

Fingerprint Identification System in library and Information Center

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Abstract- AFIS is dramatically improving in the last decade. It can use in Library and Information Center for providing better security. The application of AFIS in Library and Information Center will protect from thief, mutilation of library materials and other unethical losses.

Keyword- AFIS; Fingerprint; Library and Information Center.

INTRODUCTION

Library is a 'temple of learning', which play an important role in the development of an institutes and society. Library is not always safe and secure place. Books are often found on the library shelves with pages torn from the spine. Sometimes books are damaged beyond repair and almost all academic libraries are suffering from book or document theft by its member [1]. So librarian need to aware from theft, mutilation of library materials and other unethical losses. The duty of the librarian is to keep the library buildings, shelves and stacks open and free without losing items to make available or putting individuals at unacceptable risk from the malicious, avaricious or senseless act of others.

It is important to provide a safe and secure environment for library staff, library resources and equipment, and library users. In this regard, the fingerprint identification system is really useful for the library and information science professional [2,3].

HISTORY OF FINGERPRINT IDENTIFICATION SYSTEM

The history of fingerprints perhaps date back to thousands of years B.C. There is a record of recovering fingerprint from the Tomb of Egyptian king, Tuken Khamen in the year 1340 B.C. [4]. During the year of 246-210 B.C., the Chinese imposer Te-in-She was the first imposer who used the fingerprint as a sign of manual in the form of seal on the documents for the purpose of the identification. The seal was being made on a clay bearing thumb impression of the king on one side and the name of the owner on the other.

In India, during the Mughal period, the fingerprint along with palm print, known as "Panja" were in extensive use for the purpose of identification [5]. The fingerprint system was first officially used in India in 1858 by Sir William Hershel, I.C.S. officer to prevent the impersonation but it is properly systematized by Sir Francis Galton for the purpose of identification of criminals.

In the year 1872, Dr Henry Fauld, who was practicing in Japan came to India as a medical missionary in Darjeeling and observed the uses of fingerprint as a signature for official purposes. Afterwards Dr. Henry Fauld started recognizing the value of fingerprint and collected the materials which was gathered by Dr Sir W. Herschel. Dr Henry Fauld published an article in the journal in 1880; the name of the article being 'Nature'.

In 1890, Sir Edward Richard Henry with the help of two assistants Mr. Rai- Bahadur Hemchandra Bose and Mr. Khan Bahadur Azizul Heg had developed this system of fingerprint further by classifying the prints for practical applications in the field of identification of criminals. In the year 1897, the fingerprint Bureau was established in Calcutta. Then afterward it has been developed throughout the world. A case is reported in Argentina where conviction was possible by using the fingerprint system. Later in the year 1902 in Jalpaiguri, India, in a burglary case where identification was possible by using the fingerprint system which was accepted as an evidence and hence included in India Evidence Act (Vedi Sec. 45).

With the rapid evolution of information technology, people are becoming even more and more electronically connected. To compare manually one fingerprint with other for verification take lots of time. People start aware of machine which can compare hundreds of fingerprint within few seconds [6]. This makes the development of Automatic fingerprint identification System(AFIS).

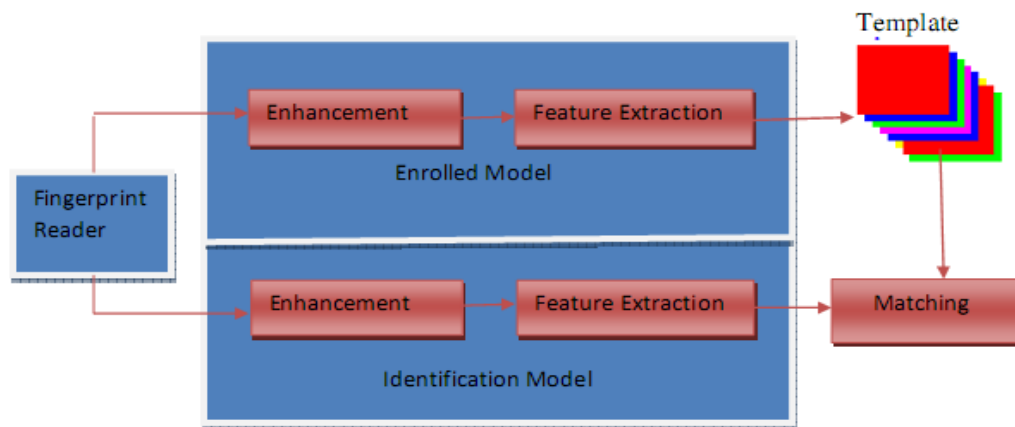


Fig 1: A generic fingerprint identification system.

