Smart Attendance System using QR Code

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Abstract: *In the day-to-day life of teachers, workers, and student recording attendance are repetitive and time-consuming. In most places, the attendance system is marked manually it is not automated. It requires a lot of manual workforces to accomplish it. This project intends to make automatically save attendance records in the database. An automated attendance system can increase the efficiency and speed of taking attendance. In this attendance system, we have to adopt a mandatory development methodology. Some improvements have to be made before it is fully functional, for instance, the camera is not zoomable at the moment. In conclusion, the project achieved its objectives, which ultimately save lecturers' time in managing attendance, bring convenience to students on attendance registration, and reduce the likelihood of fake attendance records.*

Keywords: NPM, API, QR Code, Firebase

I. INTRODUCTION

In these modern days, the popularity of smartphones has increased over the years. The current attendance system i.e., the manual has been used over the years which is time-consuming and requires a manual workload and manual attendance list. And also, the manual attendance system is listed and marked by humans, who can introduce errors when transferring from paper attendance to digitalized attendance records. Besides its students can easily cheat on attendance. The proposed solution is based on a QR code to record students' attendance. The system will be able to verify students' identities and prevent false registration. All of the attendance records will be recorded in the system and available to students and lecturers instantly. This will eventually reduce the human efforts on attendance registration.

Steps for how the automated attendance system works:-
Step 1:- Generate Code.
Step 2:- Display in QR Code.
Step 3:- Scan QR Code.
Step 4:- Send for Verification.
Step 5:- Update the database after verification.

1.1 Case Retrieval Measures
In this smart attendance system, the main moto is to decrease workload and get accurate responses. The marked attendance is stored in a database which is in the google cloud storage Firebase that is mainly a backup of the database because we are using a QR code. If any error occurs and any case database is destroyed then it has a backup plan through google cloud storage

1.2 Result Representation
We are developing a web application base on smart attendance system using QR Code. So, the representation is take place on the browser. We used CSS, HTML, PHP, and QR codes. It is simply effective. It is two-dimensional and there is a different unique code for every subject and every day. For teachers, they have to log in and then fill in the tabs and create a QR code and then students fill in attendance and scan QR Code. In this way, a representation of the teacher side, student side, cover page, and database are stored on the teachers' side.

II. LITERATURE SURVEY

Paper 1:- Design of Attendance System Based on Face Recognition and Android Platform Author:- Xiaojun Bai, Feihu Jiang Publisher:- IEEE

Paper 2:- Smart Attendance System using QR Code Author:- Asri Nuhi, Agon Memeti, Florinda Imeri, Betim Cico Publisher:- IEEE Abstract:- Academic success in higher education institutions is directly connected with student engagement in the classroom. However, the bulk of student attendance registration is still carried out in the old-fashioned manner, which takes a lot of time and is laborious, particularly for courses with a big enrollment. At most universities, participation management has historically been done by hand.

Paper 3:- NFC-Based Mobile Attendance System with Facial Authorization on Raspberry Pi and Cloud Server. Author:- Andrew Fade, Siti Ummi Masruroh Publisher:- IEEE

III. NEED OF SYSTEM

The current attendance system is time-consuming and requires a manual workload. Lecturers will let the students sign on the attendance list. Then, he or she will key into the university's portal to record the attendance, each for every class. This will consume lecturers' valuable time. Also, it will introduce human errors during the transfer from paper attendance to digitalized attendance records. React (also known as React.js or ReactJS) is a free and open-source front-end JavaScript library for building user interfaces based on UI components. It is maintained by Meta (formerly Facebook) and a community of individual developers and companies. React is a library for building composable user interfaces. It encourages the creation of reusable UI components, which present data that changes over time. Lots of people use React as the V in MVC. React abstracts away the DOM from you, offering a simpler programming model and better performance. React can also render on the server using Node, and it can power native apps using React Native. React implements a one-way reactive data flow, which reduces the boilerplate and is easier to reason about than traditional data binding.

We can use bar code but it has less data storage, it is dimensional and we can't retrieve data but QR Code is two-dimensional and it has more data storage capacity. And it is more useful for retrieving 40% to 50% of data if data get destroyed or deleted.

3.1 QR Code Structure

To create a QR code we have to use API(Application Programming Interface)

QR code for ID

Algorithm

Quick Response (QR) Code

- A 'Quick Response Code' also known as a QR code it is a two-dimensional type of barcode.
- QR codes were first launched in 1994 by Denso Wave. • QR code stores more data than Barcode.

Detection Markers

- The detection marker tells the system where to start code reading.
- We can store data in QR codes in 4 ways.
- So, the detection marker tells the system which type of data is stored in QR.

Timing Patterns

- Timing pattern tells the system that the data is stored in which row and column.

