

A Project Report on
Smart Attendance Management System

Submitted in partial fulfilment of the requirements
in

Computer Science

by

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Under the Guidance of
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UNIVERSITY OF MUMBAI

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Approval Sheet

This Project Report entitled “*Smart Attendance Management System*” Submitted by “*Apurva Patil*”(17102049), “*Komal Lonkar*”(17102029), “*Veda Kowale*”(17102052), is approved for the partial fulfillment of the requirement in *Computer Engineering* from *University of Mumbai* .

(Prof Archana Kotangle)

Guide

Prof. S.H.Malave

Head, Computer Engineering Department

Place: A.P.Shah Institute of Technology, Thane

Date: 29/05/2021

CERTIFICATE

This is to certify that the project entitled “*Smart Attendance Management System*” submitted by “*Apurva Patil*”(17102049), “*Komal Lonkar*”(17102029), “*Veda Kowale*”(17102052) for the partial fulfillment of the requirement for award of a degree *Bachelor of Engineering* in *Computer Engineering*, to the University of Mumbai, is a bonafide work carried out during the academic year 2020-2021.

(Prof Archana Kotangle)
Guide

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Principal

External Examiner

Place: A.P.Shah Institute of Technology, Thane
Date: 29/05/2021

Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, We have adequately cited and referenced the original sources. We also declare that We have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Archana Kotangle

Komal Lonkar, 17102029
Veda Kowale, 17102052
Apurva Patil, 17102029

Date: 29/05/2021

Contents

1. Project Conception and Initiation

- 1.1 Abstract
- 1.2 Objectives
- 1.3 Literature review
- 1.4 Problem Definition
- 1.5 Scope
- 1.6 Technology stack
- 1.7 Benefits for environment and society

2. Project Design

- 2.1 Proposed System
- 2.2 Design(flow of modules)
- 2.3 Class diagram
- 2.4 Module-1
- 2.5 Module-2
- 2.6 Module-3

3. Implementation

- 3.1 Proposed system
 - 3.1.1 Policies
 - 3.1.2 Algorithms
 - 3.1.3 Pseudo code
 - 3.1.4 Platforms for Execution

4. Results

5. Conclusion

6. References

7. Bibliography

1. Project Conception and Initiation

1.1. Abstract

With the advent of technologies and multiple options available, it's very essential to rethink and optimize the current manual process by utilizing technologies, like web, mobile together. At present mobile phones play a vital role in our day-to-day life, and it also became a mode of identity. Using the mobile and its geo tagging feature we can precisely locate and validate once presence. The inbuilt ability of mobile can be very well leveraged to modernize the current manual attendance system. QR Code scanning is one of such features of mobile phones that enables them to quickly capture and process the data. Smartphones can be used to speed up the process of taking attendance. This project 'Location based Smart Attendance Management System' focuses on simplifying & solving the problem of manual process of taking attendance. The project proposes a system that is based on using a QR code. QR stands for 'Quick Response'. They can be read quickly by a cell phone. It stores information such as the lecture number, date, name of the professor, etc, which is used in this proposed system.

1.2 Objectives

Taking student's attendance is the most important and crucial part of academics. The attendance rate is important because it is observed that students are more likely to succeed in academics when they attend school or college consistently. This process historically is manual. In many schools, colleges and universities there is an allotment of marks for attendance rate. If the attendance rate is higher, he/she will be allocated maximum marks in the attendance section. This helps to increase the overall grade of the student. Professors spend a valuable amount of time from the lecture to note the attendance of the students and to verify that the student who is not present in the lecture is marked as "present". This procedure is repeated for every lecture and thus, consumes a lot of time.

The Location based Smart Attendance Management System uses a QR code, which will be displayed by the teacher during the lecture. The students will have to scan the QR code using a smartphone application. The system also uses location tracking to eliminate false attendance marking by the students. Smart Attendance takes the student's previous attendance record from today and carries it forward through any of their remaining classes. It helps to generate various types of reports of a class or student attendance. Now that the technology has improved and everything is getting digital, there is a need for this traditional process of marking attendance to be modernised. The proposed system helps to reduce the workload of faculty and saves many man-hours that could be utilized in more fruitful tasks. It helps to record attendance efficiently and accurately.

