

Chapter in Book

# I-Attendance System: Implementation of Student Attendance System using Fingerprint

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**Abstract:** In an educational institution, attendance procedure plays an important role. Due to the many students in a class, monitoring attendance is time-consuming and prone to errors. Teachers may require aid differentiating between students with similar names or may not hear their name called and wrongly designate a student absent. Students often help missing friends by raising their hands, writing on the attendance sheet, or sharing the Google Form. An automated fingerprint attendance system using biometrics to ease the attendance process at an institution called the I-Attendance System has been proposed to overcome those problems that are being faced. This was a mechanism we developed for Saint International School to address issues such as teachers having to call out students' names during the class period repeatedly. The primary objectives are to create a fingerprint authentication system for tracking students' attendance to replace the current manual approach with an automated one and to create data visualization based on the data recorded from the attendance system for a better understanding of the information gathered and stored. Cost and portability are two main reasons fingerprint attendance systems are less widely used to track students' whereabouts in and out of school. However, I-Attendance could be had for a low cost and installed with no difficulties, which increases its potential for commercialization. This project is fully sponsored by Jabatan Pengajian Politeknik dan Kolej Komuniti (JPPKK) in applying for the Intellectual Property Filing from the Intellectual Property Corporation of Malaysia MyIPO. The IP Filing Number is LY2022P04663. This project uses a real-time fingerprint attendance system, Visual Studio for data editing and storage, and Microsoft Power BI for data analysis. This project monitors time in and out of students which encourages students to be on time, reduces attendance recording time, and visualizes and analyzes attendance data. This project will develop a graphical, user-friendly system. This initiative stops attendance from affecting academic achievement.

**Keywords:** Fingerprint Attendance System, Visualize, Students



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## 1. INTRODUCTION

Having such a huge class size presents a unique set of challenges for educators. Time is wasted when teachers manually take attendance by calling out students' names and filling up paper rosters. If the teacher does not have a chance to take a roll at the conclusion of class, pupils may lie on their attendance forms and claim to have been there. Students who require assistance keeping track of time may try to convince their professors that they arrived early. Fingerprint scanning devices are becoming more widespread in the workplace. These gadgets have fingerprint databases and can verify prints with a computer. Before it can be utilised in a classroom, it will need several tweaks. Thus, the concerns identified have led us to conclude that a fingerprint identification system for monitoring student attendance is necessary. Since the system now needs fingerprints as proof of attendance, pupils may no longer have their pals sign for them. Next, we'll design a statistical graphics-based report detailing the attendance statistics we've acquired based on the information captured by the attendance system. The technology will record attendance more effectively and with less room for mistake, making it simpler to monitor and analyse student achievement based on attendance. Under addition, students' academic performance will improve since they will be unable to fake their attendance in the new system; hence, they will be more motivated to show up to all of their courses.

## 2. METHOD & MATERIAL

This project could well be produced utilizing the Agile methodology. The Agile methodology is primarily meant to assist developers in creating projects that can swiftly adapt to changing requests. The agile methodology reduces the total project duration of every project, making it perfect for our project development.

### 2.1 *Planning*

We identified the problem faced by our client, SAINT INTERNATIONAL SCHOOL, which has been clarified above in this project proposal, which is that it is possible for errors to occur while documenting student attendance, keeping track of attendance can take a long time, and students easily falsify their attendance. Several important actions were carried out in this process, such as meeting with the customer and approaching them with our proposal of implementing a fingerprint attendance system dubbed I-Attendance system. Then, ask for the needs, where we discuss the design and the features, they wish to have in the system to overcome the challenges they have and may have in the future. We also acquired information for our project from the school.

### 2.2 *Analysis*

The requirements supplied by the customer are examined in the analysis phase, and project goals are translated into the defined system functionalities to be developed. The following are the two key actions involved in the analysis phase:

- i. Collecting customer needs
- ii. Conducting a thorough analysis

The I-Attendance System for SAINT INTERNATIONAL SCHOOL criteria are determined after a careful examination of the data we were able to acquire, and the next step should begin.

### 2.3 *Design*

The project is developed during the design phase to visualize and comprehend the system design. Based on the agile process, the system's design may be adjusted in each phase to satisfy the client's needs.

### 2.4 *Development*

During the development phase, all of the last phase's documentation for the I-Attendance system for SAINT INTERNATIONAL SCHOOL project are changed into the real system.

### 2.5 *Testing*

During the testing phase, all code is merged and deployed in the testing environment. Testers then do Software Testing Life Cycle tasks to examine the system for mistakes, flaws, and defects in order to determine whether or not the system's features work as planned. The Heuristic Evaluation approach will be used to test and assess the I-Attendance System that we are developing for our customer. Various inputs will also be tried in order to discover any problems in the system.

### 2.6 *Implementation*

During this phase, all necessary documentation for the project, such as the technical report and user manual, is prepared. The documentation phase will have an influence on how well consumers understand and use the technology.

### 2.7 *Maintenance*

The I-Attendance System for SAINT INTERNATIONAL SCHOOL Attendance system project is deployed to the customer at this phase, and the product is completely functional. The data is subsequently moved into the manufacturing phase. The system may then undergo routine maintenance to ensure a seamless functioning.

