

SECURITY IN LIBRARIES NEED SURVEILLANCE AND BIOMETRICS

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Abstract

The security of materials and information in a library is quite essential. This paper discusses the use of CCTV cameras and biometric methods for surveillance in libraries to safe guard its possession of books and information. This paper presents the various types of CCTV cameras, their functioning and uses. A brief discussion of biometric methods like fingerprint scanning, iris scanning, facial recognition, voice recognition and palm vein authentication is presented. Finally the author recommends that the libraries in India should initiate the implementation of biometric methods and surveillance of the libraries by using CCTV cameras.

Keywords: Closed Circuit Television/ Cameras/ Functioning/ Biometrics Methods/ Voice recognition/ Signature verification/ Surveillance

1. Introduction

We are familiar with the slogan Beware; this area is under surveillance, where Closed Circuit Television (CCTV) is used. Now-a-days, Closed Circuit Televisions are usually used in many public as well as private institutions as a surveillance facility. Over the years the CCTV became less expensive and hence both large scale and small-scale organizations are able to install cameras to detect the on-going activities. CCTV has many industrial and scientific applications in the world of surveillance, electron microscopy, medical imaging and robotics. The uses of CCTV include live onsite displays for special occasions such as conventions, sports, concerts, etc.

Closed Circuit Television not only provides live picturing but also video or digital recording, which can be used to detect crime, violence and anti-social behavior in the preview of CCTV cameras. It can be used to monitor town centers, public transport, domestic and commercial premises, etc. Its use in libraries can enhance the ability to control the book thefts and tearing off the pages from the books and magazines in addition to creating a feeling in the users of the library that their activities are being watched. With the use of any one of the biometric methods in the library, the user's identity can be verified authentically and to a great extent the misuse of lost or stolen membership cards and passwords to use the Internet ,etc. can be reduced. Since the prices of CCTV cameras and finger print scanners are in an affordable range, the libraries in India should use these methods to monitor and control the activities in the library, which results in better management of the libraries.

2. CCTV and its Uses

2.1 What is CCTV?

Closed Circuit Television (CCTV) uses a video camera to transmit a signal to a specific or limited set of monitors. It is used for surveillance in areas like - Banks, Airports, Railway stations and City centers, etc. where strict security is of utmost importance. Traditionally VCR, CCTV pictures are sent via CCTV cameras to a closed area like a CCTV monitor. In the earlier days, the CCTV cameras used in public places were crude and have low definition black & white systems. They lacked the ability to zoom. The modern CCTV cameras use small high definition color cameras that can focus to record minute details by linking the control of the cameras to a computer and the objects can be tracked semi-automatically. Modern digital CCTV systems can be remotely operated through a Personal Computer or a mobile phone.

2.2 Functioning of Cameras

CCTV is a television transmission system, in which live or prerecorded signals are sent over a closed loop to a group of receivers. For example, Cable TV is a form of closed circuit TV. In the earlier days, CCTV cameras were attached to a multiplexer, which sends the analog images to a time-lapse video player. Though this method is in use even today, for simple CCTV installations, but the quality of recording is poor. With the emergence of modern computer technology, the CCTV camera images can be digitized, compressed and stored in the hard disk of a computer for later use. The modern cameras have the facilities like night vision and motion detection in which the system goes on red alert when an incident is detected in front of the camera. Some cameras are covered with bullet-proof casing and have automated self-defense mechanism. These systems ensure that cameras under attack are recorded by the neighboring cameras.

2.3 Uses

The first CCTV system was used in 1942 at test stand VII in Peenemuende, for the purpose of viewing the launching of V2- Rockets [1]. As a result, CCTV came into use in Rocket launching sites to film and record the scenes of rocket launching. At present CCTV, has become an indispensable accessory in civic management in modern cities. It provides digital or video recording of crime, violence, theft, antisocial behavior, etc. Its use is necessary in the following activities:

- In chemical process industries, where the processes take place under dangerous conditions, CCTV should be installed to supervise and control accidents and disasters.
 - Coalmines are one of the important places where CCTV is essential.
 - The use of CCTV in places like Banks, Airports, Railway stations, city centers and other busy locations will not only provide security but also help in planning the traffic control during rush periods.
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- The use of biometric systems is in progress for locking and unlocking of cars, office rooms and residences. Along with this system, if CCTV can be installed in car parking areas, car thefts can be reduced to a great extent.
- In educational institutions, instead of inspecting the various departments and sections periodically, video surveillance and remote monitoring can be used for an effective management.
- The use of CCTV in warehouses, construction sites, gas stations, hospitals, shopping complexes, libraries, museums, archives, supermarkets, departmental stores and jewelry shops are quite successful.
- If Railway stations and busy town centers of all the cities use CCTV, the crime can be reduced and traffic control will become easy.
- CCTV can be used in libraries to monitor the student activities and their behavior in the library. The common mischievous activities in the libraries like tearing of the pages from the books, hiding the books, sitting in corners and gossiping and book theft can be reduced to a great extent.