1.3 Literature review

Many attendance management systems have been proposed in the past. These systems include the installation of devices like biometric scanners and cameras.

- Reference [1] addresses the attendance systems which had been used previously and provides a methodology for the attendance system using QR Code. The proposed paper comprises a device to be installed in a classroom that is connected to a camera and the internet. The lecture is registered once the professor reads the QR code and the students are required to scan the code using their mobile, displayed on the device at the end of the lecture.
- Reference [2], makes use of two applications. One application is a Desktop application that is used for storing the attendance of the students and the other application is a mobile application. This paper also makes use of GPS (Global Positioning System) to avoid false registrations by the students. The desktop application is used by the teacher to generate and display the QR code.
- Reference [3] is an example of a biometric scanning system, which proposes a planned system of recording student uses fingerprint identification that enables faculty and students to track student attendance electronically. The system proposed in this paper is going to display attendance on a computer with additional enticing graphics and have students complete details with Microsoft Visual Basic Studio and integrated exploitation of the Fingerprint Reader.
- Reference [4] proposes a mobile device with the application installed. The device is passed among the students, wherein two options for registration are provided, registration using selfies and using signature. The images will be stored for identification during attendance.

1.4 Problem Definition

Presently, several attendance monitoring systems are being implemented in various organizations and universities. One of the most widely used systems is the traditional paper based attendance management system. The teacher has to manually mark the status of the student and also log this data into multiple registers which consumes a lot of space. Over a period of time, keeping a track of these registers becomes difficult and the papers can get misplaced or damaged easily. The process is tedious and also time consuming.

1.5 Scope

The proposed system can be used in universities, as all the professors and students have access to smartphones. Once the QR Code is scanned by the students, a location check is performed, which eliminates the false attendance marking. The teachers can generate an attendance report as soon as all the students have finished scanning the code.

1.6 Technology stack

- Mobile application:
 - JAVA

- Website
 - HTML
 - CSS
 - JAVASCRIPT
 - PHP

- Database
 - Google Cloud SQL

1.7 Benefits for environment and society

- The conventional method of recording attendance involves manual logging of attendance, which might lead to inaccurate and misleading data. Hence, it is essential for the institutions to automate the system.
- The Internet has brought a paradigm shift in almost every domain, especially in the education system.
- The paper has proposed an efficient and an economical online attendance management system which scales down manual work to negligible amounts.
- It helps to record attendance in a paperless manner which helps the environment. The proposed system is systematic and effective.

2. Project Design

2.1. Proposed System

The proposed solution offers QR code generation and a system consisting of a web application and an android application. Initially, during the start of the lecture, the teacher will log in to the web application and by entering the details of the lecture, to generate the QR Code. The details of the code will be stored in the database after clicking the “Generate QR” button. This code will be displayed to the students through the website on the smartboard.

Meanwhile, the students will open the respective application on their phones and scan the QR Code. If the student is using the app for the first time, then he/she will first sign in to the app, using their credentials. Upon logging in, they can select the “Scan QR” button to start the camera. Once the background check is performed, the student details will be inserted into the “attendance” table. The student will also be notified, whether the attendance was marked successfully.

