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A Portable Biometric Fingerprint Attendance Reader System

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Abstract – *Every organization, whether it is an educational institution or a business, must keep a proper record of the attendance of their students or employees in order to function effectively. The development of an efficient attendance management system for students, which allows for easy and accurate record-keeping, is a crucial aspect of this project. Currently, attendance is taken manually on paper and records are maintained by an individual who has to calculate everything at the end of each month. This process is time-consuming and leaves students waiting until the end of the month to find out their attendance. By implementing this system, the accuracy of attendance records would be improved as it eliminates the need for roll calling and saves valuable time for both students and teachers.*

Key Words: A Portable *Biometrics, Minutiae, Fingerprint, Feature Extraction, Encryption,AS608 Scanner.*

1. INTRODUCTION

The attendance system of a classroom incorporates the concept of lots. To achieve this, a portable module has been developed that can identify students through their fingerprints and transmit the student's ID to the server. In order for the system to function, an internet connection is necessary, which can be established using Wi-Fi. To cater to this requirement, a board (P6951) has been selected that supports Wi-Fi connectivity. Upon powering on the system, it automatically scans for available Wi-Fi networks and prompts the user to enter the password for the desired network. Once connected, the system proceeds to scan for fingerprints using the fingerprint module r-305 and identifies the corresponding student. The fingerprint ID of the recognized student is then sent to the server (PC). When the server receives the fingerprint ID, it records the student's attendance.

The attendance percentage can be easily monitored through the website or android application, enabling students to check their attendance in real-time. The current attendance system relies on teachers manually taking attendance through roll calling, which presents several drawbacks. These include the possibility of proxy attendance, the additional burden on teachers to calculate attendance percentages, the potential for calculation errors, and students not receiving their attendance reports until the end of the month. By implementing this system, all of these problems can be avoided. This system utilizes fingerprint recognition to accurately identify students, making it impossible to mark proxy attendance. Furthermore, attendance data is immediately sent to the server in real-time, eliminating any delays. All attendance calculations are performed by the server, ensuring accuracy, and students have the ability to check their attendance in real-time. On the fingerprint data set can be Performed and documented.

1.1 A TFT Display:

The TFT LCD screen, also known as a thin-film-transistor liquid-crystal display, utilizes TFT technology to enhance image contrast and addressability. It is an active-matrix LCD, which sets it apart from passive-matrix LCDs and direct-driven LCDs that have fewer segments [11]. The TFT LCD has become the most crucial visual display terminal (VDT) screen in use today [12]. It is used in a wide range of devices such as mobile phones, computer monitors, television sets, and other applications that require a display system. For our specific device, we have implemented a TFT 1.8 screen that showcases information based on the coding we have programmed. Essentially, it serves as an interface for users, providing them with information about identification and attendance.

1.2 Background /Content

The fingerprint scanning sensor is responsible for creating an image that captures the unique ridges and valleys of each individual's fingerprint. This system serves two main purposes. Firstly, it scans the fingerprint and gathers relevant data from the user. Secondly, it uses this information to compare and match the fingerprint with the corresponding student ID. In our particular system, we have incorporated the AS608 fingerprint module. The AS608 is a module specifically designed for secondary development, and it combines various components such as a fingerprint optical sensor, CMOS image sensor, CPU, and Flash memory. This sensor boasts several key features including a large fingerprint capacity, compact size, simple ports, low power consumption, high reliability, and a small fingerprint template size of 496 bytes. These features contribute to the overall user-friendly nature of this sensor [15]. Since this particular fingerprint module is not

readily available in the market, we have developed our own Arduino library to enable its functionality with a microcontroller. Figure 3 provides a visual representation of the AS608 fingerprint sensor's appearance.

2. Related Work

Tu and Hartley, as well as Pankanti et al., have conducted research on analyzing system performance using a statistical framework. They have proposed a method of creating a binary code from a set of fingerprint features and conducting matching experiments on a database.

