

# Student Attendance System Using Barcode Scan

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**Abstract** – The project is a barcode-based system for recording student attendance. Every student is given a card with a unique barcode on it. Each barcode reflects a student's unique identifier. Students just scan their cards with a barcode scanner, and the system records their attendance according to the dates. Following that, the system saves all of the students' attendance records and creates a defaulter list. It also creates an overall report for the administrator in the form of an excel sheet. This type of application is highly beneficial in school and college for keeping track of everyday attendance.

**Key Words** – Attendance, Barcode Scan, QR Code, Students

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## INTRODUCTION

Student participation in the learning process is seen as a crucial exercise for knowledge transfer in most educational institutions. This emphasises how important it is for students to attend all of their scheduled lectures and classes. Traditional techniques of recording student attendance are still used by the majority of institutions. One not unusual place approach is for college kids to manually signal the attendance sheet that is generally surpassed across the study room even as the lecturer is speaking. This approach has the ability to permit college students to faux attendance records. As a result, one of our objectives is to create a portable attendance system with an online database, principally to avoid data loss and to promote a paperless and ecologically friendly workplace. Aside from that, the programme will assist in the reduction of class time lost, resulting in increased productivity.

## LITERATURE REVIEW

In article [1,] software that uses a barcode scanner to record and monitor student attendance is discussed. A barcode is a machine-readable visible illustration of information. A bar code is made up of a series of parallel, contiguous bars and spaces that a barcode scanner can read. Each student will be given a unique barcode ID that will be used to identify them and show their information. Only teachers and administrators with their own login IDs and passwords will be able to access the system.

The Intranet Based Content Management System is described in the study [2]. It is an application designed for students or departments to use in order

to keep track of a student's attendance. This system can be accessed by both students and teachers in order to collect records for which each person is given a login ID and password. For access, the student must first register with the system administrator.

Paper [3] describes the system's functional and architecture design, and emphasises the system's functionality, database design, and functional modules, among other things. It also presents a Student Information Management System realisation, which includes database setup and maintenance, as well as front-end application development. The friendly interface and fully functional, adaptable, and convenient application provide a good guarantee for student information management.

A tracking system[5] that includes all of the students' data for the entire academic year, including attendance, progress in the course, completed semesters, years, coming semester year curriculum details, exam details, project or any other assignment details, final exam result, and all of this will be available through a secure, online interface embedded in the college's website. It will also include faculty details, batch execution details, students' details in all aspects, and the var

The installation of an RFID-based library management system is discussed in the paper [5] RFID is employed because it may enable for a smooth transaction flow for the issue and return of books while keeping track of the issuer's records. This system would be able to issue and return books using RFID tags, as well as calculate a fine

based on the length of time the book was missing from the library database.

The implementation of an RFID-based library management system is discussed in detail in the paper[5.] RFID is employed because it allows for a smooth transaction flow for the issue and return of books while keeping track of the issuer's records. This machine might be capable of trouble and go back books the use of RFID tags, in addition to calculate the high-quality related to the period of time the e-book has been lacking from the library database. RFID technology is the most commonly used technology for documenting student attendance since it is easy to transmit data to the internet [7], [8], [11]. RFID technology, on the other hand, are expensive and require skilled personnel to operate. Biometrics technology, on the other hand, is a fantastic use of technology in the realm of attendance reporting and tracking. The thumb print was utilised as an indication of system entrance in the majority of biometrics technology [9]. Because there is no platform for attendance cheating, a fair and dependable attendance may be recorded [10]. Apart from the thumb print method, biometrics use fingerprints. Using wireless technology, a fingerprint peripheral was utilised to record attendance and send the data into the system [12].

These cutting-edge technologies necessitate a hefty budget and a well-trained system developer. Bar code scanners are widely used in educational institutions that are not financially supported, and they do not require highly qualified personnel to install and maintain [14].

## METHODOLOGY

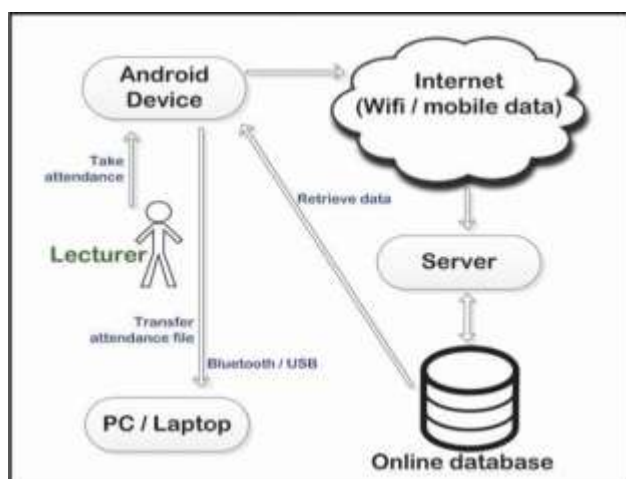


Fig -1: System architectural diagram

These cutting-edge technologies need a sizable budget as well as a highly skilled system developer. Bar code scanners are frequently employed in non-profit educational institutions, because their installation and maintenance do not necessitate highly experienced people [14].