2.2. Design(flow of modules)

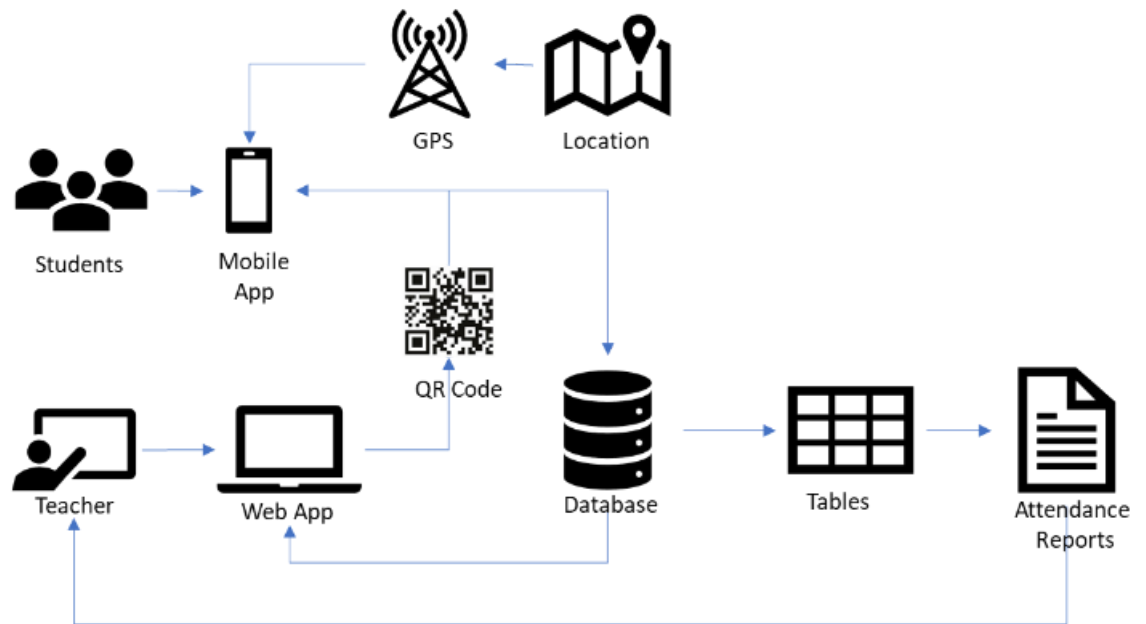


Fig 1: System Architecture

2.3. Class Diagram

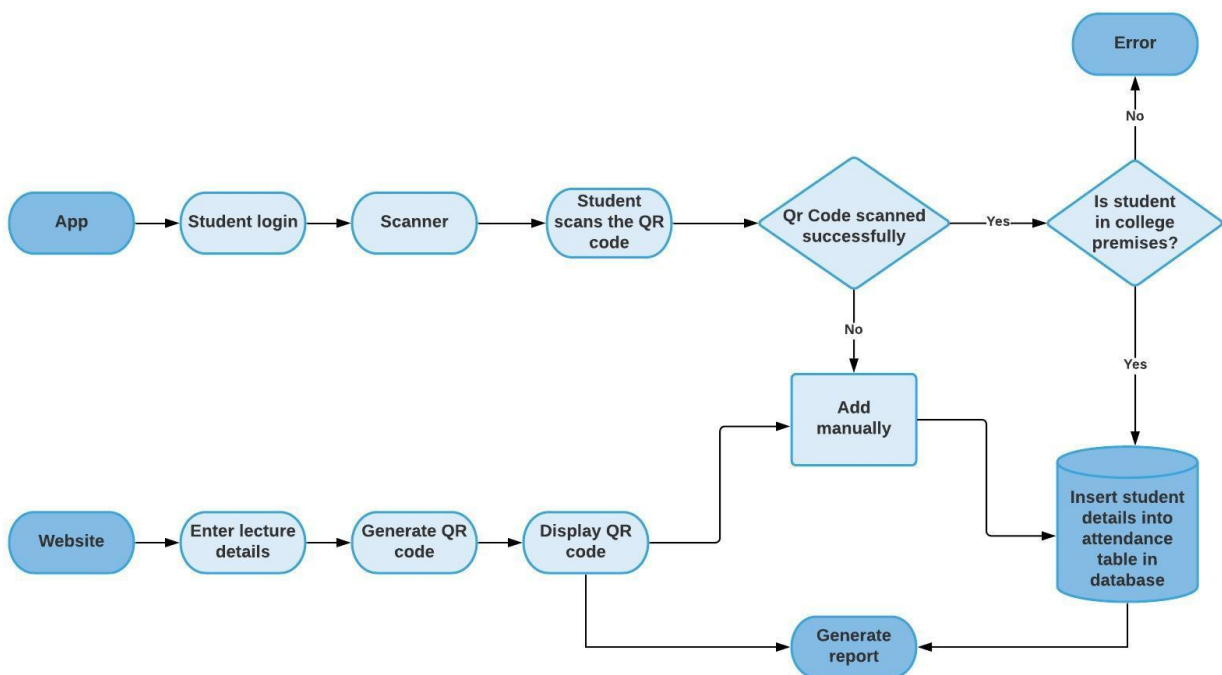


Fig 2: Location Based Smart Attendance Process

2.4. QR Code

A QR (quick response) code is a type of matrix barcode. A QR code consists of three large squares which are used for positioning and several small squares which contain the data. The number of squares in the QR code increases as the amount of data stored in it increases. Fig 3. Displays the QR code format which will be used for the system. It can be scanned using any imaging device like

cameras or smartphones which support QR scanning or have the respective application installed. The small squares which contain the data are decoded and error correction is also performed. QR code will speed up the process, reducing the time taken by traditional procedures significantly. It will eliminate the need for keeping track of the reports. Hence, less maintenance is required in the proposed system.



