RESPONSIVE ATTENDANCE SYSTEM BASED ON THUMB SCANNING

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Sesi Pengajian : 1 2 / 1 3

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Lovingly dedicated to my

beloved family and friends

For being a

constant source of Inspiration and Support.

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ABSTRAK

Tujuan projek ini dilaksanakan untuk mereka bentuk dan membangunkan sistem kehadiran pelajar untuk pelajar pasca siswazah sebagai Pembantu Penyelidik Siswazah (GRA). Sistem ini akan menggunakan cap jari sebagai subjek untuk merekodkan kehadiran pelajar. Semua maklumat akan direkodkan ke dalam aplikasi pangkalan data dan boleh dipantau oleh penyelia individu masing-masing. Dengan adanya sistem ini, secara langsungnya ia akan meningkatkan kecekapan pelajar lepasan ijazah dan akan membantu penyelia untuk memantau kemajuan pelajar. Selain daripada itu, sistem ini juga dapat mengesan pelajar yang hadir lewat dan secara automatiknya sistem ini akan menghantar emel kepada penyelia yang bertanggungjawab terhadap pelajar tersebut. Sistem yang dicipta ini juga merupakan satu sistem yang mudah alih, ini bermakna pengguna dapat membawa peranti ini ke dalam kelas untuk menggantikan kertas kehadiran biasa. Sistem ini boleh digunakan dalam organisasi yang memerlukan pengurusan kehadiran pelajar atau pekerja.

ABSTRACT

The motivation for this project is to design and develop a responsive attendance system based on thumb scanning for postgraduate students during their appointment as Graduate Research Assistant (GRA). The development of this system is using the thumb print scanning as platform for attendance recording into the system. The system functions to record all the incoming and outgoing activities. All information is recorded into a database application and can be monitored by the respective individual supervisor. Development of this system increases the efficiency of the postgraduate student and helps the supervisor to monitor the student's progress. Apart from that, this system also able to detect the late attendance and intermittently sends a notification to the respective candidate. Also, the respective candidate is required to update his or her status by just sending an update notification to the system. Besides, this system is portable, which mean lecturers are able to carry the device into the classes. Besides, this developed system is portable, thus lecturers able to bring the device into the classroom to replace the conventional attendance sheet. This system can be applied in any organizations that need attendance management.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The motivation for this project is to design and develop a responsive attendance system based on thumb scanning for postgraduate students during their appointment as Graduate Research Assistant (GRA). Currently there is no attendance recording practice is restricted to the postgraduate students. The development of this system uses the thumb print scanning as attendance recording into the developed system. The developed system functions to record all the incoming and outgoing activities. All information is recorded into a database application and can be monitored by the respective individual supervisor. Development of this system increases the efficiency of the postgraduate student and helps respective supervisor to monitor the student's progress. Apart from that, this system also able to detect the late attendance and intermittently will send a notification to the respective person. Also, the respective person will have to update his or her status by just sending a notification to the system. Besides, this developed system is portable, thus lecturers able to bring the device into the classroom to replace the conventional attendance sheet.

1.2 Objective

The objective of this project is to design and develop a responsive attendance system based on thumb scanning for postgraduate students. Hence it will improve the self-responsibility awareness among the postgraduate students. By using this developed attendance system, there will be no more cards needed, no more paperwork needed, hence no more hassle! In the end, this system is able to improve the attendance recording system for postgraduate students and at the same time increase the awareness of self-responsibility among postgraduate students.

1.3 Problem Statement

Employee absenteeism is a worldwide phenomenon which, due to the financial impact on a nation's economy, is an important subject on the international agenda. Absenteeism according to Collins English Dictionary, defines as persistent absence from work, school, etc. In most of the institutions, the attendance is an important factor for several purposes and important principles to be follow by the students or even organization employees. Decreasing the amounts of student absenteeism is an aim of any schools and school systems.

