



Bus Pass QR Code Scanner

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Abstract - QR Codes have become common for usage in day-to-day life, and it is used in a wide range of applications. While authentication and authorization have become a major part of today's world for security purposes, implementing them in checking the validity of the transport passes of the passengers is quite needed. The use of buses for private transport services for corporates and colleges is well-known. This brings about the situation of authentication, authorization, and unwanted time consumption. To solve such problems, we have developed a "Bus pass QR code scanner". This application helps to eradicate the problems we faced earlier of authentication, authorization with the help of a QR code scanner. This also reduces the time as we have created a cross-platform app for students to use for a bus pass. As we were researching and finding the information, we also encountered a problem that was faced by students, the problem was the vacancy of seats. So, we added the option for students to choose the bus they boarded and decrease the number of seats available on a bus. This is done in real-time and students are updated on the info about vacant seats on every bus.

Index Terms - bus pass, transport services, QR code scanner, cross-platform app, vacancy of seats.

1. Introduction

The usage of private transport services has increased in the last decade or so. Most people reach from homes to workplaces or schools using public/private transportation. People can lose time in transportation because of unwanted waiting. In today's computing world, different technologies have emerged. Organizations use the help of private transport services for the transportation of individuals that represent their organization. These private transport services are paid for their services by taking yearly, half-yearly, or quarterly charges through these individuals^{[7][8]}

To verify if the individual has paid the charges a bus pass is used. These physical passes are sometimes lost through the hands of the individual and this situation makes the usage of transport services hectic as without passes they are not allowed to enter the bus.

In today's world, everything is done through the use of technology. To authenticate and authorize the individuals we can use the help of certain technologies. QR codes can be used instead of passes to authenticate if the individual can board the transport vehicle or not. As Quick Response technology makes the checks faster the overall time required for boarding is less. If the QR code passes are made digital these helps in the mobility of the passes and can be accessed through mobile phones.

As the passengers wait for the bus at their pick-up point, they don't know if the seats are available for them or not. This arises the issue of the vacancy of seats and can be tackled through a simple real-time update of the number of seats available in the vehicle^[6]. An application can be made to tackle both the problems and make the process a lot cleaner and less hectic.

1.1. Motivation

We have observed and experienced the hardships that the students and the faculty face by following the existing system of carrying the bus pass with them and showing it to the faculty for validation. We aimed to give students the ease of accessibility of always finding their bus passes in the palm of their hands whilst making the management process easier too.

1.2. Problem Statement

Currently, the system is based on giving a physical bus pass to the students after payment of the bus fees by the college. Which in case gets lost or misplaced by the student creates a lot of mess

between the student and the bus faculty, as the bus faculties are told to check the bus pass before the student gets into the bus. So, we thought to revamp the whole process and develop an app to scan and generate unique QR codes for authentication of the bus pass, and to help determine the number of vacant seats.