## **3. BENEFITS TO INTENDED USERS AND SOCIETY**

Attendance records may be automatically updated; thus, it saves time for both students and teachers, which will not affect their teaching and learning. By visualizing and analysing data from student attendance records, administrators may guide teachers on what they should focus on to increase students' presence in the classroom. Today's teaching and learning rely heavily on students' regular participation, which has far-reaching benefits for society. Students will start coming to class early or on schedule since the system records time in and time out and marks them as late if they are more than 3 minutes late. The graphical report may assist if you need a fast and straightforward way to visualize and analyse attendance data. The community may affordably acquire a project with long-term benefits and sustainability. Because of its potential connectivity to its surrounding environment, the project may be accessed from any laptop. Its graphical representation of data can be seen on any phone or other device.

#### 4. COMMERCIALIZATION POTENTIALS

Cost and portability are two main reasons fingerprint attendance systems are less widely used to track students' whereabouts in and out of school. However, I-Attendance could be had for a low cost and installed with little difficulty. With the help of positive feedback and satisfaction from Saint International School, we can spread the word about our idea and increase its potential for commercialization. We have gone through the steps necessary to get a unique patent identification number to show our product's originality. Our project is fully sponsored by *Jabatan Pengajian Politeknik dan Kolej Komuniti (JPPKK)* in applying for the Intellectual Property Filing from the Intellectual Property Corporation of Malaysia MyIPO. The IP Filing Number is LY2022P04663.

#### 5. PROJECT SIGNIFICANCE

This project was developed primarily due to the client's difficulty managing student attendance when there are many students in a class, which leads to mistakes made by teachers and attendance fraud on the part of students. This solution benefits the user and the client (teachers) (students). The users can also save time by not having to fill out an attendance paper or a google form to register their attendance. The establishment of the attendance system around the academic regions will start with this project of ours. Additionally, this project will ensure that the procedure is simple and efficient for both users and clients. This invention possesses excellent novelties in the framework of the I-Attendance System using the hands of Visual Studio, Microsoft Excel, and Microsoft Power BI. One of the system's many strengths is how quickly and simply it records students' attendance. This way, no time will be wasted during class time. Considering that all you need is a laptop to run the system and a fingerprint scanner to get started, the overall cost of the system and the setup is quite reasonable. When compared to conventional methods, such as calling out names and so on, this strategy performs significantly better in many ways. The data that has been collected also can be analysed and visualized using Microsoft Power BI for the teacher's and administrator's view.

#### 6. OVERALL DESIGN, DISPLAY AND PACKAGING OF THE PRODUCTS

The I-Attendance system is built on a fingerprint scanner that can read all ten of a student's fingers. All of the gathered data is editable in the Visual Studio system that controls the system, and each teacher and administrator is given their own unique login credentials. Teachers and administrators may use Microsoft Power BI, which is available for desktop computers and mobile devices, to analyze and display the gathered data in Excel. The product comes in an application form which can be download by the teachers in their laptop device.

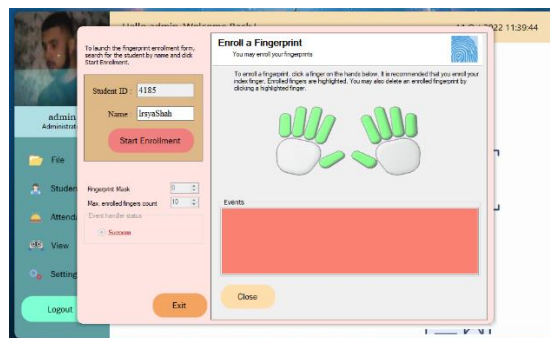


Figure 1. Enrolling process of all fingerprint

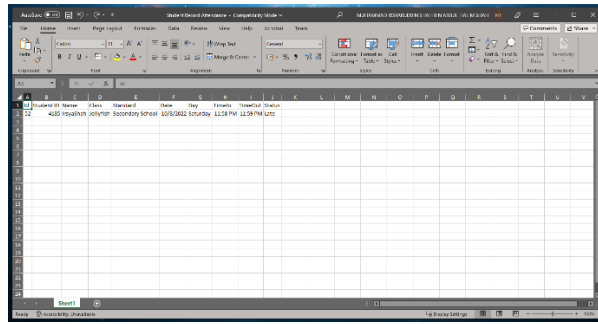


Figure 2. Microsoft Excel Document of attendance

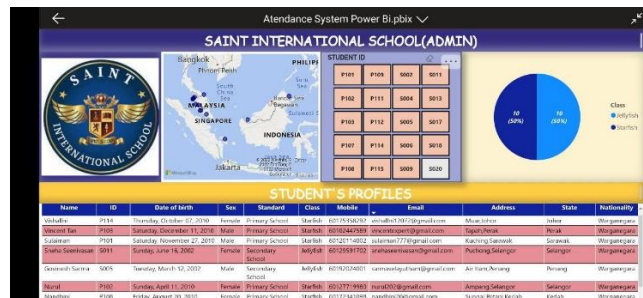


Figure 3. Microsoft Power BI Dashboard View

## 5. CONCLUSION

As a conclusion, a fingerprint recognition attendance system will be developed to swap out the old technologies already used by many educational institutions. Gaining the desired level of hybrid student attendance will signify the successful execution of this project. Our hope is that this system will make taking attendance easier and more accurate for everyone involved. The use of biometric devices will also make it easier to record attendance and reduce the number of times that numbers need to be entered incorrectly.

## 6. RECOGNITION

These are the certificates of recognition that the director of Saint International School presented to the software developers and our supervisor.



Figure 4. Certificate to the developer



Figure 5. Certificate to the supervisor

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