An Efficient Automatic Attendance System using Fingerprint Verification Technique

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Abstract— The main aim of this paper is to develop an accurate, fast and very efficient automatic attendance system using fingerprint verification technique. We propose a system in which fingerprint verification is done by using extraction of minutiae technique and the system that automates the whole process of taking attendance. Manually which is a laborious and troublesome work and waste a lot of time, with its managing and maintaining the records for a period of time is also a burdensome task. For this purpose we use fingerprint verification system using extraction of minutiae techniques. The experimental result shows that our proposed system is highly efficient in verification of user fingerprint.

Keywords-fingerprint verification; image processing; minutiae matching; segmentation

I. INTRODUCTION

In many institutions and organization the attendance is a very important factor for various purposes and its one of the important criteria that is to follow for students and organization employees. The previous approach in which manually taking and maintains the attendance records was very inconvenient task. After having these issues in mind we develop an automatic attendance system which automates the whole process of taking attendance and maintaining it.

We already know about some commonly used biometric techniques are used for objective identification and verification are like iris recognition, voice identification, facial recognition, fingerprint identification, DNA recognition, hand geometry recognition, signature recognition, and gait recognition [1]. Biometrics techniques are widely used in various areas like building security, forensic science, ATM, criminal identification and passport control [2]. In our proposed automatic attendance system we uses fingerprint recognition technique [3, 4] for obtaining the attendance. The fingerprint recognition is widely used for many other purposes and it is widely popular technique [5]. Fingerprint verification is very convenient and reliable way to verify the person's identity. It is believed that no two people have identical fingerprint in this world, so the fingerprint verification and identification is most popular way to verify the authenticity or identity of a person wherever the security is a problematic question. The reason for popularity of fingerprint technique is uniqueness of person arises from his behavior; personal characteristics are like, for instance uniqueness, which indicates that each and every fingerprint is unique, different from one other. Universality, that means every person hold the individual characteristics of fingerprint. Permanence, means that fingerprint are permanent, are impossible to change or forgot, and can never be stolen. Collectability means that we can measure fingerprint quantitatively [6].

In present scenario, the various uses of fingerprint verification are widespread like authentication to logon machine and others but still majorly for law enforcement applications. There are a lot of expectations that the use of fingerprint recognition will increase which is dependent of some factor involved like small fingerprint capturing devices, fast computing hardware, and awareness on easy to use methods for security [3]. This paper cover the topics on fingerprint verification, algorithm and our proposed system, the details of pre-processing of fingerprint image including enhancement, binarization, segmentation, extracting minutiae from image, post processing and matching, experiment and its result.

A. *Fingerprint Recognition*

The Fingerprint is the feature pattern of one finger or an impression of friction ridges found on inner surface of finger as shown in figure 1(a). Everyone in this world has his own fingerprint with the permanent uniqueness. A fingerprint is made up of ridges and furrows, which shows good similarities like parallelism and average width [6]. However the research conducting on fingerprint verification and identification shows that we can distinguish fingerprint with the help of minutiae, which are the some abnormal points on the ridges. There are two type of the termination of minutiae, immediate ending of ridges or a point where ridge ends abruptly called ending or termination and the point on the ridge from which other branch derives or a point from where ridge splits into two or more branches is known as bifurcation as shown in figure 1(b).

B. *Proposed System*

Figure 2 shows our proposed automatic attendance system using fingerprint verification technique. A fingerprint is captured by user interface, which are likely to be an optical, solid state or an ultrasound sensor. Generally, there are two approaches are used for fingerprint verification system among them first one is Minutiae based technique, in which minutiae is represented by ending or termination and bifurcations. Other one is Image based method or matching pattern, which take

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Information Retrieval provides the reader with a broad coverage of the concepts themes and instrumentalities of the important and evolving area of biomedical text images and visual features towards information retrieval It aims to encourage an even wider adoption of IR methods for assisting in problem solving and to stimulate research that may lead to additional innovations in this area of research The book discusses topics such as internet of things for health informatics data privacy smart healthcare medical image processing 3D medical images evolutionary computing deep learning medical ontology linguistic indexing lexical analysis and domain specific semantic categories in biomedical applications It is a valuable resource for researchers and graduate students who are interested to learn more about data mining techniques to improve their research work Describes many biomedical imaging techniques to detect diseases at the cellular level i e image segmentation classification or image indexing using a variety of computational intelligence and image processing approaches Discusses how data mining techniques can be used for noise diminution and filtering MRI EEG MEG fMRI fNIRS and PET Images Presents text mining techniques used for clinical documents in the areas of medicine and Biomedical NLP Systems

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