The worker, who is hired, is expected to perform a job and attend to work regularly, so that the scheduled work projects can be carried out successfully. All workers are expected to create working environment that are conducive to good attendance [1]. However, due to the intrinsic factors such as interest, motivation, learning styles and preferences, and extrinsic factors such as socio-economic considerations, family commitments, and task deadlines [2] the attendance of the students that are appointed as Graduate Research Assistant (GRA) are not as good as expected.

According to Yasmin Khan based on her Punch Card Attendance Monitoring System Feasibility Report, she stated that the pervious approach which is manually taking and monitoring the attendance records was very inconvenient task, as users need to record their attendance on the log book daily [3]. Manual attendance

checking is one of the oldest methods to record the attendance, but it is a hard process to carry out during the attendance which gets more time consuming [3]. Manual attendance record book will result in late compilation of attendance data because of collecting and compiling process needs to be done by each supervisor [3]. Then the total attendance record has to be entered into a computerized system manually. Mismanagement may occur due to human error. It increases the pay roll processing time and one of the major reasons is that it lacks security [3].

Later, another approach which is to record the attendance using card punching, was introduced to solve time consuming issue for the manual attendance record book system. However, this card punching system leads to other problems [3], which are the reliability of the system and the troublesomeness of carrying the card. Buddy punching is the act where one person clocks into the payroll system using another person's card, creating it look as that a person, who did not actually come to work, is in fact worked for the full period of their shift [4].

1.4 Scope of Work

1.4.1 Deliverables

The designs and developments of this Responsive Attendance System Based on Thumb Scanning are divided into two parts, which is external deliverables and internal deliverable.

1.4.1.1 External deliverables

The external deliverables are elements which are touchable or seeable that produced at the end of this project. The external deliverables of this project consist of the Thumbprint Scanner, Liquid Crystal Display (LCD) and Graphical User Interface (GUI). Thumbprint Scanner is resumed to obtain the thumbprint with the aim of recording the attendance of the respective registered user. Whereas LCD functions as

an indicator to inform the user about the status of the overall system. While Graphical User Interface is to allows the user to access to the database.

1.4.1.2 Internal deliverable

The internal deliverable in this imposed project is the database. Database is required in order to allow the system to store the data of the respective required users such as their respective attendance. These data can be fetched and executed in the user interface.

1.4.2 Functionalities

The proposed Responsive Attendance System Based on Thumb Scanning will operates according to as following:

i. Users able to record their attendance efficiently.
ii. Supervisor will be instantly being notified through email for the student's attendance status.
iii. Increase the accuracy, reliability and the security of the attendance system.
iv. Time and cost saving.
v. Improve the self-responsibility awareness among the postgraduate students.

1.4.3 Technical Structure

The technical structure of this system is divided into two parts as shown in Figure 1.1, which included Hardware (Thumbprint Scanner, microcontroller and LCD Display) and Software (Database and Graphical User Interface).

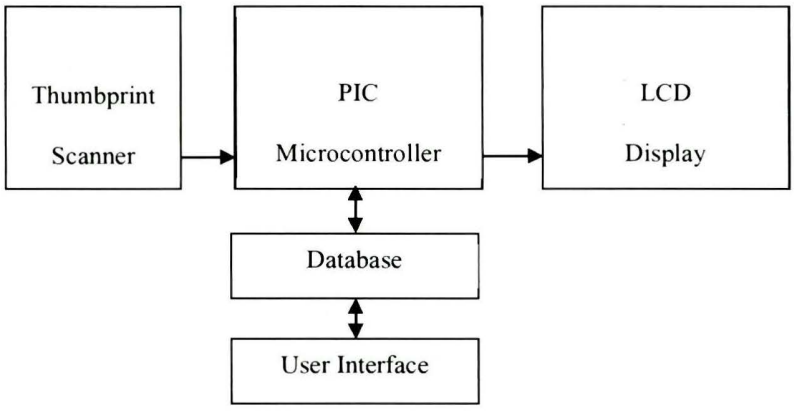

Figure 1.1: Block Diagram of the Overall System's Technical Structure

1.5 Project Planning

There are seven phases of work need to be done in order to complete this project. The first phase that needs to be settled first is problem statement identification. The problem faced by the previous approaches [3] included inaccuracy, time consuming, reliability, and security. The problem statements are reviewed throughout the project, to make sure the new system created able to solve the problem facing by the previous approaches [3].