Fig 3: Quick Response Code

```
{"sessionId":"1117","qrCode":"AISC1117",  
"date":"2021-03-17","time":"20:45:26","de  
ptId":"DCS4","subjectId":"AISC"}
```

Fig 4: Contents of QR Code

2.5. Mobile Application

The mobile application will be used by the students for scanning the encrypted QR code. Upon scanning the code, it will perform the following operations:

- A check whether the student is enrolled in the course will be performed.
- The status of the QR code at the time of scanning will be checked, i.e, the status should be “Active” and not “Expired”.
- The real-time location (latitude and longitude) of the student, as well as the university, is compared. The attendance will only be marked if the student lies within the specified range.

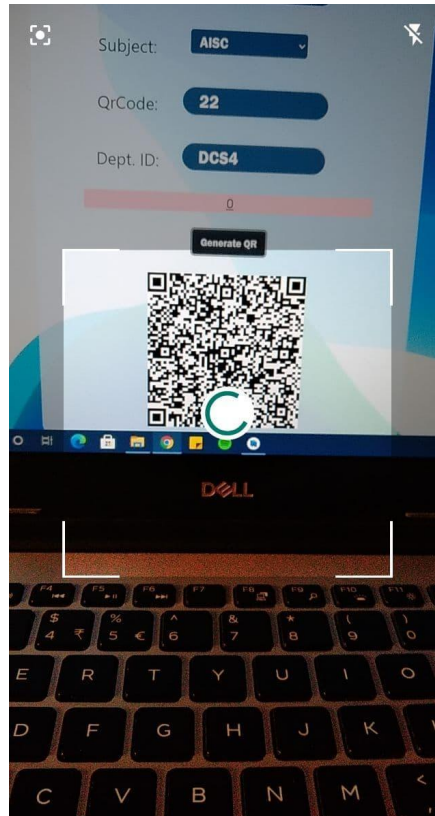


Fig 5: Mobile Scanner

2.6. Website

The website is used to generate the QR. The main input “Session ID” is a 6-character long randomly generated string, which will be unique for each session. After the QR is generated and a few minutes are given to allow students to scan the QR, after this specific amount of interval a popup will be generated indicating the number of students who scanned the QR. Professor also has the flexibility to add the attendance manually.

The website also generates reports depending on the Session ID. Also if there are multiple sessions on the same day, then multiple reports can be generated separately.

Session: **f8e891**

Subject: **AISC**

QrCode: **5**

Dept. ID: **DCS4**

Generate QR




Fig 6: Generating QR

Daily Attendance Report

Subject: **Select Subject** Date: **dd / mm / yyyy** **Get Result**

Get PDF for Session - 010daf

Get PDF for Session - 064371

Overall PDF Report

Fig 7: Report Generation



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Attendance Report of Session - 064371 (Date : 2021-05-06)

Prof. Name: S Total Students: 5
 Subject: AISC Total Present: 2
 Session No.: 064371 Total Absent: 3

Sr No.	Moodle Id	Name	Status
1	17102029	KOMAL LONKAR	Present
2	17102049	APURVA PATIL	Present
3	17102018	SALONI JACKERY	Absent
4	17102019	RITIKA RANE	Absent
5	17102022	VEDA KOWALE	Absent

Fig 8: Session wise attendance Report



A. P. Shah Institute of Technology

Overall Attendance Report

Prof. Name: S Total Students: 5
 Subject: AISC Total Lectures: 6

Sr No.	Moodle Id	Name	Total Lectures (6)
1	17102018	SALONI JACKERY	0
2	17102019	RITIKA RANE	0
3	17102022	VEDA KOWALE	0
4	17102029	KOMAL LONKAR	2
5	17102049	APURVA PATIL	2

Fig 9: Overall Attendance Report

2.7. Database

MySQL is used as a Relational Database Management System which is deployed on the Google Cloud.