The purpose of these experiments is to estimate the number of degrees of freedom within the population of fingerprints. By utilizing this approach, they aim to gain insights into the performance of the system. The work conducted by Tu and Hartley and Pankanti et al. focuses on the statistical analysis of system performance. Their research involves the creation of a binary code based on fingerprint features. Through a series of matching experiments, they seek to determine the number of degrees of freedom present in the fingerprint population.

This statistical framework provides valuable information about how the system performs.In their study, Tu and Hartley and Pankanti et al. present a statistical framework for analyzing system performance. They propose a method of generating a binary code from a set of fingerprint features and conducting matching experiments on a database. These experiments help estimate the number of degrees of freedom within the fingerprint population.

Table -1: Attendance Interface

ID	Name	Date	Time In
01	Shrikant	2024-04-01	11.06 AM
02	Subodh	2024-04-01	11.09 AM
03	Shahebaz	2024-04-01	11.15 AM
04	Pragati	2024-04-01	11.21 AM
05	Vrushabh	2024-04-01	11.23 AM
...	...	...	...

This table includes the following columns:

1. **Employee ID**: A unique identifier for each employee in the system.
2. **Name**: The name of the employee.
3. **Date**: The date on which the attendance was recorded.
4. **Time In**: The time at which the employee arrived and their attendance was recorded.

2.1 LITERATURE SURVEY

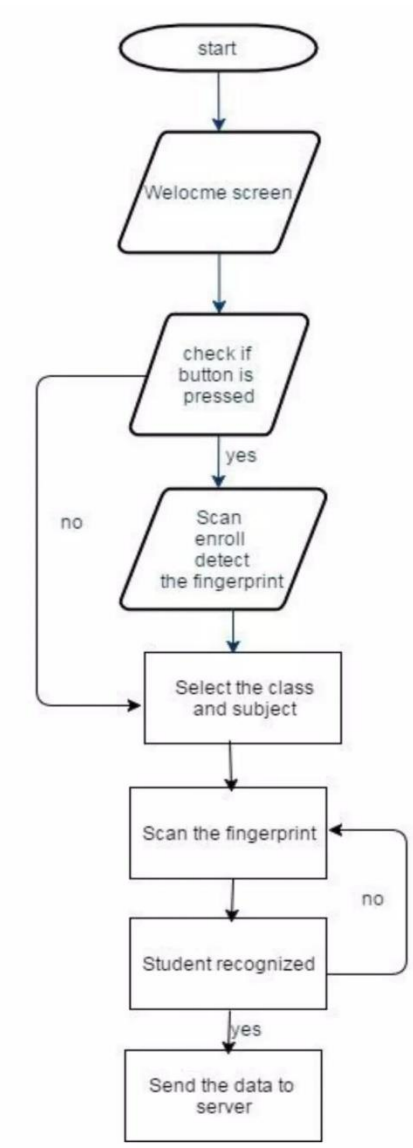

Fig -1: Flow chart

Based approach. However, upon analysis, it has been observed that the performance of these algorithms is not consistently high, particularly when dealing with fingerprints from the same finger but with different rotations or minimal intersection. Therefore, it is imperative to develop a model that standardizes the fingerprint template in order to improve the matching score.

The uniqueness of a fingerprint is determined by the specific characteristics of the ridges and their relationships. However, this method may not be suitable for real-time

applications. Despite this, the system's accuracy can be easily adjusted. Most automated systems that compare fingerprints rely on matching the unique features.

In 2010, Le Hoang Thai and Ha Nhat Tam proposed a standardized model for fingerprint recognition. Nowadays, fingerprint recognition is considered one of the most crucial biometric technologies due to the distinctiveness of fingerprints. Their approach aimed to improve the quality of fingerprint images. During the process of fingerprint recognition, the matching between the template and query fingerprints plays a vital role in determining the accuracy of the system.

This approach functions by utilizing the uniqueness of each individual's fingerprint. It integrates a biometric device to capture and transmit the collected information. The method involves using algorithms for fingerprint extraction and matching, as well as maintaining a database to authenticate individuals who access an online web page hosted on a local server.

