

Student Attendance Tracking Management

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Abstract-Tracking student attendance is essential for keeping tabs on their performance in the classroom and during their studies. It becomes a significant issue since the university administration upholds the rule that a student may only take the exam if his or her attendance is greater than or equivalent to a certain percentage (60 percent, 70 percent, 80 percent, etc.). According to the conventional method of keeping track of attendance, each time a class is attended, students must physically sign the attendance sheet. Noticing and marking a student's name on the attendance sheet takes too much time. Additionally, it can happen that some students will fully or unintentionally mark another student's name as a proxy. The paper attendance record could disappear. Using smartphone technology like Android our developed mobile application will make it simple for the course instructor to take attendance, save it to the phone and to the server, verify the percentage, and print out a paper copy. This system can mark attendance, mark intruders' admission, calculate attendance percentages, send emails, and send SMS to the guardian to keep them informed about their child's attendance at the institute using the stored information. The established system allows for internet access at any time and from any location, which can be incredibly helpful for the course instructor in managing their students' attendance.

Keywords—*Student Attendance, Student Authentication, Tracking Management, Mobile Application, Student Database, Testing*

I. INTRODUCTION

The management of student attendance is a crucial component of student administration in high school, college, and universities. The standard method of monitoring student attendance in a classroom involves requiring the students to physically mark the attendance sheet that circulates in the room while the course instructor is giving the lecture. For instance, a teacher of a course with a large class can note that the hassle of passing around the attendance sheet and the actual recording of attendance by students are oppressive and undoubtedly take time away from them teaching and receiving full attention from the students. This project's main goal is to introduce the use of smartphones in the attendance system.

All teachers have smartphones these days, which makes it easy for them to take attendance and process information as needed. The key advantages of this system are that teachers can obtain computed percentages, print physical copies with attendance statistics, keep data in phone databases as well as remote server databases, ensuring that the information won't ever be lost, and use the data as needed.

1.1 Attendance Control

Managing students' and admin presence and absence in a school or other institution is known as attendance management or a management firm with offices. The modern world employs a variety of biometric attendance management technologies. Applications to machines. There is an urgent requirement for an efficient approach for managing attendance so that their participation records are effectively managed. Particularly in the case of the lecture, which contains numerous participants. Consequently, numerous systems to improve the so far, suggestions for managing student attendance have been made.

1.2 Authentication

Authentication is the process of confirming if a person, thing, or assertion is who or what it claims to be. By determining whether a user's data matches that in a database of authorised users or in a data authentication server, authentication enables access control for systems. Specifying access rights to resources connected to information security, computer security, and access control is the role of authorization. Formally speaking, "to authorise" means to set an access policy.

1.3 Flutter

Developing a mobile application is typically a challenging and hard task. There are many frameworks available for the creation of mobile applications. Swift and Objective-C are the basis for the native frameworks that are provided by iOS and Android, respectively. To build an application that works with both OSs, we must employ two different frameworks and two different coding languages. There are mobile frameworks that support both OSs that can help with this challenge. These frameworks range from simple HTML-based hybrid mobile application frameworks (which use HTML for the user interface and JavaScript for the application functionality) to complex language-specific frameworks (which do the heavy lifting of converting code to native code). These frameworks always have a lot of downsides, with their poor performance being one of the most important, regardless of how simple or complicated they are.

1.4 Dart

Google developed the high-level, all-purpose programming language known as Dart. The new programming language first appeared in 2011, but it wasn't made widely available until June 2017. The Flutter is gaining more popularity than it did at the time when it started using darts. Dart is a dynamic, class-based, object-oriented programming language that has closure and lexical scope. In terms of syntax, it is extremely similar to Java, C, and JavaScript. If you are familiar with any of these programming languages, learning Dart won't be difficult for you.

Dart is an open-source programming language that is frequently used to create Internet of Things (IOT) apps, modern web applications, desktop applications, and mobile applications. It also supports a few more advanced concepts, such as type interfaces, mixins, abstract classes, and refiled generics. It is a compiled language that can be used with one of two compilation techniques.

The platform's core component, the Flutter engine, which is mostly created in C++, offers the primitives needed to enable all Flutter apps. The engine rasterizes composited sceneries each time a new frame needs to be painted. Along with graphics (through Skia), text layout, file and network I/O, accessibility support, plugin architecture, a runtime for Dart, and a compilation toolchain, it provides a low-level implementation of the fundamental Flutter API.

Using dart: ui, which transforms the underlying C++ code into classes that Dart can utilize, the engine is made available to the Flutter framework. This library exposes the most fundamental primitives, such as classes for managing input, graphics, and text rendering subsystems.