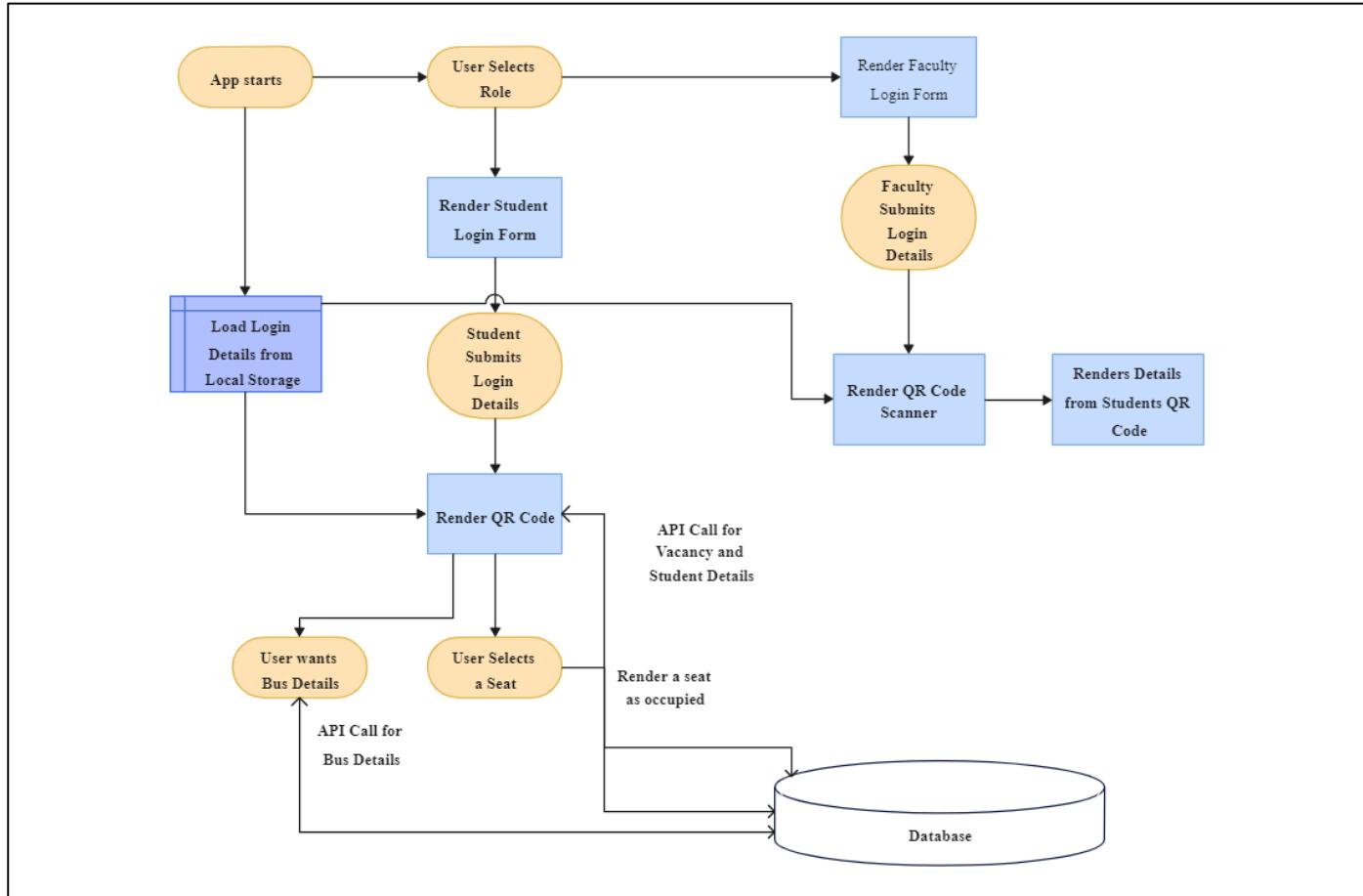


Figure 1. System Architecture

Whilst using the app “Bus Pass Scanner” the students can authenticate themselves using the unique QR code generated in their app if they have paid the due travel fee. The Admin side can scan the QR code generated on the student’s phone and verify if the bus pass is valid. Admin Panel can create, update or delete the student’s data according to their wishes [4].

2. Review of Literature

In paper [1], the authors have proposed a system that uses Artificial Intelligence (AI) with the help of RFID, this makes the manual work carried out for bus management and tracking system easy. In this, an RFID is used to track a bus when it crosses the bus stop. Hence the exact location of the bus is not shown, only an approximate location is shown based on the bus stops. In today's world, accuracy is very important and hence this was the limitation of this project.

In paper[2], the students and faculty can use the tracking system to track the location of the bus. It stores up the bus arrival and departure time of buses and will showcase it on the LED outdoor panel next to the bus stop, this information can also be shown in smartphones and IVR systems. This system does not give the exact position of the bus but only time information

In this paper[3], Bus tracking system, any passenger with Smartphone can scan QR code placed at the bus stop to view estimated bus arrival times, the current location of the bus. The drawback in this project was that the user had to be physically present at the bus stop to scan the QR code.

The proposed project[4] handles all the data like current location of bus, management of buses and its schedule this information is then given to remote user who want to know the real time bus information. It reduces the waiting time of remote users for bus. A system is used to track the bus at any location at any time. All the current information is stored to the server and it is retrieved to remote users via web based application. This System is a web based system but nowadays people mostly tends to use apps since they are more portable and smart phones are used more widely in today's world. Also a web based system is inconvenient for a user to use on a regular basis while waiting for a bus at the bus stop.

