressways and junctions of the roads, and further analyse the traffic and the status of road congestion [5][6].

d) *Anomaly detection and alarming.*

In some circumstances, it is necessary to analyse the behaviours of people and vehicles and determine whether these behaviours are abnormal or normal. For example, visual surveillance systems place in parking lots and supermarkets could analyse abnormal behaviours indicative of theft. Normally, there are many ways of giving an alarm. One way is to automatically make a recorded announcement whenever any abnormal behaviour is detected. The another is to contact the police automatically [7][8][10].

IV. PROPOSE SYSTEM

A street crime is the issue with which almost every government has to deal. Personal identification at a distance by a smart CCTV surveillance system can help the police to catch suspects. The police may build a biometric feature database of suspects, and place visual surveillance systems at locations where the suspects usually seen, e.g., subway stations, casinos, etc. The systems automatically recognize and judge whether or not the people in view are suspects. Visual surveillance is an active research topic in tracking systems. It has been using to detect, recognize and track certain objects from image sequences, and more generally to understand object behaviours. The aim is to use surveillance and smart phones to accomplish the entire surveillance task as automatically as possible. These days, CCTV systems are using a variety of well-established

methods for human detection. In general, any object detection algorithm can be used which may vary its complexity depending on its features and use. Although there are many applications in market which are offering more or less same services but nobility of this proposal is that extract information from the real time incident and by using artificial intelligence approach make a decision for proper actions.

A. *Mobile Application for Client Usage*

Mobile application will stream video from captured from mobile camera and will be broadcasted to server. It is also sensing location by GPS and will send it to server.

B. *Server Application for Monitoring and Controlling*

By using this propose application, a user can inform his/her location when it is needed and then at that location existing CCTV cameras can focus on given parameters. The best use of this application might be in that case when a user feels danger around or not sure about the security of surroundings. In that case, user will turn on the application which will calculate the location parameters of the user. These parameters will be sent to server which will issue commands for CCTV cameras for focusing that particular location. This way, our system inherently provides two core services:

(a) Identification, since the people detected in the video streams can be recognized and

(b) Localization, as each mobile phone detects its own location in the process**.**

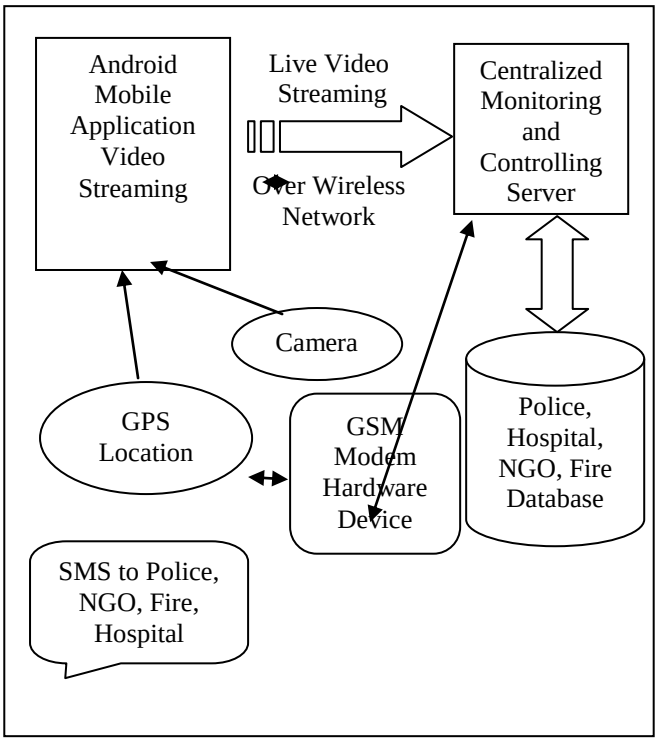

Figure 1. Propose System Architecture.

C. *Scheduling Algorithm for Video Streaming*

MPEG-4 achieves high compression ratio with several provisions for error concealment: resync-marker, data partitioning for P frames, and reversible variable length coding (RVLC) [8]. A frame is having of several video packets (VP) separated by resync-markers. Using data/information partitioning mode, a VP may be further separated into motion and texture fields by the motion marker. In this paper, we use video packet mode with resync-marker with and without data partitioning mode. We will assume no compression and/or expansion of total display time, i.e., we enforce that the playback duration at the receiver to be equal to the duration of the original video clip. Suppose we have frame sequence $\{F_0\ F_1\ F_2\ \ldots\}$ to be displayed at frame rate of f frames per second. If the receiver starts to display the first frame F_0 at time $t = 0$, then the n-th frame, F_n, is expected to be displayed at its deadline, i.e., at $t = n/f$. If a VP is not available at its expected display time at receiver, it miss its deadline, and the receiver applies error concealment by copying corresponding macroblocks from the previous frame [11].

Scheduling of VPs involves determining their sending sequence to be sent. One basic criterion for deciding sending order is the 'deadline' of VPs; this means the sender sends the VP with earliest deadline first (EDF). In this conventional EDF case, the dwelling time of VPs in the receiver system buffer is minimized, and a result, we will achieve minimum required buffer size at the receiver. However, with predictive video, it is conceivable to add other criterion, namely, the relative 'importance' of data in the encoded video. If the channel condition is not good with large error rates, then it is desirable to send more important VPs within GOPs first in order to achieve low video distortion. Combining these criteria we have develop the following scheduling algorithm. We propose a basic frame based scheduling. We extend it to the case with motion-texture discrimination.

1. *Frame based Scheduling*

We consider frame sequences: $\{F_0\ F_1\ F_2\ \ldots\}$
Where Fi = I or P frames. Assume that F_0 = I. Each GOP is composed of one I and (M-1) P frames. Suppose that F_0 is on display at the receiver system at time $t = 0$. Then the deadline of F_n is given by $t = n/f$.

We now define the type a_i of F_i where $a_i = 0,\ldots,M$-1 as

$$\alpha_i = i \mod M \tag{1}$$

In other words, I frames having type 0, P frames immediately after I frames having type 1, and P frames immediately before I frames having type M-1. Frame F_i are composed of video packets with $VP_{i,j}$ denoting the j-th VP in F_i. We assign the following *deadline threshold* $d(VP_{i,j})$ in seconds to $VP_{i,j}$:

$$d(VP_{i,j}) = \frac{\beta\alpha_i}{M-1}, \text{[sec]} \tag{2}$$

Where β in second is called as importance coefficient, and is explained later. For the frame based scheduling in this section, all VPs in a frame will be assumed to have the same deadline threshold. The deadline threshold is larger for frames which occur later in a given GOP than for those that occur earlier, reflecting their relative importance.

V. RESULTS AND EXPECTED OUTPUTS

This Paper screen shots showing the expected results of client streaming and server monitoring data.

Figure 2. Screenshot of Mobile Application.

Figure 2 showing android mobile application screenshot for streaming video to server. This application capture video by using android mobile camera and will stream that video to monitoring server. This android application also send location details to server to track the object and take necessary action against that situation.

VI. CONCLUSION

Surveillance by using CCTV systems has reached to at best level. Also sending information or data through data networks to servers is common these days but coupling these two surveillance and data transmission processes is a very challenging work. CCTV surveillance systems are mostly implemented and managed by governments so, using CCTV systems information has a security problem or very difficult to handle. This propose system can be used at low scale in first phase where security issues are less or easy to handle. In the future, we will enhance the propose system tracking algorithm by using the Enhanced Filter model, that will considers the multiple sensing data of mobile user with network connected CCTV environment.

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