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Biometric based security system is one of the today advance security issue. The security based software computer applies combination between the human biometric and computer technology to produce high advance security technology. Attendance system via fingerprint is one of the biometric based systems to record attendance. The key to this technology advancement is due to every human have his/her unique biometric such as fingerprint. That why I have develop the Event Student Attendance System, a system that have a potential to become a very effective event attendance system in this project. This student attendance system is using a fingerprint verification method to verify whether the fingerprint is belong to the student or not before the attendance is recorded in the database. As the result, merit mark will be given to the student that already check-in and check-out the attendance in the event that held in the university.
ABSTRAK

Sistem keselamatan berasaskan biometrik merupakan salah satu isu-isu teknologi canggih dalam bidang keselamatan. Perisian komputer berasaskan keselamatan menggunakan kombinasi antara biometrik manusia dengan teknologi komputer telah menghasilkan tahap keselamatan teknologi yang lebih canggih. Sistem kehadiran yang menggunakan cap jari adalah merupakan salah satu system berasaskan biometrik bagi tujuan untuk mencatat kehadiran. Kunci kepada kecanggihan teknologi ini adalah disebabkan semua manusia ada biometrik unik sendiri seperti cap jari. Ini telah menyebabkan saya mengambil keputusan untuk membina satu sistem yang mempunyai potensi untuk menjadi salah satu sistem kehadiran dengan efektifnya dalam mencatat kehadiran pelajar untuk acara-acara dalam universiti, iaitu Event Student Attendance System. Sistem kehadiran ini adalah menggunakan kaedah cap jari pengesahan untuk mengeash adakah cap jari ini adalah milik kepada pelajar atau tidak sebelum kehadirannya akan disimpan dalam pangkalan data. Keputusannya, markah merit akan diberikan kepada pelajar yang sudah daftar masuk dan daftar keluar dalam acara-acara yang dianjurkan oleh univeriti.
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List of Acronyms / Abbreviation / Glossary

ESAS = Event Student Attendance System

RFID = Radio Frequency Identification

ER Diagram = Entity Relationship Diagram
CHAPTER 1

INTRODUCTION

1.1 Introduction

In the year 2013, Apple introduce its new Apple product, the iPhone 5S. This iPhone 5S boosts fourth quarter sales in China. What is so special about this Apple iPhone 5s that achieve these high sales in China? Apple iPhone 5S have introduce a new security protection function that is fingerprint recognition protection method. This fingerprint recognition protection has replace the old tradition phone security method that is enter 4 digit number as password.

Fingerprint is one of the examples for the biometric. In computer science, biometric is refers to authenticate technique that rely on measurable physical characteristic that can be automatically checked. Every human in the earth have his/her unique biometric.

Fingerprint recognition is the oldest method which has been successfully used in many applications. This is because human fingerprint is unique and it will never be change for an individual life. In this era of technology, fingerprint technology plays an important role in identification and forensic investigation for a long time. For example in America drama crime series: The mentalist, Crime Scene, FBI, N.C.I.S and others. The forensic will use the fingerprint left in the crime scene to trace out who is the criminal.
This technical report includes:

1. Chapter 1: Introduction
   - In this chapter, we will discuss the which are the introduction, problem statement, objective, and scope of the project

2. Chapter 2: Existing System
   - In this chapter, we will discuss the existing attendance system in the Malaysia that is each system description and problem exist in each system include advantage and disadvantage.

3. Chapter 3: Report Body
   - In this chapter, we will discuss the technique and overall work to develop this system. This includes user requirement, and design description.

4. Chapter 4: Development Plan
   - In this chapter, we will discuss how the system is developed

5. Chapter 5: Testing Plan
   - In this chapter, we will discuss how the system is tested. In this report, we will provide the test case for each module and user acceptance testing form.

6. Chapter 6: Conclusion
   - In this chapter, we will discuss and conclude on the result that has been recorded and all data analysis.