1.5 Node.js

Networking and server-side applications are made using the Node.js open source, cross-platform runtime environment. The Node.js runtime allows JavaScript-based Node.js applications to be developed and executed on Linux, OS X, and Windows platforms. A large library of various JavaScript modules is also available in Node.js, substantially speeding up the process of developing web applications that use this framework. A schematic showing several significant Node.js components.

1.6 Express.js

Express JS is a web application framework that has a simple API and allows you to build webpages, web applications, and back ends. When utilising Express JS, you don't need to worry about low-level protocols, processes, etc. Express provides a simple user interface for developing our programmes. It provides us with the tools we require to make our app. Because npm provides a variety of modules that may be directly incorporated into Express, it is versatile.

Npm is the name of the node package manager. The npm Registry is a publicly accessible collection of open-source code packages for Node.js, front-end web applications, mobile applications, robots, routers, and several other needs of the JavaScript community. Using npm, we can have access to all of these packages and locally install them.

1.7 Mongo DB

The MongoDB course discusses both basic and complex SQL concepts. Our MongoDB training may help both experts and beginners. In MongoDB, SQL is absent. It is a document-oriented database that was created in C++ and is open-source and cross-platform.

II. LITERATURE SURVEY

With the assessment [1] that attendance administration is overlooked by the current educational organization administration framework, focusing only on record administration, training design [5], course administration, and so on, scholars chipped away at the change in order to improve the [2] attendance tracking framework. They established an attendance administration framework using VisualStudio.NET and Oracle. A special finger impression device that is used as part of a special finger impression attendance system was described by Mohamed et al.

By placing their finger on the device's sensor,[3] the kids can check their essence. However, because fingerprint scanners can't always identify something the first time, this architecture lacks viability.

2.1 Propose System

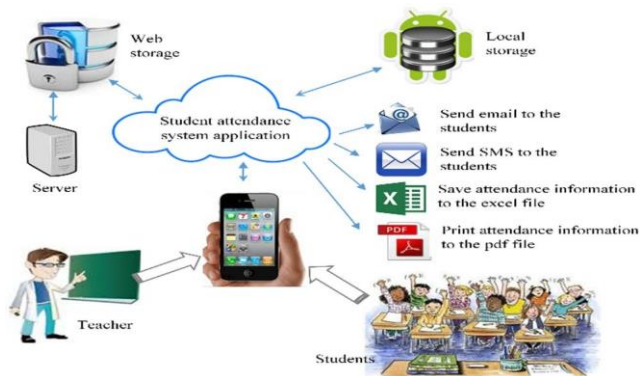


Fig 1. proposed solution of student attendance system

Fig. 1 shows the proposed solution of student attendance system where a course teacher takes attendance via Smartphone and then the Smartphone application process the data and teacher can save the data in the web server as well as phone server.

III. TECHINCAL IMPLEMENTATION

The system execution was completed in light of the framework diagram that was previously displayed.

3.1 Mobile Application

The system uses level 19 of the Android API. The application is developed using the Android ADT bundle for the Eclipse ide. www.golapmilonkuet.byethost16.com as the web server database and the internal SQLite database as the phone database. The MySQL database is stored on the server.

3.2 My SQL Database and SQL Lite Database

The Student Attendance System for smartphones is specifically linked to the MySQL database. Four main tables were created in our database to house the recorded data. All customer attendance data, including dates and other details, is kept in a table called the attendance table. The application stores the data it has acquired in a database. The teacher table is a different table in the database that is used to keep track of the subtle details about the teachers, including their personal information, such as names, IDs, addresses, email, telephone numbers, and so forth. The course info table contains information about the courses, such as the course code, the scheduled class scene, and the start and end times. The student data table contains all of the students' detailed information. The attendance database keeps track of the investigated student's attendance information in the interim. Regular functions include a set of pre-defined SQL queries that allow for simple information adds, refreshes, and recoveries for both phone and web servers.

3.3 Graphical User Interface (GUI)

A course instructor may access the application user interface by logging into the framework through a login page and entering the necessary data. This type of validation is crucial in order to prevent unauthorized access. The technology is completely accessible to the course instructor. The framework's data can be modified and altered by the course instructor. Fig. 6 depicts the road map for a graphical user interface.

IV. TESTING

The purpose of testing is to identify errors. Finding every error or vulnerability in a piece of work is the practice of testing. You can use it to test the operation of particular parts, subassemblies, assemblies, and/or finished goods. It is the process of testing software to make sure it complies with specifications, lives up to user expectations, and does not malfunction in an unfavorable way. Since software testing is the last check of the specification, design, and code, it is a crucial component of software quality assurance. Pressure for extensive testing is growing due to the cost of software failures and the increasing likelihood of software as a system.

4.1 For the Purposes of Testing: Running a programmed with the intention of finding an error is known as testing. A test case that has a good possibility of spotting an error that hasn't been found is ideal.

