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# Smart Attendance System

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***Abstract-: Smart Attendance System is a smart way of marking attendance using digital ways. Nowadays there are multiple types of attendance systems like log books, using punch cards, fingerprint systems, barcodes, QR codes and also RFID which creates multiple issues like proxy attendance, records misplaced, etc. This paper provides a prototype that will help to overcome all the problems occurred in the systems nowadays. The proposed system in the paper works on three different techniques which will help to avoid proxy attendance and also generate annual, monthly as well as weekly report that will help a teacher to analyse the class.***

***Keywords: - attendance system, proxy, report, analyse.***

## I. Introduction

Nowadays attendance monitoring becomes an essential for every organization and institution in order to maintain the records of an individual's presence at his/her work place. For this, every institution requires a robust and time efficient system which keeps the records of present and absent students in well-ordered manner. A lot of institutions use a traditional way in which teachers either call the name of the students which the student responds or pass the attendance sheet to sign. This way is very time consuming and has a high risk of human error. The major drawback of the traditional attendance systems is proxy marking, in order to counter this problem various systems are available in market which uses different technologies like QR scanning, fingerprint scanning, face recognition, location aware systems.

There are lot of systems based on scanning of QR code. In some systems every student has their own QR code. Teacher passes a scanner and every student needs to scan their QR code (Yunos & Reza, 2012) , (Fadi & Nael, 2014). Some system are based on android operating system where administrator grants the user name and password to the one who wants to use the system, instructor marks the attendance and reports are generated automatically. Few systems are location aware uses GPS technology in which Location of the student will be sent to admin after clicking on submit button (Ayop, Yee, Anawar, Hamid, & Syahrul, 2018). There is a lot of attendance system based on face recognition technique. This system detects the face from Real time video processing and uses different algorithms to detect and recognize faces (Yang & Han, 2020).

Attendance systems available in market uses a single technique to mark attendance but if the system fails there is no another option to avoid marking of proxy. Therefore, there is call for such a system which uses multiple techniques to verify the marked attendance. The objective of this paper focuses on designing user friendly, paperless and multi way authenticated system. The proposed system consists of three techniques includes automatic generation of QR code which will scan by the students, using GPS location of a student will be checked. The system also checked the face of student when all these verifications are done successfully then and only then the student attendance will be marked successfully. The proposed system generates the reports on daily, weekly, monthly and yearly basis which will help the teacher to analyze the class.

### 1.1 Characteristic of proposed system

User Friendly

Reports are easily generated on a click

No Paper Work

One Spot Solution for Attendance Calculation

## II. Literature Survey

There are multiple system that can mark attendance in school, colleges and different institute. We have studied multiple paper and collect all the data. Below table display data of multiple paper with our observation. And there is also the comparison of our system with all the other system we were able to get.