3. Use of CCTV in UK

According to Michael McCahill and Clive Norris [1], the number of surveillance cameras in private premises in London is around 400, 000 and the total number of cameras in the UK is around 4,000,000 so that every 15 people are being watched by one camera in UK. The cameras have been installed in taxis and mobile police surveillance vans to detect violence. As a result, the crime rate has reduced.

Traffic monitoring

In the city of London, cameras have been installed at the boundaries and also inside the congestion zones, which automatically reads the registration plates of cars to monitor traffic and notice accidents. Though USA is also using CCTV, but its use is less compared to UK and Germany.

4. Types of CCTV cameras

There are three types of cameras: (1). Dome camera (shown in Fig.1) - These are usually placed inside a dark dome and cannot be seen from outside. (2). Wall cameras - These are big visible units having many options like, waterproof, bulletproof, infrared light or zoom. (3). Hidden cameras- These are small and hidden inside other objects and are not easily detectable.



Fig. 1: Vari-focal dome color security camera.

Fig.1 shows a dome camera. It is an indoor color high-resolution mini dome camera with manual zoom lens. It provides manual zoom capability from 4mm to 8mm views. It can be operated with any standard video surveillance system.



Fig.2: High resolution color indoor mini dome security camera.

Fig.2 shows a mini dome camera. This camera provides 30-foot night vision, auto iris with 306mm lens, and covers an area of 30 ft x30 ft, with 420 lines of resolution.



Fig. 3: High performance outdoor camera.

Fig.3 shows a high performance outdoor high resolution camera. It has 200-day color and 150-night vision security system, with long-range auto zoom lens. It is meant for all types of outdoor long-range video security applications.

5. Use of CCTV in India

In India, Smt. Hansa Mehta Library and the Central library of Vellore Institute of Technology, Vellore and many other institutions/universities are using CCTV. In almost all the cities, many jewelry shops, departmental stores are also using CCTV.

6. Biometrics

Your finger is the key, which unlocks your car and your eyes are your bank card to withdraw cash. Your hand is the security software that protects your network from intrusions and fraud. Your face opens the door to your work place.

By measuring something unique about an individual and using that to identify an individual is the present generation's form of security. Biometrics refers to the automatic identification of a person based on his/ her physiological characteristics like fingerprints, eye-retina and irises, facial patterns, hand measurements, etc. Behavioral characteristics like signature, gait, typing pattern, voice recognition, etc. are also used in Biometrics. The use of biometric methods for personal authentication is more accurate than the methods of using passwords or PIN codes. The use of biometrics is not new to the world, and we all are familiar with the thumbprints in place of signatures. Even today in India, thumbprints are taken in addition to signatures on important documents, particularly legal documents and money transactions.

7. Use of Biometrics

With the increased use of computers for data storage and easy retrieval methods, the biometric techniques can prevent unauthorized access to ATMs, Cellular phones, Smart cards, desktop personal computers, workstations and computer networks. In a personal identification system, emphasis is on verifying the identity of the authorized user. Hence, it is assumed that the user of such system will cooperate when he makes a claim for identity. Some studies have revealed that the use of biometric technology is increasing steadily. According to a research conducted by Ponemon Institute for Unisys, 66% of consumers worldwide consider biometrics as an ideal method of security and identity. The study [2] reveals that 68% of the public of Asia Pacific prefer the use of biometrics. In North America 71% of the public and in Europe 69% of the public prefer to the use of biometrics. U.K is using facial recognition as the primary biometric with Iris and fingerprint as backup. U.K. is also using Biometric techniques while issuing passports to confirm the identity in addition to using the method for border security.

In India, Tirumala Tirupathi Devasthanam (TTD) is the first organization to use modern biometric system (with computerized scanning devices) to control the pilgrims. The TTD is using touch less fingerprint and eye scan biometrics, to allot time slots to devotees at Tirumala. Approximately 100,000 pilgrims per day can be scanned with this system. The Hyderabad based Bartronics India [3] is pursuing the task of integrating all biometrics-based readings of eye, fingerprints and facial images. They are also working on biometrics-based access control for buildings. These activities are in the R&D stage

at present. The Jaypeetex has already launched their own manufactured fingerprint identification unit for access control and time & attendance Scan 4000, which is shown in Fig. 4. The government of India is planning to provide National ID cards and the required data has been already collected in 13 districts of 13 states from 3 million participants. The finger print data will be encoded in smart cards. Various state, police and city offices in Maharashtra, Andhra Pradesh, Karnataka and Kerala are trying to use finger print clock in systems for workers to ensure accuracy and punctuality of the employees.



Fig.4 Jaypeetex’s manufactured Scan 4000 unit.

8. Types of Biometrics Methods

Though many types of biometric methods are available now-a- days, the most popular ones are, Fingerprint matching, Iris scans, Hand geometry, Face recognition, Voice recognition, Gait, Signature verification etc. Of all these fingerprint and iris technologies are widely used. Foolproof security with the use of CCTV and Biometrics can be achieved in the libraries.