## System Requirements

Through the use of an Android-based attendance management application, the solution we present in this research intends to address the challenges of collecting students' attendance in class. Given that most professors are expected to already own an Android device, adoption of this proposed system will undoubtedly reduce the cost of hardware and its upkeep. This method, unlike RFID-based systems, requires relatively little setup. Furthermore, Android smartphones are often tiny, light, and portable, making them easy to use anywhere and at any time.

With the end product in mind, we began the system development process by making a list of the features that the programme would deliver. To utilise the software, a lecturer must first download the apk file and install it on their Android device. The lecturer will need to log in to the application using their user id and password after it has been launched. The user will be sent to another page after successful authentication, where they will be asked to select the course code and student group to be tracked.

An online database server will be used to download a list of students registered in the selected group into the Android smartphone. The programme can then be used to check student attendance based on the downloaded list of students by using the device's camera to capture and scan the barcode displayed on the student card. A student's unique student ID is represented by a barcode label like this. As a result, the lecturer's Android tablet will be used to record student attendance by having students flash their cards one by one. After all students have reported their attendance, the lecturer can publish the revised attendance list to the online database server or transfer it as a file to a PC via USB.

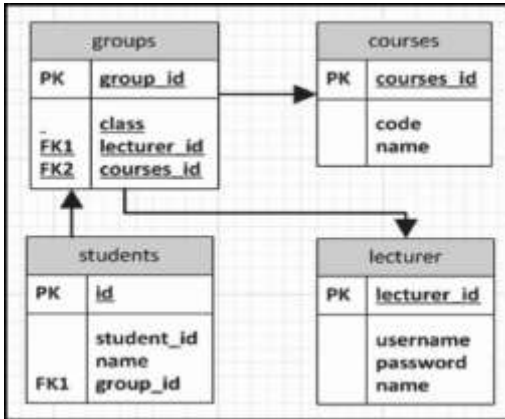
## System Design

The client-server framework is used to design the Android-based Attendance Management System. According to the system architectural diagram (see Figure 1), the system comprises of an online server with database, as well as an Android-based application and its hardware component, which serves as the client.

## Software Architecture

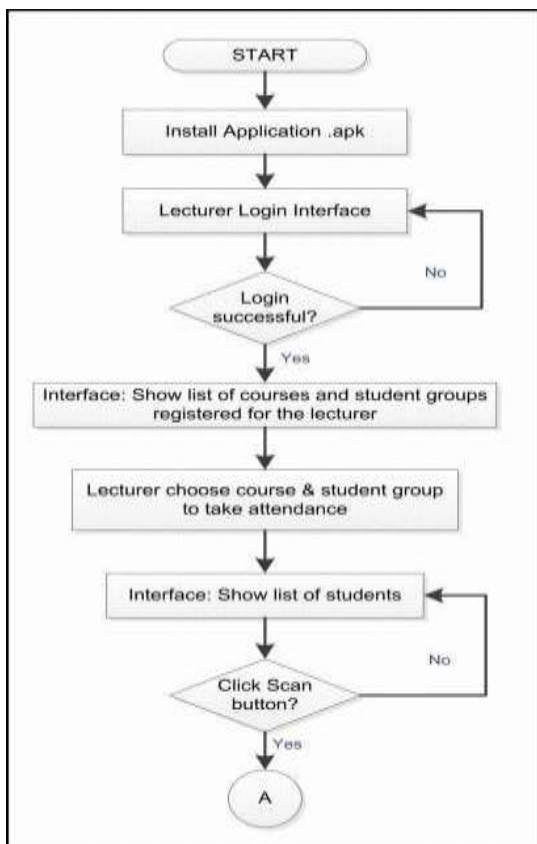
The online database is critical to the system because without it, the user authentication and data extraction processes will fail. The database is made up of several tables that are used to store various types of records needed to manage student attendance data. In general, there are four relational tables designated 'groups,' 'lecturer,' 'courses,' and 'students.' The 'lecturer' database contains information about the lecturers, such as their username, password, and name, whereas the 'courses' section contains information about the

offered courses. The primary key of the 'courses' and 'lecturer' tables is added as a foreign key into the 'groups' database, as shown in Figure 2. The foreign key in the 'students' table corresponds to the id from the 'groups' field.



**Fig -2: Table's relation diagram**

The online web server can be installed on any computer with an Internet connection. The server should be configured with a public IP address to allow public access. This server will receive requests from client applications running on Android devices that require Internet connectivity, particularly when collecting student lists from the server and uploading updated attendance records.