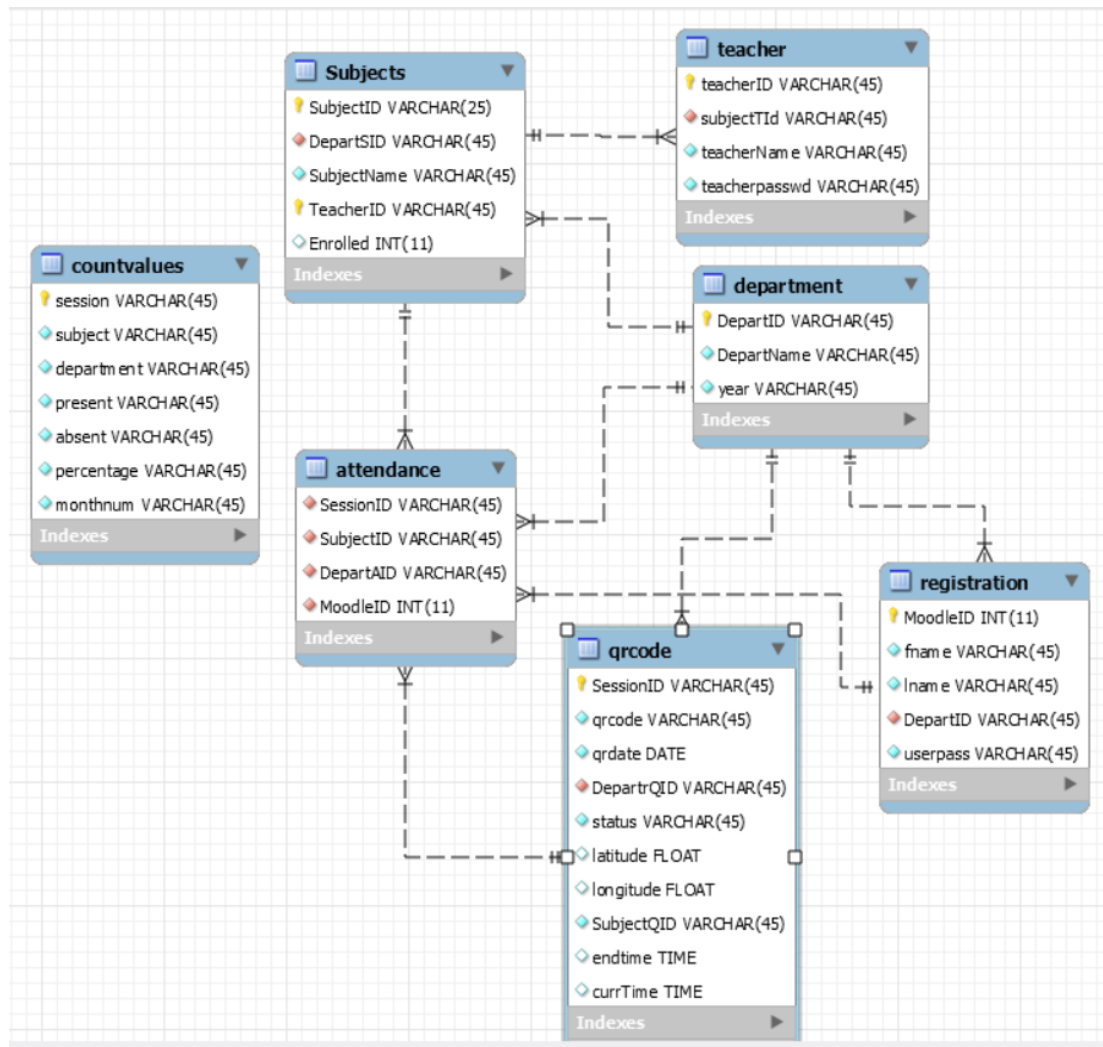


Fig 10: Database Schema

3. Implementation

3.1. Proposed System

- The Location based Smart Attendance Management System uses a QR code, which will be displayed by the teacher during the lecture. The students will have to scan the QR code using a smartphone application.
- The system also uses location tracking to eliminate false attendance marking by the students. It helps to generate various types of reports of a class or student attendance.
- Now that the technology has improved and everything is getting digital, there is a need for this traditional process of marking attendance to be modernised.
- The proposed system helps to reduce the workload of faculty and saves many man-hours that could be utilized in more fruitful tasks. It helps to record attendance efficiently and accurately.