A few libraries in the world have already switched over to biometric identity. The most simple, inexpensive and best method of biometrics is finger print match, which can be used for library security. According to the American Library Association, the Buffalo-Erie county library system consists of 52 public libraries that serve approximately 400,000 people in Network using fingerprint scans as an optional replacement for library cards. The author is familiar with the use of CCTV in library and with her experience, she recognized the advantages of using CCTV and Biometrics in libraries for fool-proof security. Now the CCTV products range from a simple analogue or digital package to highly advanced digital systems, which can be integrated into other security systems, such as intruder alarm. For example, If a library wants to install CCTV, the TV monitors can be kept in the librarian’s cabin or security personnel’s cabin. The librarian or the security in-charge can monitor the stack areas for any misconduct of users. With

constant monitoring, the misuse or theft of the books can be reduced to a great extent. Even if the library is spread into many floors, the cameras can be fixed in each floor and where ever surveillance is necessary. As a result of this arrangement, the tearing of pages from the books, hiding the books by the users, book theft and sitting in corners and gossiping can be reduced to a large extent. The models of a few devices for biometric systems used in libraries are given below. The fingerprint scan device is shown in Fig.5, while the facial recognition device is shown in Fig.6.



Fig. 5. Fingerprint scan device

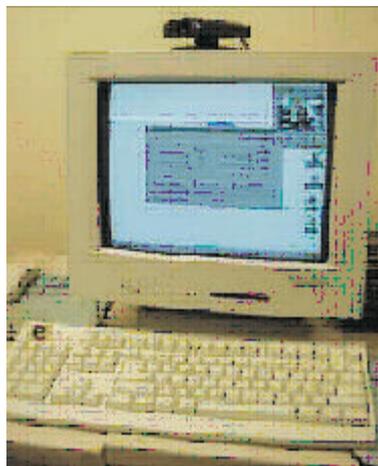


Fig. 6. MiroData Facial Recognition

Voice Recognition

A voice recognition device is shown in Fig.7. The Voice recognition [4] operates by translating voice tones into a unique corresponding mathematical pattern. Only a microphone, sound card, and software are required for implementation.



Fig.7. T-Netix Voice Recognition Device

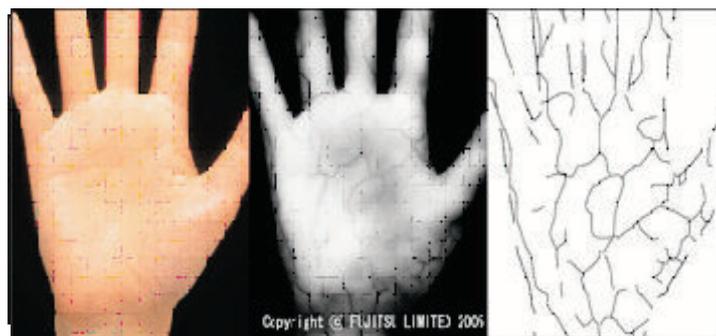


Fig.8. Fujitsu's palm vein authentication technology.

Fujitsu's library system is the first of its kind to implement contactless palm vein authentication technology to start cardless lending of library materials. With this, users will have simple and reliable access to library services without using an ID card. It eliminates concerns over unauthorized use of lost or stolen library ID cards. The Naka City Public Library in Japan has commenced the use of this system since October 2006.

Improved administrative efficiency through use of RFID tags

The Radio Frequency Identification (RFID) is a technology similar to the theory of barcode identification. It consists of an antenna and a transceiver, which reads the radio frequency and transfers the information to a processing device and a transponder or tag. The tag is an integrated circuit containing the radio frequency circuitry and information to be transmitted. By attaching RFID tags to the library's materials, the

lending process can be automated and made faster. Management of the library's bibliographic resources can also be accomplished with more speed and efficiency. In addition, the system helps in preventing the unauthorized removal of materials from the premises.

Signature verification

The biometric signature verification system, shown in Fig.9, analyzes the act of writing and examines the pressure one applies while writing, the speed and rhythm with which one writes. This method also records the sequence in which one forms the letters. For example, some individuals may add dots and crosses as they keep writing or after they finish the word. These traits are very difficult to forge. Handwriting recognition system's sensors can include a touch-sensitive writing surface or a pen that contains sensors, which detect the angle and direction of writing as well as the pressure applied while writing.



Fig. 9. Biometric signature verification device

9. Conclusion

The simple fingerprint biometric system can be used, in place of the identity cards in the libraries. For this purpose a fingerprint scanner is necessary. The identity verification can be activated by comparing a user's pre-registered fingerprint patterns to the data read by a contact less fingerprint scan device linked to the libraries administrative terminal. The most common problems like unauthorized use of lost or stolen library cards, misuse of passwords (if you know the password of your friend you can access the PC or internet) to use the Internet, etc. The biometric authentication of users contributes to resource conservation also by reducing the number of cards issued. Even though the use of both CCTV and biometrics in libraries in India is in its infancy, it is necessary for all the libraries to switch over to these methods as early as possible. The personal computers of the future might include a fingerprint scanner, where one could place the index finger for the computer to assess the authenticity of

the user. The computer would analyze the fingerprint to determine whether the user is authorized to access the data or not. At present many libraries are using bar-coding system, for data retrieval but with the increasing technology, we hope that it may not take very long time to go for biometric systems coupled with CCTV for better management of the libraries.

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