

Academic Monitoring System

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Abstract: Managing Scholars academic and attendance record is a pivotal task. Everyday at least ten to fifteen minutes are wasted in marking attendance of scholars. Faculty also has to keep a separate record for student academic performance including student assignment, systems, forums, class tests submissions etc. This requires lots of time and paper work. thus, storing and managing scholars academic record at one place has come a pivotal task. This paper presents a simplified approach to achieve this purpose using android operation. The proposed system helps to manage student academic details at one place which will be available to student as well as to the faculty on a single click.

Keywords: Flutter, firebase, academic monitoring system

I. INTRODUCTION

In advanced education institutions, a student's classroom attendance is directly related to their academic performance. However, utmost student attendance enrollment is still done in the traditional, which is clumsy and time-consuming, especially for courses with a large number of scholars. Over the times, attendance operation has been done manually at utmost universities. The traditional and normal way of taking attendance is by using pen and paper manually which is sounded as unproductive, repetitious and tedious processes. Everyday, at least ten to fifteen minutes are wasted on taking attendance. This mode of taking attendance will dodge time lost instead of delivering lecture effectively especially if the population of a class is big. This system is also time consuming and prone to error process. In addition, they've to manage separate records for student academic performance, which is a tedious as well as the excited process. To overcome the problems with manual attendance, we proposed and enforced an academic monitoring system to promote the implicit use of Quick Response(QR) code as a future attendance management system to track and record student attendance in lectures and tutorials for all applicable courses, which is an objective of this paper and help to reduce the time consumption in the lecture. The system comprises the way of displaying the QR law on an intelligent mobile terminal; Getting the information in the QR Code; Storing the information in the QR Code.

Statistics in[1] shows that 75 of smartphone users have an average age of 12.6 years old and 99 of the scholars have a smartphone for study purposes. therefore, with the wide use of smartphones among university scholars, this paper addresses the problem of similar waste in the lecture time and proposes a system that offers to reduce it by nearly 90. The proposed result offers a QR code for the scholars to scan via a specific smartphone application. The law along with the pupil identity taken by the application will confirm the students' attendance. In this way, the system will conserve both time and the effort that lecturers were meant to put in during each session. It'll speed up the process of taking attendance and leave important time for the lecture to be given properly.

II. LITERATURE SURVEY

2.1 Background History:

There are different methods of attendance control, from manual systems where attendance is recorded on a piece of paper to automated systems such as biometric attendance control. Punch cards, logbooks, fingerprint systems, barcodes, QR codes, and RFID are just a few of the various attendance management methods that have been invented that still have a lot of issues. such as providing incorrect information to users. All methods have some disadvantage in attendance management.

2.2 Related work:

In paper[1], The suggested solution consists of two applications: one that generates a QR Code by entering student information, and another that records attendance and outputs it in CSV or XLS format. To verify a student's attendance, the instructor will need to scan their unique QR code. The system's verification of student identification to stop bogus registrations is covered in the paper. All pupils' attendance is managed by the system, which also evaluates it. The lecturer will get the student's QR code in order to record their attendance. The subject- area professor is in charge of recording everyone's attendance for the group or class. The attendance will be recorded as 0 for present and 1 for absent.

Researcher has proposed, a method for detecting the presence of students in classroom using face recognition techniques is proposed, combining discrete wavelet transforms (DWT)And discrete cosine transforms (DCT) to extract the features of the student's face, after which a radial basis function (RBF) is applied to classify the face objects [2]. This research aims to determine the value of an organization's biometric (fingerprint)- based attendance management system for students or employees[3]. This study will assist any institutions or businesses in tracking the timely attendance of any employees or students using data obtained from finger impressions, which are regarded as signatures. The challenging part of the system is how to manage database and the database architecture and its business logic.

2.3 Limitation of existing system:

The instructor has to scan each student's QR every time, which is a time inefficient process. It requires more time than the traditional attendance system [1].

The author tries to mark the presence with the help of a face recognition system but this system is effective only if the presence is recorded only once a day. It is not efficient to recognize a student's face after every lecture because it takes more time to recognize and there is a chance of misrecognizing the faces [2].

The proposed system is hardware dependent, as it needs to scan fingerprints to mark presence. The fingerprint is an immutable physical feature. We can reset a password, but we cannot change our fingerprint or retina. These are immutable and our biometric data is stored in the respective databases, so there is a possibility that data can be hacked from the server [3].