Many Automatic fingerprint identification algorithm were available in the literature [7,8,9,10,11]. Most of the effort are done in enhancement stage because the accuracy of feature extraction is completely depend on the quality of the input fingerprint image, it is require to enhance the image to make the ridge distinct from furrows. The two common types of feature which use in AFIS are ridge ending and ridge bifurcation as shown in Fig 2..



Fig 2: a) Ridge bifurcation, b) Ridge ending.

Biometrics, which refers to identification based on physical or behavioral characteristics, is being increasingly adopted to provide positive identification with a high degree of confidence [12,13]. Among all the biometrics techniques, fingerprint have received the most attention because of the long history of fingerprints and their properties as shown in table 1.

| Biometrics | Universality | Uniqueness | Permanence | Collectability | Performance | Acceptability | Circumvention |
|---------------|--------------|------------|------------|----------------|-------------|---------------|---------------|
| Face | high | low | medium | high | low | high | low |
| Fingerprint | medium | high | High | medium | high | medium | high |
| Hand Geometry | medium | medium | medium | high | medium | medium | medium |
| Hand Vein | medium | medium | medium | medium | medium | medium | high |
| Iris | high | high | high | medium | high | low | high |
| Retinal Scan | high | high | medium | low | high | low | high |
| Signature | low | low | low | high | low | high | low |
| Voice Print | medium | low | low | medium | low | high | low |
| F. Thermogram | high | high | low | high | medium | high | high |

Table 1. Comparison of biometrics technologies.

Fingerprint is a flow like pattern in which ridges flowing in some symmetrical order and the space between the ridges is almost constant and orientation of the ridge changes.

FINGERPRINT APPLICATIONS IN LIBRARIES:

Application of AFIS in Library and Information Center can be done in three respective fields.

A. Control access to library premises-

This type of application will not allow any unauthorized person to open the door. In this application, fingerprints of the authorized users will be scanned and stored for verification. This fingerprint identification is really a secure, convenient, and cost-effective alternative to passwords, badges, swipe cards and PINs. The fingerprint reader mounts on a wall near the library main door. This fingerprint scanners offer various levels of authorization for an individual. This authorization includes a scheduling mechanism for allowing access for individuals based on the time of day. This can avoid unauthorized access from computer room or server.

This system increases security levels more than a ID card or ID badge as the fingerprint can't be lost or stolen. It also reduces overall cost in eliminating portable devices and reducing administrative time as well. The system is convenient and there are no more fumbling of keys and ID cards. The member need not worry about misplacing their cards. The premises access devices can be networked together so that the system can be controlled and maintained from a central location.

B. Control access to library network-

Now a days, most of the libraries are working on digital environmental where the library is concerned with the local area network, wide area network or intranet of the organization. In a world of cyber crimes, it is the need of the hour for any library to have control over the member access to the library network. Libraries are providing user name and password to the members to make use of the library computer systems and networks. However, too many passwords or inappropriate passwords lead to security lapses in which virtual credentials are lost, forgotten and hacked.

To overcome this problem, advanced biometric solution is available which ensures network authentication and safeguard the library network against unauthorized intrusion. This kind of biometrics system will protect individual PCs and network access. It also reduces the password reset requests from the users. The library administrator can be able to authenticate who is accessing a PC, network, and application with exceptional accuracy. It associates a single fingerprint with as many as passwords or PINs on a system. User can log on automatically without having to type in username or password. It eliminates the security risks of written down passwords and PINs.

C. Control access to library books-

Implementation of fingerprint as a library borrower cards will be one of the positive steps to make library a digital environment. Every applicant of library cards will get enrollment of their fingerprint image and get stored in the database. And at the time to borrow book, the person need to scan their fingerprint in the fingerprint scanner. If the fingerprint is matched with the template in the database, the person can be allowed to borrow the book from the library because fingerprint is unique to every individual. This will release the burden of forgetting, stealing and missing of library cards. Introducing a fingerprint as a library card will reduce the workload of making cards of each and every authorized member.

LIMITATION AND PROBLEMS OF FINGERPRINT APPLICATION

Though the biometrics technology provides a number of advantages, there are some disadvantages too. The following are a select list of problems associated with the system.

- Fingerprint Identification System is inherently individuating and interface easily to database technology, making privacy violation easier and more damaging.
- Fingerprint Identification System are useless without a well considered threat model.
- Fingerprint Identification System are no substitute for quality data about potential risks.
- Fingerprint Identification System accuracy is impossible to assess before deployment.

CONCLUSION

Fingerprint Identification System are really very useful for Library and Information Science professionals to ensure better safety and security to the valuable collections which consist of information resource base. Though there are few limitation, the technology could be used in our libraries in a phased manner. The academic libraries can make use of the benefits of the technology to ensure better safety and security to their invaluable information resource base and human resources as well.

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