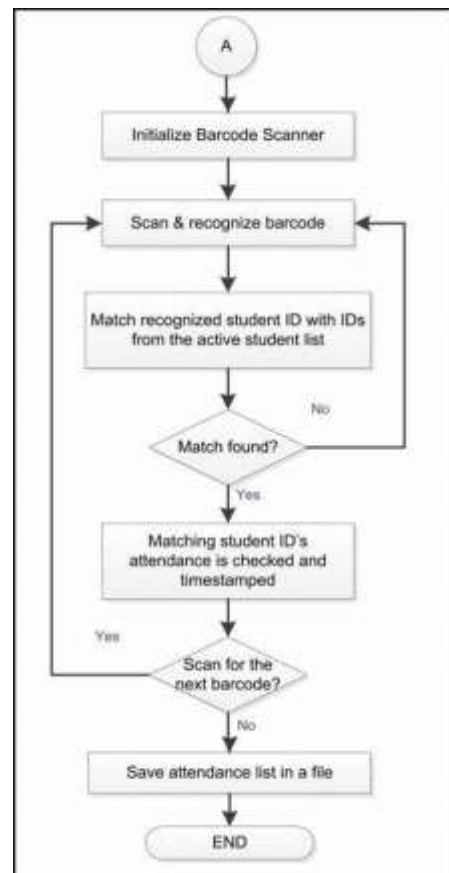
**Fig-3: Flowchart: student list activation for attendance recording**

**1) User Navigation Design**

The programme must first be installed on the user's Android-based device, according to the flow chart (see Figure 3). The application will transport the user to the login page after it has been activated. After successfully logging in, the user is directed to a screen where they can select their registered teaching course and class (student group) from a drop-down menu. A list of students' names for the corresponding class will be downloaded into the device once all needed inputs have been completed.

When a class begins and the lecturer is ready to take attendance, the scanner programme should be activated by pressing the start button. The scanner application will be launched and ready to detect and collect the barcode written on the student's card using the phone's camera (see Figure 4). The barcode-captured student ID will be compared to the student IDs in the student list. As the attendance validation, a matched student ID will be marked with the current timestamp.

This scanning procedure will continue until there are no more cards to scan, at which point the camera will read and confirm barcodes from each and every student's card one by one. Finally, the modified student attendance list can be saved as a file and copied to a PC or uploaded to the server.



**Fig -4: Barcode scanning flowchart**

## 2) Hardware Architecture

This scanning process will continue until there are no more cards to scan, at which point the camera will read and confirm the barcodes on each student's card one by one. Finally, the revised students' attendance list can be saved as a file and downloaded to a PC or uploaded to the server.

## 3) System Implementation

The development effort for this project is divided into two parts: the construction of the online database server and the development of the Android application. The design effort for the Android application entails creating the Graphical User Interface (GUI) required for presenting information, taking user inputs, and integrating with the Zxing barcode scanner (see Figure 5), particularly to enable the barcode scanning process.

For attendance validation, this attendance management system leverages the student's unique identification number, which is obtained from the scanned barcode. The ZXing library, which is embedded into the application, assists with barcode scanning. Basic SQL knowledge is required to setup and manage the online database. The Xampp server is the internet server application in use, and one of its components is the MySQL database. The SQLite library is used on the client side to maintain a local database on the Android device, which is used to hold the downloaded and updated student list.

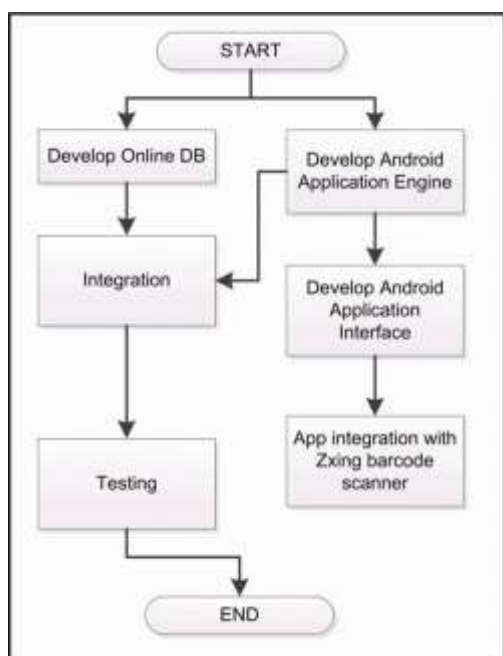


Fig -5: Flow of development activities

## CONCLUSIONS

This paper proposes a method for taking attendance using an Android application. Once installed, this application can be used to get a list of students from

a specified web server. The gadget will then operate as a scanner, scanning each of the student cards one by one to validate and verify the student's existence, based on the downloaded list of students.

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