2.4 Proposed System

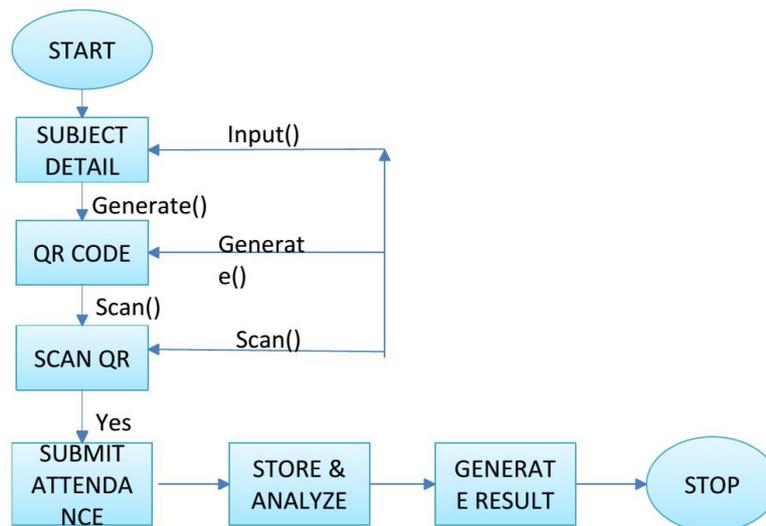


Fig 1: Basic Work Flow Academic Monitoring System

This application is used for maintaining the students' attendance record automatically. The academic monitoring system uses the flutter-based front-end application. The application contains various modules such as the student, faculty, and the admin. The student must register themselves and after the registration they must complete their profile. The faculty must create the course and automatic generation of the QR code for that subject to be generated. The QR contains the subject details that would later be scanned by the student for marking the respective attendance of the student for that

subject. When they scan the QR code the attendance is marked. The location is fetched when the attendance is recorded. Also, every time the students face is recognized by the system. The faculty can see the whole attendance record of the student. The admin has all the authority of the application.

We are using the firebase backend of our application. Firebase is considered a web application platform. It helps developers“ builds high-quality apps. It stores the data in JavaScript Object Notation (JSON) format which doesn't use query for inserting, updating, deleting or adding data to it. The system's backend functions as a database for storing data. Firebase provides all the inbuilt processes for storing and the retrieval of the data. There are many processes in the flutter such as Firebase Analytics, Firebase cloud messaging, Real time database, Firebase storage, Firebase Test Lab for Android, Firebase crash reporting, Firebase notifications. We are using Django for handling requests and responses in the back end. Django is a free and open-source python-based web framework that follows the model- template-views architectural pattern. The focus of the system is to get the image via the body of the form data and predicting on the image then returning the prediction with the max possibility. This kind of system makes the gaining a false positive very real and therefore more classes must be introduced to the dataset for the reduction of false positives.

Loading the image as base64: This step includes converting the image data in base64 which can be sent via. This can be done in JavaScript.

Sending the data in the body as POST request: The HTTP method sends data to the server. A POST request is typically sent using the fetch Api which helps set a body of the request containing the JSON object with the image. Making prediction on the current image: This step includes the uploaded image data and then making prediction based on the existing model. We can use the predict method to make predictions on an image and it will return an array of predictions of individual classes.

Returning the result as JSON: This step includes responding to the user's initial request with a response in the form of the JSON object. The determined schema of the response object is as an array of numbers which can then be associated with individual classes. This could then be sent using the JSON Response class in python.

III. IMPLEMENTATION

The System is implemented using flutter at front end and firebase fire store and firebase real time database at back-end for data Storage. The project is divided into three sections that are student, faculty, and admin. The proposed System is based on Android application hence we used material package of flutter for System front-end. We can also use Cupertino package if we are using iOS operating System. Since most of the users are android users, we have imported material package. All the dart files are included inside the lib folder of project. The implementation starts with the designing of splash screen which contains the logo of the application and then move to the main dashboard screen where there are three tabs namely: admin, student /faculty, and info. Before login users must register themselves to the platform. After successful registration Student can login their account using email and password. All user's data is collected inside the Users collection in firebase fire store and a unique user id is auto generated for each user. to store data to firebase we have imported cloud firebase plugin inside the pubs.yaml file. This plugin enables us to read and write data to firebase cloud storage through flutter application. Admin have separate login module and student and faculty login through same login module. After entering the email and password, data of respective user is retrieved from the database check the role of user and open the respective dashboard according to role. Firebase has in-build Authentication module and provide sixteen different type of login options. Here we have used Authentication using email and password which is enabled by importing *Flutter_Auth* plugin from pub.dev.

Faculty: Faculty has access to subject details and students Attendance details; they can create course for their subject and generate the QR for that course. Here we have used flutter barcode plugin of flutter to generate QR for particular Subject. This package has *QRImage* method which generate the QR based on data. In proposed System the QR contains the information about data location, where the data will be stored. Using same QR Student can mark their attendance for that subject. The course can be created using information such as year, section, subject name and subject code. The data about course created is stored inside the subcollection of users (faculty) document. Faculty has also authentication to check the Attendance of any class or any subject. Faculty can update their profile so that admin can have all the details of faculty in department.

Student: Student has less access to data than faculty. Student can mark their attendance by Scanning QR presented in classroom. To Scan QR we have used QR Scanner package of flutter which can be imported using command *Flutter pub add QR Scanner* in terminal. when the camera is mounted over the QR it will decode the information from QR i.e., path for data Storage. As Soon as the data path is collected from QR, Students Data Such as id, roll no, location and timestamp are Stored to Specify path in database. For storing the Attendance details of Students, we have used real-time database in firebase. In real-time database Attendance is stored according to the year, section, subject code and date. Student can also update their details in profile.