V. ANALYSIS AND SYSTEM PLANNING

5.1. Problem Analysis

The process of recording admin attendance at PT. XYZ currently still uses a fingerprint machine-based attendance system which causes long queues during hours of entry and return from work. The queue occurred because the number of admins numbered 3,000 in one factory location. By utilizing mobile device and intranet technology, an attendance system application is adopted using a mobile smartphone. Admins can make a presence using their respective smartphones. Admins who have an Android smartphone can download the attendance system application on the Android Play store service and install it on their respective smartphone devices. Before making attendance via smartphone devices, admins must first be connected to the company's local network (intranet network). This was done because the system was designed so that it could only record the presence of smartphones connected to the company's local network to prevent fraud in the form of absence outside the company / factory area.

5.2 General Description of System

The system is divided into two parts, the backend and front end applications. In the backend system there is one access

right, which is the system admin. Admin has the duty to register admins who want to do attendance using a smartphone and monitor attendance records periodically for further download and submit it to the Human Resources (HR) section to record salary calculations. In the frontend system there is one access right that is the user for the admin. The user is tasked with taking action on the smartphone attendance application in the form of pressing the enter button during work hours and pressing the exit button when work hours go home. Then the system will process and send the presence data to the backend application. The process in the system will be explained in the next steps:

1. The input stage is the admin logging in to the application by entering the Admin ID number (NIP) and password. Next the admin presses the Attendance Enter button at the time of entry and the Exit Absence button at the time of coming home from work.
2. The process stage is the mobile application processes by sending NIP data, passwords, and device telephone numbers for validation.
3. The output stage is the successful sending status to the admin in making attendance.

5.3 Design of System Architecture

Software architecture in this application uses 3-layer architecture consisting of Data Layer, Business Layer and Presentation Layer. The Data Layer functions to handle the application database, the Business Layer functions to handle application logic and the validation of the smartphone device's telephone number. While the Presentation Layer functions to handle the appearance of the user interface.

VI. EXPERIMENT ANALYSIS AND RESULTS

6.1 System Configuration

6.1.1 Software Requirements

Operating System: Windows, Mac, Linux.

SDK: OpenCV, TensorFlow, Keros, Numpy.

6.2 Hardware Requirements

Camera: Good quality 3MP or more.

Ram: Minimum 8GB or higher.

GPU: 4GB dedicated or more.

Processor: Intel core i5 or higher.

HDD: 10GB or more.

Monitor: 15" or 17" colour monitor.

Mouse: Scroll or Optical Mouse or Touchpad.

Keyboard: Standard 110 keys keyboard.