Project that is being proposed is “Event Student Attendance System (ESAS)” using fingerprint recognition. The function of the system is to detect and match the fingerprint on the database. The system will automatically record the matrix number of the students who attend the event.
1.2 Problem statement

Merit marks play an important part in University Malaysia Pahang (UMP). UMP student need the merit mark to qualify to stay in university hostel. How the students get the merit marks? Student can get the merit marks by attending the event which held by university. For example club event, international event, university competition and etc. Due to lack of hostel’s room in university, therefore only limitation number of student can apply the hostel. The higher the merit marks, the bigger chance student can apply hostel. In UMP, there a 3 methods for a merit marks is recorded for student. The helper or the runner of the event will ask the student to provide some information that only knows by the students to help the system to record the information and gain the merit marks for themselves. The 3 methods are: -

1. Write the information in a piece paper
   - The helper will ask the students to write down name, matric number and signature in a piece of paper provide. The problem will occur when this paper lost or get dirty. All the information will gone and no merit marks is given to the student who attend the event.

2. Key-in matric number
   - Each student has his/her own matric card. Each card has unique matric number. The helper will prepare computer to let the student to key in the matric number. The computer will based on the matric number that student key-in and record it in the computer database and merit marks is given to them. The issue arise when student will remember his/her friend matric number. They will help friend to key-in the matric number so their friend can get the “free” merit marks. This is unfair to other students who attend the event.
3. Smart card

- Each student has his/her own matric card. Each matric card has its own identity verification method. The student just need to put the card near the machine and the machine will automatically verified the card and save the record in database for the event. This method is very convenience for the student and university but there is a disadvantage. Sometimes, students may forget or not remember to bring their own card. So they have to rush back to their room and come back with the card to “ti” again. This is a waste of time and energy for student.

To overcome this problem, I decide to develop an “Event Student Attendance System” using fingerprint recognition. This system is required student’s thumbprint for the fingerprint recognition process. Then the system will automatically record the attendance of the student for the event.
1.3 Objective

The objectives to develop this system are: -

1. To develop a system for fingerprint recognition using minutiae method
   - Minutiae refer to specific point in a fingerprint
   - 3 major type of minutiae feature:
     i. Ridge ending
        ➢ The spot when a ridge ends
     ii. Bifurcation
        ➢ Spot where a ridge splits into two ridge
     iii. Spot
        ➢ Fingerprint ridge that are significantly shorter than other ridges

2. To ensure that merit marks is given to the student who attend event
   - Using unique fingerprint recognition to ensure that student who attend the event will get the merit mark
   - Each student have his/her own unique fingerprint that is unchangeable
   - The system will scan and match the fingerprint and save the matric number of the student in the database
   - The system will come out a paper of record to show the matric who attend the event
   - The merit marks will give to the student base on the record

1.4 Scope

The scopes of the project consist of: -

1. The system applying fingerprint verification method to read student fingerprint and save his/her student matric into database in the university event.

2. Generation of attendance sheet by admin allow they to know student who had attended the event.
CHAPTER 2

EXISTING SYSTEMS

2.1 Introduction

Do you all realise that wherever we go, there will be an attendance sheet or system for us to sign or check in? Let start with our primary school, I still remember that my teacher will call out every student name and record the attendance if the person is called present. Then in university life, a lecturer will pass the attendance sheet to student to sign when we attend a class. After graduate from university, there is also an attendance sheet for us in our working company waiting to be sign in. Yes, attendance sheet can be exist in any place and event.

Attendance plays an importance role in our life. Attendance is an action of going or being present in a place or event. Attendance sheet or system is a paper work or software that used to record our attendance. For example, a student attends the school and the teacher records his/her attendance in an attendance book.

Human’s brain cannot remember many things after certain time. They need a thing such as computer, paper, notice board and etc.to help them to record what they need to remember it. For example in school, a teacher is hardly to remember which student is absent 1 week ago. So, teacher needs to record the student’s attendance in a student attendance book. This is easy the teacher jobs to check the attendance of student to school.