Admin: Admin has access to all the data of Student as well as faculty. Admin can check Attendance of any class. He has also right to add or delete student and faculty. As discussed earlier, attendance is stored according to year, section, subject code and date hence admin has to add all this details to check attendance. When he/she clicks on the check button the data of student present on the mentioned date is retrieve from firebase real-time database using *firebaseAnimatedList* in list format. When admin clicks on the student id all the information along with timestamp of attendance is retrieved from database. To retrieve the data from firebase real-time database we have to create the data reference and have to add path for the data. Faculty details are fetched using stream builder in list format. Here admin can check details of faculty and can also delete it from database. Similarly in Students, Admin can view the details of student and can delete the student from database.

IV. RESULT ANALYSIS

The QR-based attendance system was successfully established and evaluated. Each student's individual QR code was created by the system via a android application, and they were then able to scan it with their smartphones to record their attendance. Students took about 30 seconds on average to scan their QR codes and mark their attendance, which is much quicker than more conventional procedures like roll calls. Additionally, the system gave the teacher immediate feedback on how many students were present and absent as well as comprehensive reports on each student's attendance history. The reports could be downloaded in a number of formats for additional examination and were available through the android application.

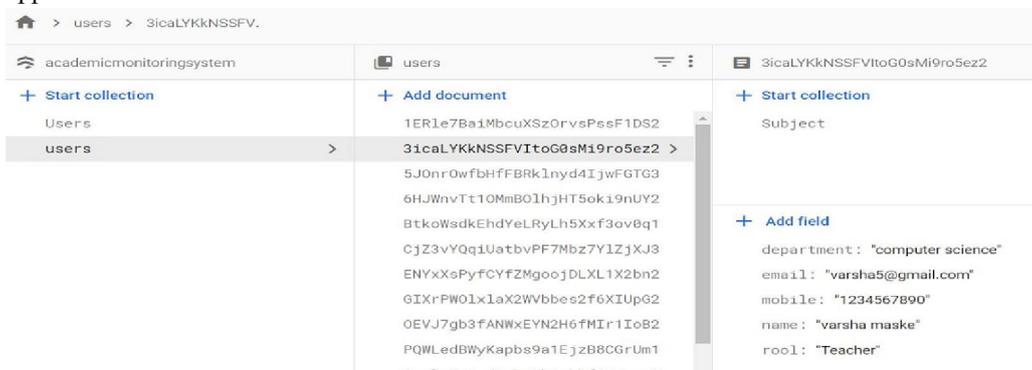


Fig 4.2: Firestore Database(Student)

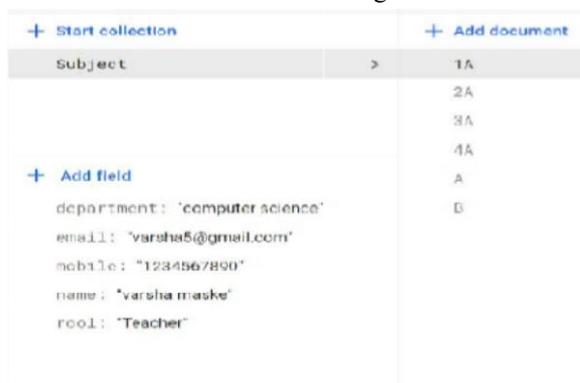


Fig 4.3: Firestore Database(Subject)

As Soon as the data path is collected from QR, Students Data Such as *id*, *roll no*, *location* and *timestamp* are Stored to Specify path in database. For storing the Attendance details of Students, we have used real-time database in firebase. Attendance is stored according to the *year*, *section*, *subject code* and *date*. Student can also update their details in profile

V. ADVANTAGES AND DISADVANTAGES

5.1 Advantages

- Easier to handle and user-friendly interface.
- Using the QR code provides versatility.
- Students will be able to mark their presence, can check their attendance subjectwise.
- Time reducing technique for marking the attendance of the student.
- Accuracy of marking the attendance is high.
- No need to mark the attendance manually.
- It reduces paper and material consumption.

5.2 Disadvantages

- Every student and faculty require smart phones.
- The user doesn't have much experience with this technology.
- It requires memory in smart phones.

VI. CONCLUSION & FUTURE SCOPE

6.1 Conclusion

The created system that is discussed in this article has undergone successful design and testing. Academic monitoring system plays an important role in student and faculty daily life. Looking at the existing situation, we have thought of using mobile technology to efficiently benefit from the complete assigned time assigned to the lecture. The student's attendance record will be analysed and exported on a weekly and monthly basis. It possesses a great advantage, among the whole type of code scanning technology. QR code-based attendance system is the most accurate system. Instead of wasting paper, it is more effective to keep the attendance information on a smart phone. The proposed system allows fraud detection based on the GPS location as well as the facial images taken for each student.

6.2 Future Scope

This system can be further adopted and some more features can be added to the application such as sending automatic notification to the student if his attendance performance is weak. In future work we will focus on making missed class topics and notes available to students. Full control to professor with more secured and enhanced options

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