Format Information Area

- This area stores two types of information first Error Correction Keys and second Masking Patterns.
- If the QR code unfortunately damaged then because of Error Correction keys we can retrieve 30% of data from that copy.
- Masking pattern helps in data encryption.

Alignment Pattern

- Alignment patterns are one or more than one.
- The alignment pattern helps the QR to maintain the orientation, which means if we scan the QR from any angle it will respond properly because of this alignment pattern.

IV. FEATURES OF THE SYSTEM

1. Monitor and mark attendance fastly.
2. Movement of employees within their working hours.
3. Prepare the database for processing wages.
4. Decrease manual workload.
5. More Secure.
6. Due to the correctness of attendance students and employees will be more regular.

V. USED TECHNOLOGY FOR RUNNING THE SYSTEM

- **API:** API An application programming interface. API enables companies to open up their applications' data and functionality to external other developers and business partners. This allows services and products to communicate with each other and purchase each other's data and functionality through a documented interface. Programmers don't need to know how an API is implemented; they simply use the interface to communicate with other products and services. API is used to generate QR codes also.
- **NPM:** Npm is also known as Node Package Manager. It holds the prime position in the front-end technologies list. It is the largest software registry. It has public as well as private collections of packages of source code for front-end mobile apps, web apps, robots, routers, and a lot of other JavaScript-related stuff. With the help of Npm, developers can conveniently share their code and reuse others' code. Moreover, it makes it easy for you to use the latest version of other developers' code in your app. This is a web-designing tool from Macromedia. Interactive animated web pages can be created quickly with Macromedia Dream Weaver.
- **REACT:** ReactJS is a JavaScript library used for building reusable UI components. According to React's official documentation, the following is the definition − React is a library for building composable user interfaces. It encourages the creation of reusable UI components, which present data that changes over time. Lots of people use React as the V in MVC. React abstracts away the DOM from you, offering a simpler programming model and better performance. It can power native apps using React Native. React implements a one-way reactive data flow, which reduces the boilerplate and is easier to reason about than traditional data binding.

VI. PROCESS OF GETTING OUTPUT AND HOW IT WORK

We have to run programs using the main file and the open cmd i.e. command line prompt. Then we have to type commands.

Commands for running the Programs:-

1. node_v:- To get the version of Nodejs
2. node_Start:- It starts the web application

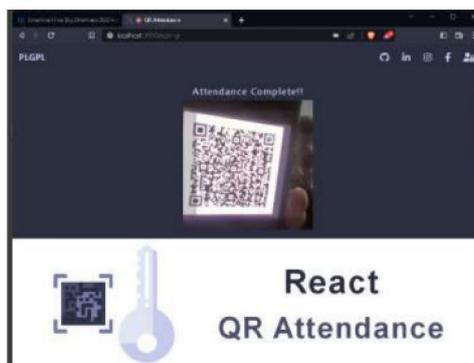After entering the command web application start and the front page will display.

There are two side logins:

1. Teachers' site login
2. Students' site login

Following teachers' side login which has to log in by teachers through Google or any media. Enter the subject and enter lecturer for which we can create a QR code. And every time QR is different.

Then created a QR code to send or present on the presentation slide. After that students scan the QR code till a certain time limit. After scanning it returns the message Attendance Completed!!

After this students have to fill in attendance detail

In this way, the process works of the attendance system using a QR code.

VII. FUTURE SCOPE

As technology advances and more businesses and organizations adopt digital solutions for attendance tracking, the future scope for attendance systems using QR codes is promising. Here are some potential future developments:

1. Integration with other technologies: QR code attendance systems can be integrated with other technologies such as facial recognition, biometric authentication, and GPS tracking to improve accuracy and security.
2. Mobile device compatibility: As a result, attendance systems using QR codes can be further developed to be compatible with mobile devices, allowing for easier access and greater convenience.
3. Cloud-based solutions: Cloud-based attendance systems using QR codes can provide real-time data collection, secure data storage, and easy access to attendance records from anywhere in the world.
4. Using location the limited distance and time for marking attendance.

VIII. CONCLUSION

Digitized attendance systems are a great way to keep track of students' attendance. They can help colleges save time and money by reducing the need for paper records. They can also help students keep track of their attendance records. There is always room for improvement in any app. Right now, we are just dealing with text communication. A positive first impression is essential in a human relationship as well as in human-computer interaction. This project hopes to develop a digitalized attendance service Web app with a high-quality user interface. In the future, we may be extended to include features such as File Transfer, Voice Messages, Video Messages, Audio Calls, Video Calls, and Group calls. This College community application can be very useful in the future to provide the features like note sharing, an attendance system for students and staff, and a notice board to showcase achievements and placement scenarios these features are available in a single application

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