6.3 Screen Shots and Results

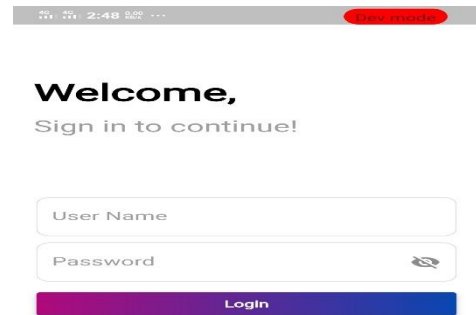


Fig 6.3.1 Screen Shot of Login Page

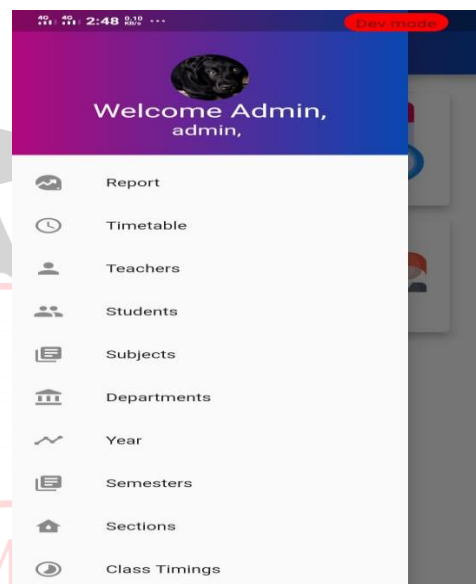


Fig 6.3.2 Screen shot of left Panel

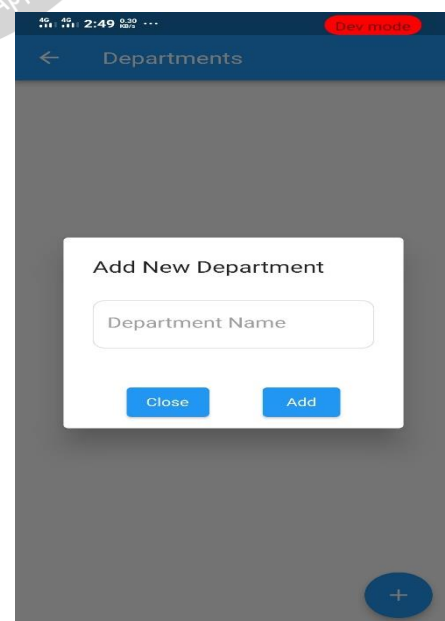


Fig 6.3.3 Screen shot of Add Department

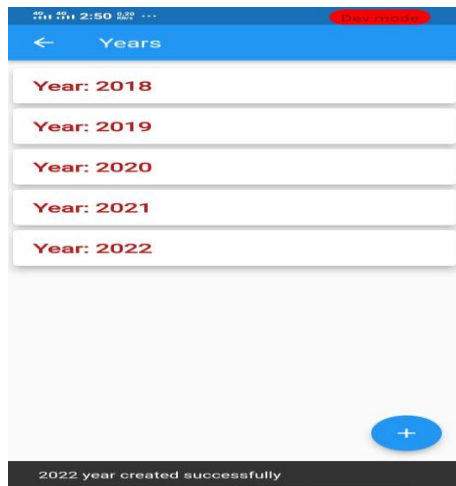


Fig 6.3.4 Screen shot of Years Page

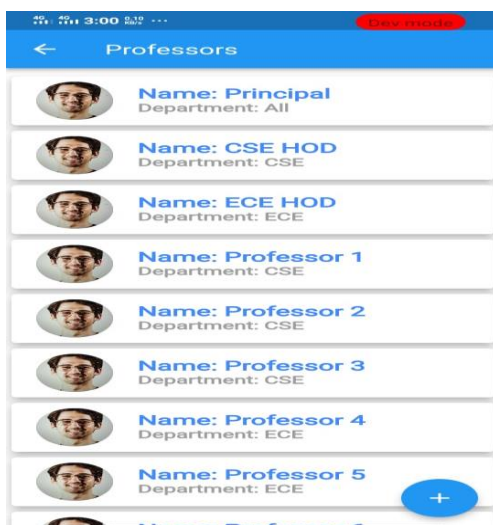


Fig 6.3.5 Screen shot of Professor Page

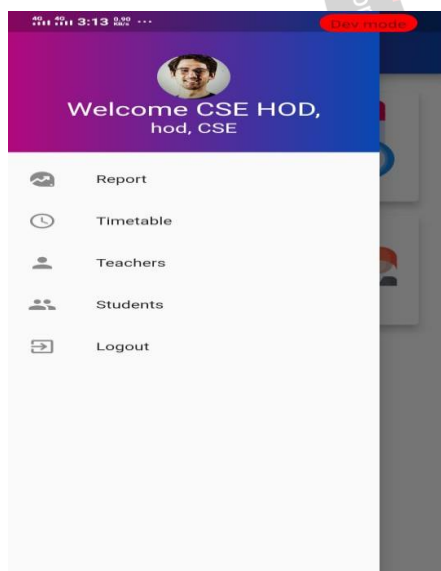


Fig 6.3.6 Screen shot of HOD Login page.

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for further download and submit it to the Human Resources (HR) section to record salary calculations. In the frontend system there is one access right that is the user for the admin. The user is tasked with taking action on the smartphone attendance application in the form of pressing the enter button during work hours and pressing the exit button when work hours go home. Then the system will process and send the presence data to the backend application.

VI. FEATURES OF THE APPLICATION

7.1 Taking Attendance and Percentage Calculations

Every student's attendance for each course is tracked separately based on their intention to remain in class. Attendance is recorded as "Present" if the length of time spent in class ties with the allotted period. Students who missed class during a scheduled class period have their attendance recorded as "absent." In the system, there is no possibility of duplicate records. Every student enrolled in a course has their percentages automatically calculated by a mobile application in order to assess their readiness for the exam. The student will suffer if the calculated percentage is lower than the necessary percentage.

7.2 Emailing System and Messaging System

When the percentage is low, a warning and data about the percentage are included in an email sent to the student's guardian. This will automatically update the parents of the kids about their child's development. Using a mobile application, short messages (SMS) can be sent. In the event that the student's guardian is unable to check their email, an SMS is sent to them informing them of their child's progress whenever they receive a low percentage.

VII. CONCLUSION

Smartphone-based Student Attendance System will significantly develop the conventional procedure of student attendance framework in university/college/school surroundings. Smartphone-based Student Attendance System is a computerized information accumulation technology, which leads to more precise data entry. The stored student attendance data are framed and investigate inevitably without any loss of data, compared to a traditional recording method. A course teacher can easily monitor the attendance of students which may develop the excellence of instruction because the fewer time required to collect and process data. Implementing the system in educational environment helps the user to identify attendance, proxy attendance, calculate percentage etc. SMS and Email messages are sent via the system automatically to inform parents so that they can be notified about their child's progress in the institution. Use

of the technology in a classroom setting makes it easier to manage attendance, calculate percentages, and do other activities.

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