

# Design of Student Attendance Information System with Fingerprints

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**Abstract.** Student attendance is one of the administrative activities in each semester and the lecturer records the attendance of students to determine whether students can take midterm or final semester examinations. The aim of this study is to design a model of student attendance information system with fingerprints for exam needs. The structured approach method is used to develop this model. Context diagram and data flow diagram used to describe the system. The result of the study is a design of student attendance information system with fingerprints. The attendance records of students that have not been automated are prone to errors in calculating the number of student attendance. Therefore, designing this information system can help the lecturer by storing student attendance data using fingerprints. Attendance data will be automatically saved to the server.

## 1. Introduction

There are nine biometric techniques which are used such as facial thermograms, voice, signature, iris, hand geometry, face, fingerprint, hand vein and retinal pattern [1]. Among all this, the fingerprint is a biometric technique that legally accepted and reliable.

The fingerprint is the reproduction of a fingertip epidermis, produced when a finger is pressed against a smooth surface [2]. Fingerprint has good performance because it's immune to aging and permanent in every person and the best thing about it is unique [3]. Nowadays, the fingerprint sensor is one of the most technologically developed. This sensor uses optical technology to detect fingerprint. In the process, the sensor will detect the contours of our fingerprint [4].

Biometric Fingerprint Authentication is the authentication systems provide a means of verifying identity by collecting information about human characteristics and comparing that information to previously-submitted data [5]. Biometric authentication using this method is one of the best authenticating method [6]. This method usually used in attendance system for staff or student [7]. Presently, attendance system for the student in most universities is taken manually. This system has much weakness like fake attendance, wasted time to collect attendance data, it can break the concentration in the study process and moreover there is no data for analysis [8]. The lecturer will calculate the number of student attendance. The student who has been alpha, sick or permitted more than a certain number cannot take the exam. That is why filling out the attendance list is prone to student fraud. The student fills out the attendance list not according to the number of attendance. This is often done so the student can take the exam. In addition, another human error is that lecturers can miscalculate the number of student attendance.



A study in India contends that the attendance system with fingerprint will produce more accurate and it's perfect to use for student, staff or management [9]. Another research was done in Philippines in 2014, this research made a system attendance for monitoring pupil's attendance using fingerprint and can inform the parents about pupils' attendance via SMS [10]. However, this research did not manage attendance data for exams.

Those two researches are used for attendance management and monitoring. However, those two did not manage attendance data for exams needs. Therefore, this research aim is to design an attendance information system with fingerprints for exams needs. So, the system will help the lecture to decide who can take the exams.

## 2. Methods

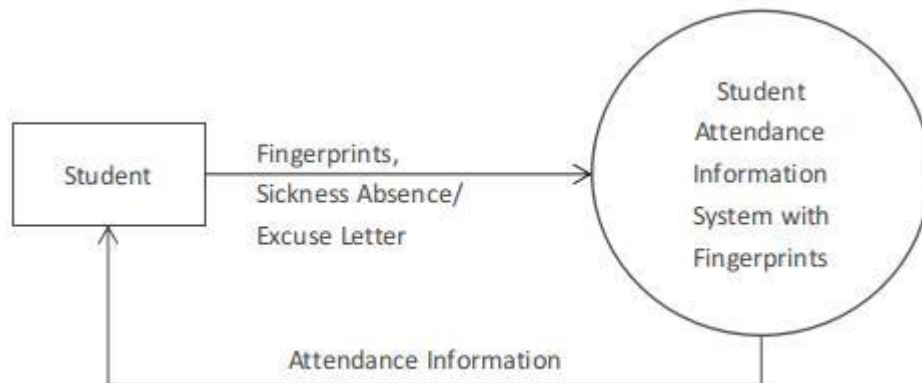
The structured approach used to develop this model. The waterfall is used as the development lifecycle where this SDLC has five stages which requirements analysis, the design of system and then implementation, are testing and finally is maintenance. This research focus to create a design of information system, so only two steps in the waterfall process that will be done, which are requirements analysis and system design.

