Bus Tracking with QR code and RFID

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Abstract: In this paper using RFID (Radio Frequency ID) for developing bus tracking systems. This project addresses two major problems: unnecessary waiting time for bus, higher cost for the tracking system. To reduce the waiting time, passengers can track the buses in their places and known about where their bus is located. If passengers are not known about the bus number they can also scan the QR code placed in all the bus stops. By scan the code they can get the information about the bus number and recently crossed bus stop of that bus. The bus tracking system requires installing RFID tags on all buses and RFID readers on bus stops for tracking.

Keywords: QR code, RFID

I. INTRODUCTION

Transportation system plays an effective role in the betterment of social and economic growth of the society. The transportation system involves the movement of goods and people from one place to other which becomes the heart of the system. With the increasing population, vehicle usage is also increasing which results in heavy traffic. To overcome the traffic due to the usage of individual vehicle is to use the public transport. But the usage of public transport, especially bus transportation timings are irregular and waiting for long leads to waste of time. But the system or application providing the details of bus timing, tracking of bus routes and maps that guides the passengers regarding bus stop will help to reduce the waiting time of the passengers.

The Bus tracking system proposed in this paper is laid down over the major route of the city. This propsed system uses the android platform with the built in QR scanner in the smart phone[1].

This paper is organised with section II comprises of the Requirement of the bus tracking system. Section III comprises of the Review of the Existing system and Section IV comprises of the major components of the bus Tracking system and Section V comprises of the Results and Conclusion.

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II. REQUIREMENT OF THE BUS TRACKING SYSTEM

Main aim of the QR code based bus tracking systems is to find the location coordinates of the bus to make the passengers travel decision better and to make them to track the location easily and to get the approximate arrival time of the bus. Parents could also use this system to track their children travelling in the bus in their smartphone. Main advantage of this bus tracking system is to reduce the waiting time, to reduce theunpredictabilitytime, ease of use, and to increase the security, increased willingness to pay and customer satisfaction [1-4].
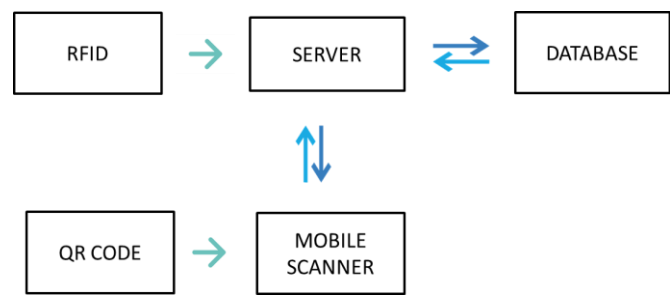
III. SYSTEM ARCHITECTURE

Fig. 3.1 Block Diagram

The architecture and components of this bus tracking system consists of 4 stages.

1. QR code placed in every bus stop.
2. Passengers scan the QR code using Scanner in their mobile phones.
3. According to the QR code id the buses in their route and recently crossed bus stops are listed in their smart phones.
4. Buses crossed in bus stops are sensed and updated in database by the RFID reader.

Usage of QR code

Nowadays, due to the wireless network infrastructure and smart phone usage development in wide range, familiarise the passengers to obtain information about the bus route timetable, bus arrival/departure timings and location of the bus by means of their smart phone. QR code was created as an information container forming two-dimensional by Toyota subsidiary, Denso Wave in 1994. By using QR code generators, data is encoded in QR optically readable format. So, QR code can be captured and it is decoded by the smart phones. QR codes are capable of handling up to several hundred times more information than the conventional bar codes which are only capable of storing twenty digits. Distinct information storage capacity can be used based on

the different versions of QR code.The image of QR code is shown in Fig 2. The information transferring through QR code cost is extremely low as compared to other technologies which require specific hardware. The QR code can be easily applied in different printed materials (e.g., posters, books or magazines) and places (e.g. bus stops, store windows, etc.) which shows that the QR code is most widely used information container. Compared to Bluetooth, accuracy of the QR code is high and this contains information of the unique id and IP address of the server. ID indicates the route path. According to the route id, the bus location was displayed [5-7].

Fig. 3.2 QR code

Radio frequency Identification(RFID)

A radio-frequency identification system tags or labels which are attached to the objects to be identified. The image of RFID tag and reader are shown in fig 3.Interrogators or readers aretwo-way radio transmitter-receivers which send a signal to the tag and read its response. RFID tags can be either passive or active. Passive tags of RFID will collect energy from a nearby RFID reader's interrogating radio waves.