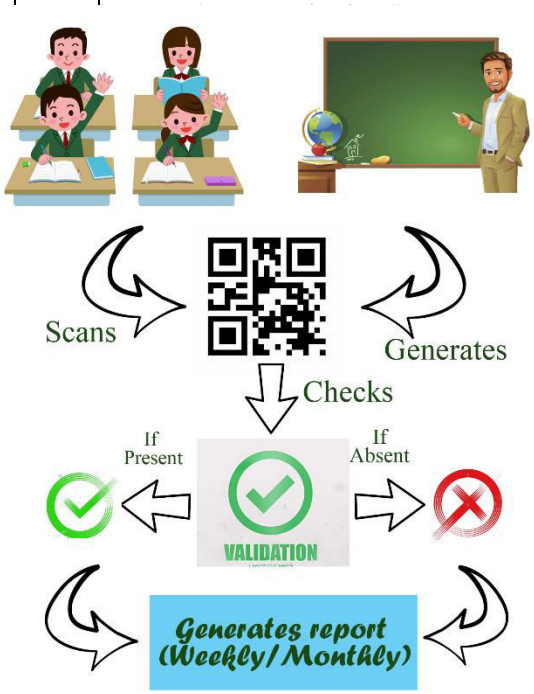
**Table 2.1. Literature Survey**

| Sr. No. | Year of Publication | Title | Authors | Remarks |
|---|---|---|---|---|
| **1** | 2012 | Android-based Quick Response (QR) Code Attendance System(QRCATS) (Yunos & Reza, 2012) | Fazrul Reza Mohd Yunos | Online -offline based system provides multiple options for scanning |
| **2** | 2014 | A student Attendance system using QR code (Fadi & Nael, 2014) | Fadi masalah, Nael Hirzallah | Require login only once and there is timer to scan QR code |
| **3** | 2018 | QR code based smart attendance system (Wei, Manori, Devnath, Pasi, & Kumar, 2018) | Xiong wei, Anupam manori, Nandgopal Devnath, Nitin pasi and Vivek kumar | Always generate new QR code for every student |
| **4** | 2019 | Android based attendance management system (Sunehra & Others, 2019) | Sunil Jadhav , Akash Gagare , Pooja Gunjal, prof. Vidya Jagtap | Cloud based system needs authentication of particular lecturer. |
| **5** | 2018 | Location aware Event attendance system using GPS and QR code technology (Ayop, Yee, Anawar, Hamid, & Syahrul, 2018) | zakia h ayop, Chan yee lin, syarulnaziah anawar, Emraan hamid, Muhammad syahrul azhar | Location of the student will be sent to admin after clicking on submit button |
| **6** | 2018 | The Features of Quick Response (QR) Code as an Attendance Monitoring System : Its Acceptability and Implication to Classroom (Maleriado & carreon, 2018) | Michael Angelo C. Maleriado , Joseph R carrean | Offline based system needs scanning of QR code by students. |
| **7** | 2019 | Enhancement of QR code student attendance system using GPS (H., 2019) | Hussam Albehiery | Need to generate unique QR code in every lecture |
| **8** | 2020 | Face Recognition Attendance System Based on Real-Time Video Processing (Yang & Han, 2020) | Hao Yang and Xiaofeng Han | Detect the faces from real-time video processing |
| **9** | 2020 | Attendance System Using Face Recognition (Londhe, Mehta, Bhinge, & Deshmukh, 2020) | Alka Londhe, Kuldeep Mehta, Ashitosh Bhinge, Aditya Deshmukh | Uses YOLO algorithm for face detection and face recognition |

**Table 2.2. Compression of all system**

| Sr. no | Systems | Model-1 QR-Code | Model-2 MACC Address | Model-3 GPS | Model-4 Face Detection | Model-5 Data Analytics |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| **1** | Android-based Quick Response (QR) Code Attendance System(QRCATS) (Yunos & Reza, 2012) | **Yes** | **No** | **No** | **No** | **Yes** |
| **2** | A student Attendance system using QR code (Fadi & Nael, 2014) | **Yes** | **No** | **No** | **No** | **Yes** |
| **3** | QR code based smart attendance system (Wei, Manori, Devnath, Pasi, & Kumar, 2018) | **Yes** | **No** | **No** | **No** | **Yes** |
| **4** | Android based smart attendance system (Sunehra & Others, 2019) | | **No** | **No** | **Yes** | **Yes** |
| **5** | Location aware Event attendance system using GPS and QR code technology (Ayop, Yee, Anawar, Hamid, & Syahrul, 2018) | **Yes** | **No** | **Yes** | **No** | **Yes** |
| **6** | The Features of Quick Response (QR) Code as an cceptability eriado & | **Yes** | **No** | **No** | **No** | **Yes** |
| | ttendance ?) | **Yes** | **No** | **Yes** | **No** | **Yes** |
| | ı Based on Han, 2020) | **No** | **No** | **No** | **Yes** | **Yes** |
| | cognition kh, 2020) | **No** | **No** | **No** | **Yes** | **Yes** |
| | | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** |




## III. Proposed System

### 3.1 Description

Very Firstly the Teachers need to login to Teacher's panel of this System. After login to the panel teacher need to fill in all the required details related to the lecture and continue. It will automatically generate the random QR code. That QR codes will only be displayed on click of the staff/teacher. This QR code is encoded with a OTP that is required to mark attendance.