Student data, lecturer data, course data, and attendance data are used in requirement analysis. The result of this analysis will be described in the diagram context and data flow diagram which is a system design phase.

## 3. Results and Discussion

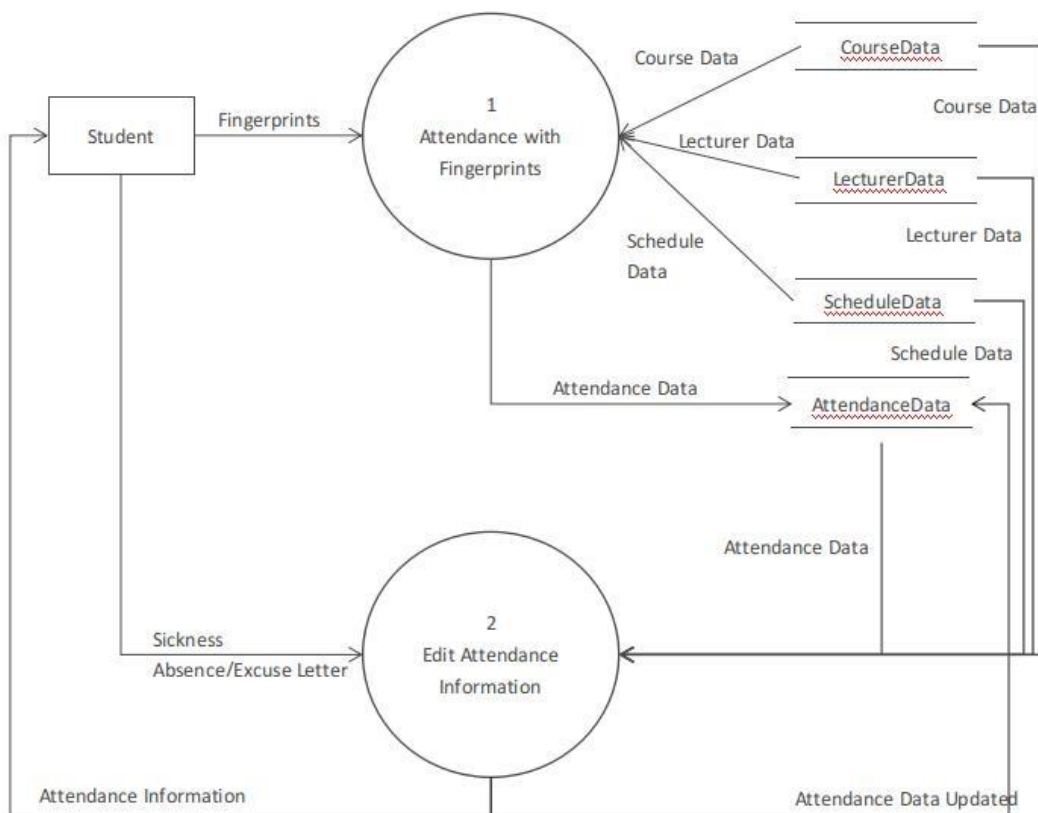
This research is to help the lecturer in calculating the attendance data of each student and minimize student fraud. The attendance data will be saved automatically to the server every day. So, it will minimize student fraud in filling out the attendance list. Another research about fingerprints in 2014 was developed, this research made a system attendance for monitoring pupil's attendance using fingerprint and can inform the parents about pupils' attendance via SMS [10]. However, the previous research did not focus on manage attendance data for exam purposes.

The current attendance system starts with students filling out the attendance list. The lecturer will calculate the number of student attendance. The student who has been alpha, sick or permitted more than a certain number cannot take the exam. That is why filling out the attendance list is prone to student fraud. The student can fill out the attendance list not according to the number of attendance. This is often done so the student can take the exam. In addition, another human error is that lecturers can miscalculate the number of student attendance. Here are the proposed system procedures: data collection of student attendance through fingerprints scanner with a maximum time limit of 15 minutes after the lecturer hour begins. The student who does not fingerprint on the fingerprints scanner until the specified time limit will automatically be considered alpha by the system. If the student is absent from illness/permission, the student must submit a sickness/excuse letter. Based on the evidence, the lecturer will change the attendance data of the student who was previously alpha to be sick/permitted. The student attendance data will be automatically stored in the database every day and the number of student attendance will be calculated. The lecturer no longer needs to register student attendance. Figure 1 shows the context diagram of the design of attendance system. The external entity in the context diagram is the student while the lecturer is in the system as an internal entity. Figure 1 also shows the input and output system.