Beside problem statements, the objectives of the project need be determined first in order to understand the purpose of the project and keep the project on the correct track. In this project, the objectives is to design and develop responsive attendance system based on thumb scanning for postgraduate students and improve the self-responsibility awareness among the postgraduate students.

After the problem statements and the objectives are identified. During Phase Three, the literature review was done to understand the overall systems that development. The researches indicated are:

i. Research on the thumbprint technology and its application.
ii. Research on existing attendance system.
iii. Research on the Structured Query Language (SQL)
iv. Research on the operation of Visual Basic.

Once the researches are done, Phase Four was continued by getting familiar with the components. The main components and software required in this project are Thumbprint Scanner, PIC Microcontroller, Structured Query Language (SQL) and Microsoft Visual Basic. These components and software need be fully understand first before it can be integrated together to form one system.

During Phase Five, the hardware part of the system was assembled. Then the project is followed with the development of the software part of the system which included the Database and the User Interface.

Finally, in the Phase Seven, the hardware and software part of the system is been integrated and troubleshoot to test the functionality of the system and make sure the system can perform as expected. The overall project flow is shown in Figure 1.2.

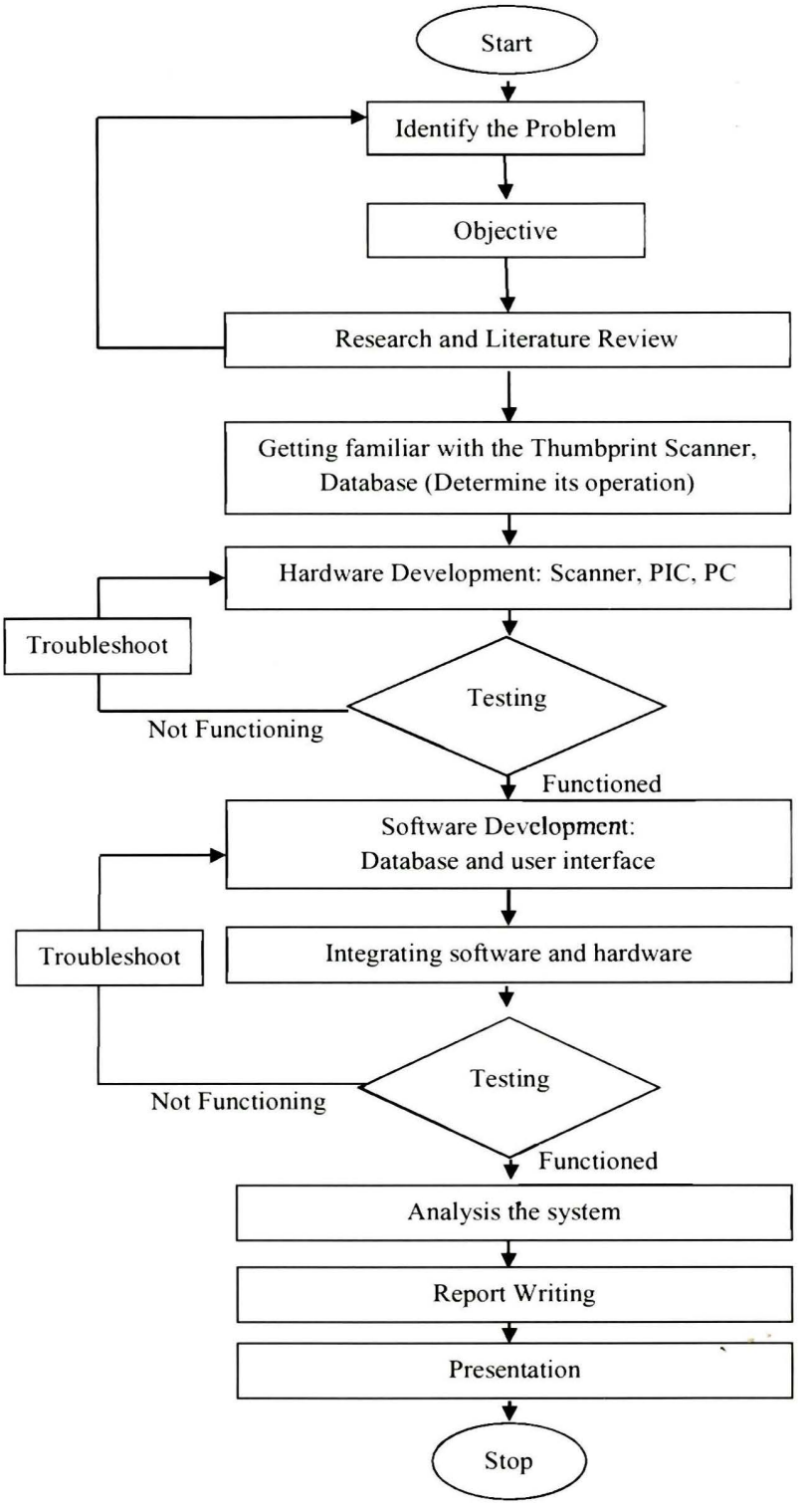

Figure 1.2: Flowchart of Project Methodology

CHAPTER 2

LITERATURE REVIEW

2.1 Existing Attendance System

The several kind of attendance systems that are available in the market.

2.1.1 Manual Attendance Taking System

The Manual Attendance Taking System also known as Traditional Attendance Taking System. This system involves recording the attendance in books or papers [5]. The attendance is taken and maintained by the user. According to Yasmin Khan based on her Punch Card Attendance Monitoring System Feasibility Report, she stated that the manually taking and monitoring the attendance records was very inconvenient task, as users need to record their attendance on the log book daily [3]. Manual attendance checking is one of the oldest methods to record the attendance, but it is a hard process to carry out during the attendance which gets more time consuming [3]. Manual attendance record book will result in late compilation of attendance data because of collecting and compiling process needs to be done by each supervisor [3]. Mismanagement may occur due to human error. It increases the pay roll processing time and one of the major reasons is that it lacks security [3].