Then student login to their application to mark attendance. Their login is mapped with the unique ID of their mobile that is stored at the time of registration. If their unique ID matches to the ID stored in database while storing the record, then the student gets the access to scan QR code. For all students QR code will be Same. After that all student will scan this QR code on their personal device (Mobile).

When students will scan this QR code, then at the back end their GPS location and their facial details are stored. Then all the data collect is compared with the data store in the database. If all the data is matched completely with the sored in database, then and only then student's attendance will be marked as present or else it will be marked as absent.

After marking of the attendance system will send a notification to reveling that their attendance is marked and if any sort of error was occurred while marking the attendance it will notify the same.

At last the system provides with all types of report that can help teacher as well as student to analysis their records. System provides report such as Weekly report, Monthly report, Yearly report, Daily report, single student's report, report of department, class report, report of students on OD and last but not the least report of whole institute.

### 3.2 For the On Duty (OD) Purpose:

Whenever student is doing any sort of extracurricular activities his attendance is not considered properly and miscommunication is happened between staff and student. To overcome this problem the system includes attendance marking for OD students.

For OD that will Student send the request to that particular event coordinator.

If the coordinator will grant the permission to that student, then it will mark their attendance as OD and notify to the HOD and also Class coordinator.

After that it will marks attendance then similarly complete analysis process. And it will give all analysis report of overall attendance. The analysis report will be in the form of charts, flow diagrams and algebraic.

### 3.3 Assumptions, Dependencies & Exceptions

It is assumed that the system is connected to Internet & GPS for the reliable working.

User must have an Android device with working front as well as rare cameras.

This accuracy of GPS Module of the system is dependent upon accuracy of GPS in user's devices.

## IV. Implementation and Outcomes

There are several methodologies used in this system. That will help to mark attendance in more effective way and help the in charge person in analysis of data.

Below mentioned are methodologies used in this system:

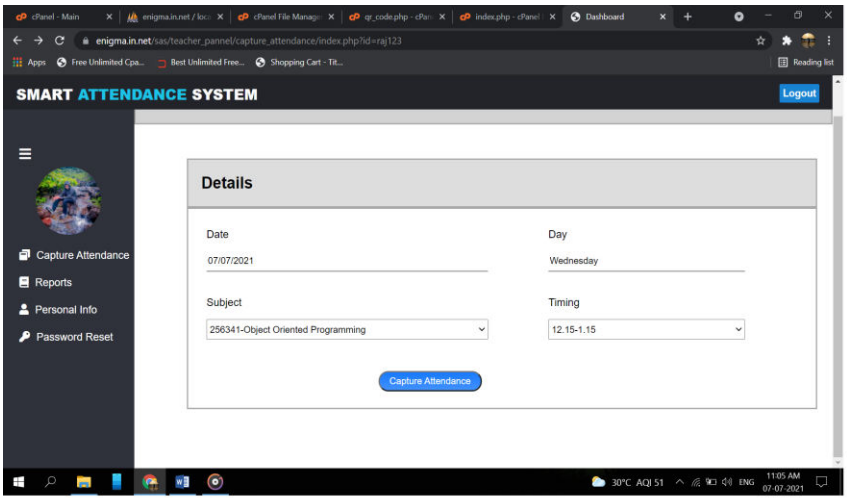
1. OTP System
2. QR Code
3. Unique ID of android device
4. GPS
5. Face detection and recognition
6. Data analytics