The goal of the project was to provide[6] the current location of bus and the available seats when it reaches the person's terminal. This system can motivate passengers to travel in bus rather than spending for autos or taxis. . Data from Automatic Ticket Vending Machine (ATVM) will be sent to database through GSM. Using that data, vacancy details shall be updated. This android system would help the passengers to have a satisfactory travel by catching the right bus at the right time with less effort. This system depends heavily upon the

ATVM which is not mainly used in a pre booking or organizational plans for bus transport.

In this paper[7] they have developed land bus tracking system and QR code based ticket pass system the drawback of the system is that it doesn't specify for pre booking or plans made by the organisation for bus transport.

This project[8] is a real-time bus tracking system for the students using Global Positioning System (GPS) this system mainly focuses on bus tracking and not the authentication of the users, platform is based on android.

This project[8] is an android based application that will help the user to check out the current location of the bus and also will help the user to know how much time the bus will take to reach the current location of the user. Drawbacks of the system : it mainly focuses on bus tracking and not the authentication of the users, platform is based on android.

3. Proposed System

We are digitalizing this whole system of bus pass by replacing it with a native application that will be cross-platform supported [8]. The student will have their account in the app which will be logged in to the application in their mobiles. Their account will hold 2 basic information:

1. QR code
2. Details of the student and the validity of the QR code.

The application consists of 2 fundamental functions:

1. The QR code scanner
2. Account login gateway

So even if the student forgets their mobiles at home they can still use their friend's mobile to log in to their account and get their QR code scanned The bus faculties will scan the QR code and the app will show them all the basic information we see on our bus pass like Name of student, Branch, Bus they are taking (Vasai, Borivali, etc) and will also include the validity of the QR code i.e. till when the QR code is valid^[7].

The admin side will have their login through which they can control the validity of the QR code of the student.

The system has two logins:

1. User side
2. Admin side

The QR code will have a validity period, that will be decided based on how many months of bus fees the student has paid. The student will have their account in the app which will be logged in to the application in their mobiles. Their account will hold 2 basic information:

1. QR code
2. Details of the student and the validity of the QR code.

The bus faculties will scan the QR code through the QR code scanner available in the app and the app will show them all the basic

information we see on our bus pass like Name of student, Branch, Bus they are taking and will also include the validity of the QR code i.e. till when the QR code is valid.

The other features added in the application are:

1. Vacancy of seats

2. Bus and the driver details

The admin side will have their own login through which they can control the validity of the QR codes of the student.

As the students who are waiting for the bus at the bus stop don't know if the bus has enough vacant seats for them^[6]. So, we have solved the problem through these steps:

Step 1: The student who has boarded the bus has the option to select the bus he has boarded.

Step 2: The selected bus has a fixed total capacity.

Step 3: The total capacity is decreased and updated in the whole database.

Step 4: The student waiting for the bus can see the updated number of seats vacant.

4. System Architecture

In Bus Pass QR Code Scanner, the admin faculty first stores all the student's data and the user's email address in the database of the app from the admin panel of the system. The student's login is through the email address that was specified in the database through the admin. The students set their passwords and generate their unique QR code that has their bus pass validity information. Now the students can use the app for authenticating their bus pass whenever the bus faculty asks the QR code for scanning. The bus faculty will have an admin login through which they can scan the QR code that the student shows for authentication. After a successful scan the app will show the details of the student and the bus pass validity to the faculty^[7].

The validity of the QR code expires after the date specified by the central authority and can be updated if the fee amount is paid or renewed. The students can even check the vacancy of seats available in a bus by just a click. The students who boarded the bus have the option to select the bus they have boarded only once and the system decreases the total seats available by one, making it easier for students to select the bus they can board.

There are 3 modules in Bus Pass QR Code Scanner - For Admin Faculty (Updating and Modifying the Database), For Students (QR Code and Vacancy Checker) and For Bus Faculty (QR Code Scanner and Authenticator).

Update and Modification: In the Admin Panel the admin faculties insert the students bus details and their email addresses in the database of the app^[4]. Here the updates are done for students and the renewing of their QR code validity too. This is the Central Authority of the app.