2.1.2 Time Clock Attendance Taking System

On 20th November 1888, the first time clock was invented [6]. Time clocks also known as punch clock or clock card machine or time stamp. The time clock is basically a clock with the function of recording the time on an inserted heavy paper card, which named as timesheet. It is a recording mechanism with typewheels [7]. First, user needs to insert the timesheet into the prepared slot and when the timesheet move against the typewheels, the mechanism will activated [7] and the clock will print or stamp the date and time on the timesheet. The time clock increases the accuracy of the clock in and clock out time of the user. It is more efficient in recording the time. However, this time clock cause another problem arises, which is named as overstamping. This problem is when the recorded time is stamped over by another one. Besides, this system also leads to other problems [3], which are the reliability of the system and the usages of paper card. Buddy punching is the act where one person clocks into the payroll system using another person's timesheet, creating it look as that a person, who did not actually come to work, is in fact worked for the full period of their shift [4]. Besides, the attendance of the employees is recorded on the timesheet; if the timesheet is stolen or misplace [8] then the employee will lost his or her attendance record.

2.1.3 Barcode Attendance Taking System

The barcode attendance taking system use the shape of symbol either in bar, square, or dots which is difference in term of width as a method of identification. The specific sensor will use light beam to strike on the barcode and by measuring the intensity of the light on the black and white area, the system may able to identify the represented data or code [9]. This data will then be saves into the database, and it can be downloads by the administrator for the updating and maintaining purpose [8]. Previously, Dudley, Mitchell, and Susan [10] had applied this barcode technology in the attendance system to record the students' attendance at an event. This barcode attendance taking system can accurately measure and track the employees' working time [8]. The errors made in manual attendance taking system [8] and overstamping