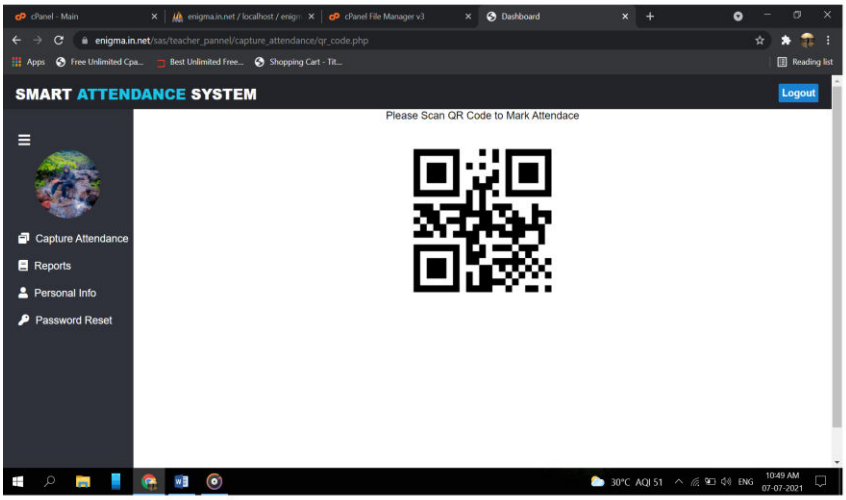
### 4.1 Unique ID of Android Device

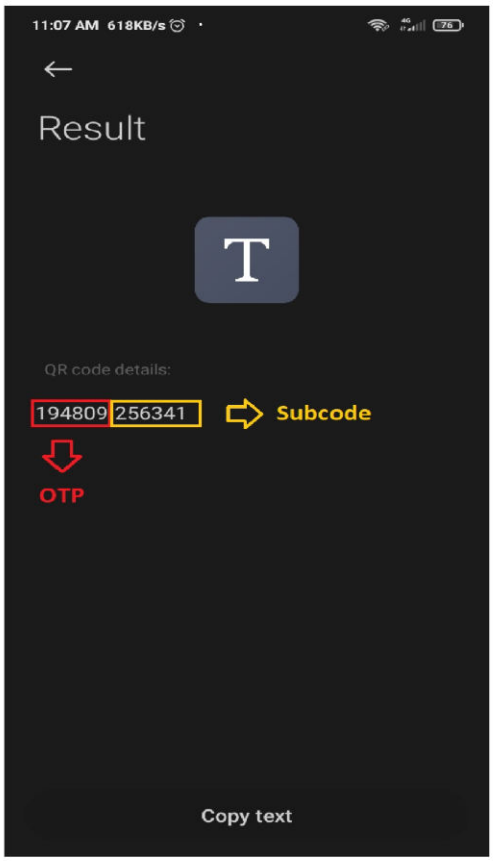
To mark attendance each and every student need to login but every student need to use the registered device. Means at the time of creation of a student every student is asked to login though their personal device and the unique ID of that device is stored by the database and the student need to use the same device every time he/she need to mark attendance. If they try to login on different device, they can only view their pervious recodes and the option to mark attendance will be hidden. To mark attendance, they need to login through the registered device only.

### 4.2 QR code and OTP System

Using the libqrencode library which is pure-php LGPL-licensed implementation based we are encoding the OTP which is generated by a randomizer. This OTP is valid only for an hour and the QR code will be demolish after that.




### 4.3 GPS

While in front end the QR code is being scanned at back end the application collects GPS location of the android device and that is compared with the GPS location of the institute the user belongs to. Due to the issues of accuracy of the GPS indoors we have considered around a ±5 % error. As it is only a way of authenticating that the user is around the institute.

### 4.4 Face detection and recognition

As there are chances that a user may pass on this device to fellow met hence to verify that the user is himself we are using the facial model. Here the face of the user is taken in consideration. It checks for the face that is store with the unique ID of device.

### 4.5 Data analytics

As every project data analysis is one of the major part. This system also provides with data analysis. It provides reports such as report of a particular student on daily, weekly, monthly, yearly bases. Then the average attendance of class, department, overall institute. It also provides with the analysis of particular student, class from particular date to particular date.

# V. Conclusion

This system demonstrates real time attendance marking and management of records. The proposed system has provided a convenient method of attendance marking as compared to other systems which increases the performance and efficiency of system. This system is user friendly and easy to use. Conclusion of this system is to avoid the proxy attendance and developed a paperless system to analysing report of every student.

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