QR Code and Vacancy Checker: This module is used in student's app, Here the QR code is generated based on the validity of the bus pass. Vacancy of seats is also determined through this module. The students can even check the vacancy of seats available in a bus by just a click. The students who boarded the bus have the option to select the

bus they have boarded only once and the system decreases the total seats available by one, making it easier for students to select the bus they can board. The students can also view bus and driver details for safety purpose.

QR Code Scanner and Authenticator: In the admin side of the app the QR code scanner is present which helps the bus faculties to scan the QR code of students and validate the authenticity of their bus pass [7].

5. Requirements / Tools for development

- Admin Computer/ Laptop.
- Internet Connection.
- Mobile Application.

6.Result

The system that is implemented helps the students to authenticate themselves and know the details of the bus without much hassle [4]. The bus faculties can scan and authenticate the bus pass and they will know only the valid students who are eligible are seated inside the bus.

Figure 2 shows the selection of role page for those who have not yet logged in through the app.



Figure 2. Select your role

Figure 3 shows the GUI of the Bus Pass Scanner App for the students who have entered it first time.

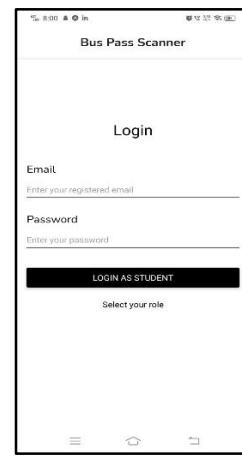


Figure 3 GUI of Login Page (Student & Faculty)

Figure 4 Shows the homepage of the app through student side, this page also shows the unique QR code generated for the student.

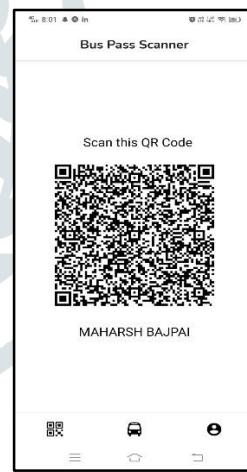


Figure 4 Homepage (Student)

Figure 5 Bus Faculty QR code scanner page, this is the first page bus faculty will be shown.

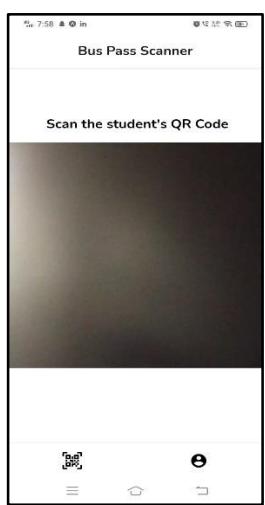


Figure 5 Bus Faculty QR code scanner

Figure 6 Shows the QR code validity alert that is shown after scanning the students QR code through the app.

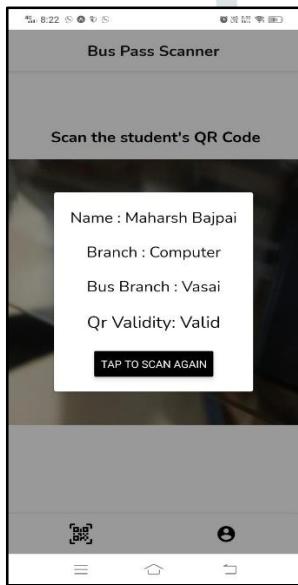


Figure 6 QR Validity Alert

7. Conclusion

In today's world travelling services are the most needed thing as people travel from one place to another i.e. specifically about students like college. In various colleges students have invested their time in waiting for showing bus pass or receipt of the bus fees, if they forget the bus pass/fee receipt it creates a mess between the students and bus faculties [4]. So, we proposed a new system which replaces the current system

by digitalizing the process to make it faster and easier for both students and bus faculties. The project is designed to provide an effective solution of maintaining bus pass information using a QR code [7]. Our system handles all the data like authentication of users (through QR code technology), seat availability in the bus, its schedule and the details required for the user [6]. The System's name is Bus Pass QR code Scanner and the system is only for institutions that are providing transportation services.

8. References

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