In this chapter, we are going to discuss several of existing attendance system in Malaysia. We will also compare its advantage and disadvantage of each system.
2.2 Student Attendance Log Book

When we in primary school, our teacher record our attendance by calling out our name and tick the attendance on our name column if we attend or absent school that day. This is the tradition method of record the student attendance in year 1990’s. A teacher will prepare an attendance log book and write down all students’ name inside it. When a class monitor report the student attendance, the teacher will put absent or “0” for the student who absent and attend or “1” for the student who attend the school in an attendance log book. Every end of the month, the teacher has to count the day for the student who absents the class this is because a warning letter needs to send to student if the student absents the school for more than 3 days without a valid reason. Imagine that a class has about 40-50 student, teacher is impossible to remember the number of day for each student that absent to school without a help from record it in an attendance book. This Student Attendance Log Book System is a waste of time and energy because teacher needs to count the total absent day for each student at the end of every month.

Weakness of this system:

1. Teacher need to write down the students’ name for every page in the student attendance log book manually.
2. Teacher need to record the attendance of student manually by write “0” or “1”.
3. Teacher need to count the number of day of absent school for each student
4. Teacher need to keep the log book in a safe place.
5. Waste time and energy.
Figure 2-1 Student Attendance Log Book

Figure 2-2 Student Attendance Sheet
2.3 Staff Attendance Log Book

A supervisor in a company will prepare attendance log book for the staff under his/her supervise to sign up the daily attendance. The log books consist of 3 categories that are time sign in, time sign out and time for overtime work. The staff will have to write down the time they arrive at the company as a sign in process. The supervisor will supervise the staff when they sign in. When sign out, same process occurs that is the staff write the time when he/she left the company. For the work overtime part, the staffs need to write down the time they start working overtime and the end of working hour. This attendance log book is very important for the staff payroll. The company will pay the staff's salary based on the working hours in the attendance log book. In the staff attendance log book, it clearly state the working hours for each staff. For example sign-in is the start working hour time as 9:00am in the morning and sign out time is 6:00pm in the evening. They will count the hours between the sign in and sign out time and minus 1 hour for the lunch breaks and the result is 8 hours. So the company will pay the staff 8 hours working's salary. In conclude, staff attendance log book not just play a important role in record the staff's attendance but also the salary payroll.

Advantage:

- Clearly state working hours for each staff

Weakness

- "Buddy Sign in"
- Fake time for sign in and sign out
- Manually count the working hour for the salary payroll
- Log book may get lost
- Space consuming for keep the all the log book record
- Environment unfriendly
<table>
<thead>
<tr>
<th>Employee</th>
<th>12/22/2008 Monday</th>
<th>12/23/2008 Tuesday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In</td>
<td>Out</td>
</tr>
<tr>
<td>John Doe</td>
<td>8:00 AM</td>
<td>11:00 AM</td>
</tr>
<tr>
<td>Jane Doe</td>
<td>8:00 AM</td>
<td>11:00 AM</td>
</tr>
<tr>
<td>Steve Doe</td>
<td>8:00 AM</td>
<td>5:00 PM</td>
</tr>
</tbody>
</table>

Figure 2-3 Staff Attendance Sheet
2.4 Time Attendance Punch Card System

A company need to provide a Time Punch card machine and an attendance board to put staffs' attendance cards. Staff needs to punch the card when they arrive company because this represent their attendance and the time that punch onto the card is according to the clock in the attendance machine. This is to prevent the staff to go to company late. Basically the attendance card is divides into 3 categories that is morning, afternoon and overwork. Each category has 2 columns that are check in and check out. Check in section is the start working time and check out section is for end of working time. For the morning section is for the time start working until lunch time. Afternoon section is after lunch time until end of working time. Lastly, overtime is for the start overtime times until end of the overtime. For example, in the morning, staffs need to check in before the company start working hours and check out during lunch time. After lunch time they need to recheck in again and work until end of working hours to check out. When a card is punch into the attendance machine, the machine will "paste" the time and date according to which button is press. The supervisor will check the attendance based on these attendance cards. If a date is not punch, that mean the staff is absent that day.

Advantage:

- Can quickly check in attendance process
- Prevent staff arrive company late

Disadvantage:

- "Buddy Punch"
- Cost expensive due to but dozens of attendance card
- Need to rekey the attendance into the company computer attendance record
- Environment unfriendly
- Need a lot of space to keep the attendance cards
Figure 2-4 Time Attendance Punch Card Machine

Figure 2-5 Time Attendance Punch Card Machine (Top View)