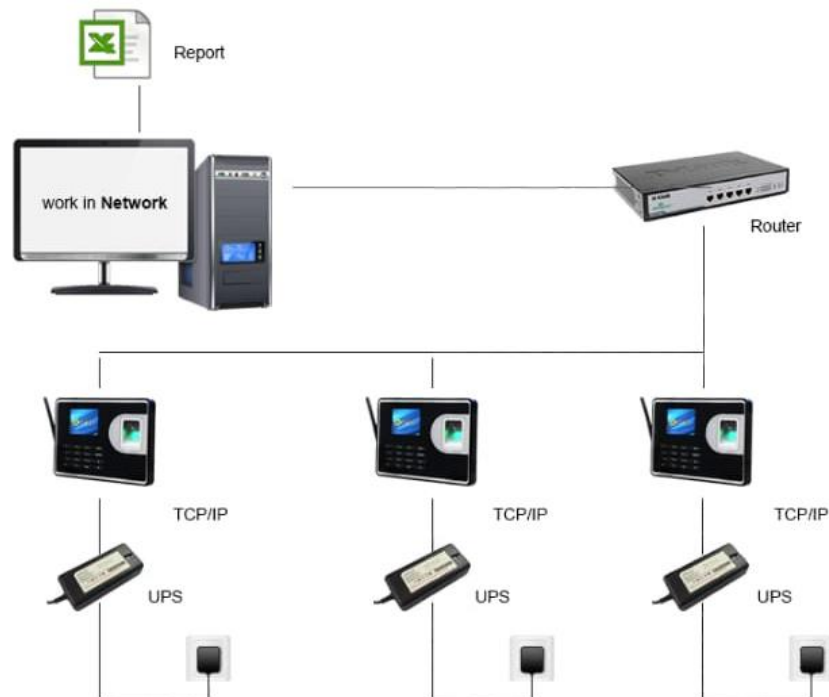
**Figure 1.** Attendance System Context Diagram

The entity that involves is the student, while the lecturer is in the system. Input from the student is a fingerprint and a sickness/excuse letter. The Output from the system to the student is attendance data. The student can access the system to view his attendance data in every course he takes. The detail system can see in Figure 2.



**Figure 2.** Attendance System Data Flow Diagram

Based on Figure 3, the system divides into 2 processes, attendance with fingerprint and edit attendance information. The data received in process 1 through the fingerprint scanner will be stored automatically to the database. In process 2, the student gives a sickness/excuse letter to the lecturer. The lecturer will update the attendance data.



**Figure 3.** Wi-Fi Fingerprint Scanner

Fingerprint scanner sensor that used is a fingerprint scanner that can save the data into the database with a configuration as seen in Figure 3. Using this device, the attendance data will be updated every day so the lecturers do not need to record the attendance data of students. The lecturers can see the number of student attendance anytime. It also helps the lecturers to decide whether the student can take the exam or not. This is different from the study in India which is to manage attendance data to be more accurate [9] and the research in Philipines which design to monitor pupils attendance [10].

#### 4. Conclusion

The design of the student attendance information system with fingerprints can be completed and can help the lecturer to control and manage student attendance data. Student attendance data will automatically be saved to the server. With an attendance system, the lecturer can view student attendance data. In addition, the lecturer can determine whether the student can take the exam or not based on the data. This also means, errors in calculating attendance and student fraud can be minimized. However, the previous research focused on how to monitor preschooler's attendance during their schooling and give information to their parents whether the pupils logged in or logged out in the system. The previous researches did not focus on how to utilize student attendance data for exam purposes.

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