3.1.1 Policies

- Android requires permission to access the Camera, Internet and the Location services.
- It is necessary that the required permission is granted for the Application to work.
- If the permissions are not granted, the application will again ask for the permission

3.1.2 Platforms for execution

- Various popular platforms were used to create this system which comprises Visual Studio Code as an Integrated Development Environment (IDE) along with Android Studio.
- For testing out the PHP code, Postman was an effective tool.
- While working with a team it is important that the team members must be up-to-date with the code progress, Github which allows developers to collaborate with others was used frequently.
- For the Database, Google cloud SQL was used. MySQL Workbench was used to connect SQL cloud instance.
- Firefox Developer Browser provides various additional tools for inspecting and debugging website, was used.

4. Results

- Implementing this project in the universities will make recording the attendance digital and simple to manage.
- The proposed system makes use of GPS (Global Positioning System), which is used to keep a track of the student's location, i.e., whether the student is present on the university premises, which in turn prevents false attendance from being awarded to a student by means of his /her friends or batchmates.
- Thus, the teachers need not worry about recording the attendance and also cross-check whether students have marked any false attendance for their friends.
- The time can then be utilized by the teachers accordingly.
- However, one limitation of GPS is that gps doesn't give accurate results in indoor locations due to low signal strength and low accuracy. Hence, in order to overcome this, the proposed system verifies whether the student lies within the specified range of the college premises.

5. Conclusion

Attendance recording is a tedious and laborious task, which requires lots of paperwork and the process is usually cumbersome. In the digital era, there is a need for educational institutions to adopt the latest technologies. The conventional method of recording attendance involves manual logging of attendance, which might lead to

inaccurate and misleading data. Hence, it is essential for the institutions to automate the system. The Internet has brought a paradigm shift in almost every domain, especially in the education system. The paper has proposed an efficient and an economical online attendance management system which scales down manual work to negligible amounts. It helps to record attendance in a paperless manner which helps the environment. The proposed system is systematic and effective. The functionality is simple to use and can be accessed easily by everyone. The ideal case to use this system is an education system such as schools, colleges. But further, with modifications, it can also be implemented in workplace settings. Apart from a smartphone, additional devices such as biometric devices, ID card scanners, specially developed ID cards (which increase costs), etc are not required. This makes the proposed system cost-efficient.

The system helps to increase productivity, and as the system is online, with just a few clicks, students can track their attendance and teachers can keep a check on student's attendance. In the future, face recognition or fingerprint functionalities can also be added.

6. References

- [1] Asri Nuhi, Agon Memeti, Florinda Imeri, and Betim Cico, "Smart Attendance System using QR Code" MEDITERRANEAN CONFERENCE ON EMBEDDED COMPUTING. JUNE 2020
- [2] Hussam Elbehiry, "Enhancement of QR code Student's Attendance Management System using GPS" IOSR Journal of Computer Engineering (IOSR-JCE), Volume 21, Issue 4, Ser. I (Jul - Aug 2019), PP 18-30.
- [3] M.A. Meor Said , M.H. Misran, M.A. Othman , M.M. Ismail , H.A. Sulaiman , A. Salleh , N. Yusop, "BIOMETRIC ATTENDANCE", International Symposium on Technology Management and Emerging Technologies, May 2014.
- [4] Jun Iio, "Attendance Management System using a Mobile Device and a Web Application", 19th International Conference on Network-Based Information Systems, Sept. 2016.
- [5] Fadi Masalha, Nael Hirzallah, "A Students Attendance System Using QR Code", (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 5, No. 3, 2014.
- [6] Omar Abdul Rhman Salim, Rashidah Funke Olanrewaju, Wasiu Adebayo Balogun, "Class Attendance Management System Using Face Recognition", 7th International Conference on Computer and Communication Engineering (ICCCE), 2018.

7. Bibliography

- <https://github.com/yuriy-budiyev/code-scanner>
- <https://davidshimjs.github.io/qrcodejs/>
- <https://larntech.net/android-retrofit-login-register-using-mysql-server/>
- <https://howtodoandroid.medium.com/how-to-get-current-latitude-and-longitude-in-android-example-35437a51052a>