2.2 ADVANTAGES:

- This method has very high accuracy and it is Easy to use.
- Fingerprint identification is that it is accepted in legal community, among law enforcement and general public.
- This method is the most economical biometric PC user authentication technique.
- Fingerprint identification is widely perceived As highly accurate and very reliable.
- This method required small storage space for the biometric template, reducing the size of database memory required.

2. 3 DISADVANTAGES:

- The major disadvantage of this technology is that using the fingerprint scanner does not take into consideration when a person physically changes.
- For some people it is very intrusive, because is Still related to criminal identification.

2. 4 IMPLEMENTATION

2.4.1 HTML AND CSS :

Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS) are essential technologies for creating web pages. HTML provides the structure of the page, while CSS controls the layout, allowing for a diverse range of device compatibility. When combined with scripting and graphics, HTML and CSS form the foundation of building web applications and web pages.

2.4.2 PhpMyAdmin:

PhpMyAdmin is an open-source tool written in PHP, XHTML, CSS, and JavaScript. It is designed to manage the administration of MySQL through a web interface. With PhpMyAdmin, users can perform various tasks such as creating and modifying databases, tables, and fields, executing SQL statements, and managing user permissions. To cater to a wide range of users, PhpMyAdmin has been translated into 72 languages and supports both left-to-right (LTR) and right-to-left (RTL) languages.

2.4.3 PHP :

PHP, originally known as Personal Home Page, now stands for PHP: Hypertext Preprocessor. It is a server-side scripting language specifically designed for web development but can also be used as a general-purpose language. PHP was created in 1994 by Rasmus Lerdorf and is currently maintained by the PHP group, serving as the reference implementation of PHP.

2.4.5 MySQL :

SQL stands for Structured Query Language. MySQL is an Open source Relational Database Management System

(RDBMS); it is a popular database for use in web Applications, and is a central part of the greatly used LAMP

(Linux, Apache, MySQL, Perl/PHP/Python) open-source web Application software stack. MySQL is used by many

Applications like, WordPress, Joomla, TYPO3, Drupal, MyBB, phpBB, MODX and other software. Numerous large scale websites including Google, YouTube, Facebook, Twitter, and Flickr are also using MySQL.

3. APPLICATION:

This system can be use in biometric attendance Of students.

This system can be used for real time monitoring of any class strength and make attendance record In real time

It can be used for security purposes where high Level security is desired.

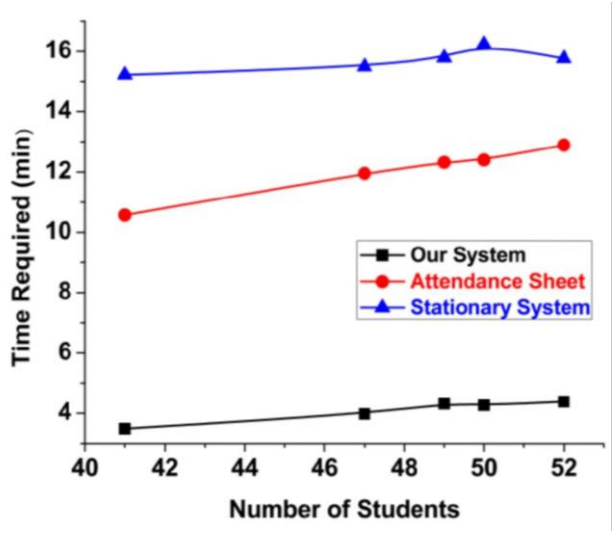

Fig -1: Comparison of other different types.

4. CONCLUSIONS

In this article, we have introduced a mobile biometric attendance system designed for academic use. The system operates wirelessly, connecting to a web server and storing data in a MYSQL database. This portable solution offers significant advantages over traditional stationary systems, including improved time efficiency and reduced workload for course teachers when calculating percentages and marking attendance. Additionally, it effectively prevents students from falsifying their attendance records, ensuring a high level of security.

Automated attendance system hazed on face recognition technique proves to be time saving and secure. In future when the student is absent then a message can be automatically sent to their parents and also the same system could used for hostel. Attendance monitoring

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