In this system RFID will detect the buses by sending signal to the tag placed in every bus. And then it sends the tag information to the server, with the help of ESP8266.

The server processes the received data and updates the Bus details. This is also updated to the passenger who scans the QR code.
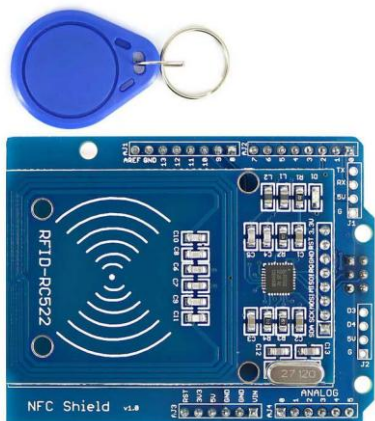

Fig. 3.3 RFID module

Server

It receives all the HTTP request send by the passenger. Passengers give request to the server by scanning the QR code .As per the request server respond to the client by sending the route bus details to their smart phones, which helps the passenger to track the bus in their route. And they knows the details of the buses like recently crossed bus

stops, total number of remaining stops for their buses, and the destination of the bus. All these information are store in databases. The server fetches details from the database and responds to the passenger who scans the QR code. Fig 4 shows the server response to the passenger for their request.
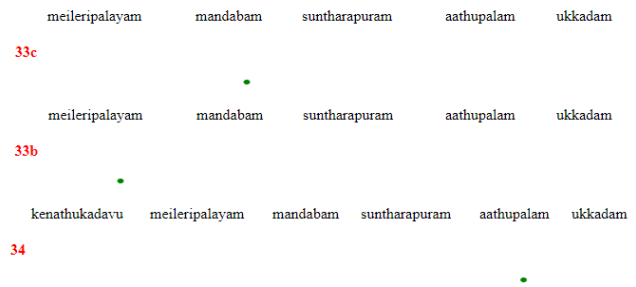

Fig. 3.4 Bus location

Green dot represents the recently crossed bus stop for all the route buses.

IV. RESULTS

The hardware setup for RFID is shown in Fig 4.1. This setup is placed is every bus stop for track the buses.

Fig. 4.1 Hardware Setup

When passengers scan the QR code, this page will display to the passenger as shown in fig 4.2. Here the route buses are displayed according to the QR code placed location.
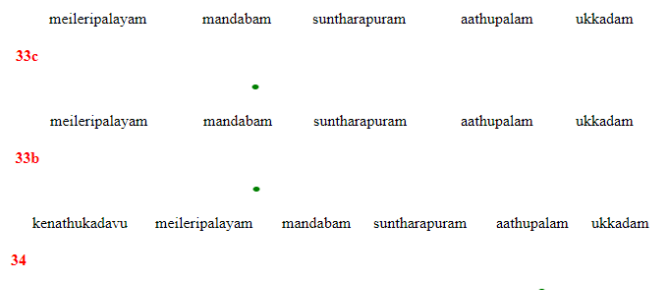

Fig. 4.2 Bus location of 33b before cross the bus stop

When suddenly any busses cross the bus stop the green dot will indicate the location of the bus. Fig 4.3 shows that the 33b crossed the sundharaburam bus stop.
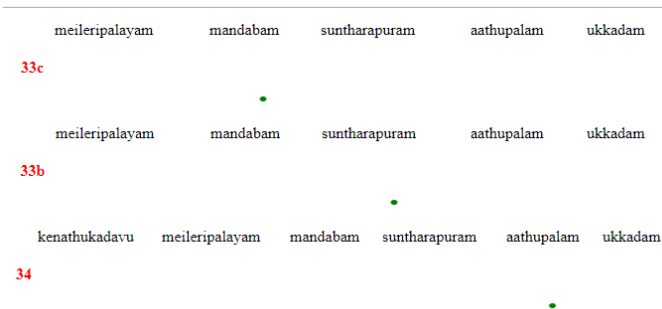
meileripalayam	mandabam	suntharapuram	aathupalam	ukkadam

33c

meileripalayam	mandabam	suntharapuram	aathupalam	ukkadam

33b

kenathukadavu	meileripalayam	mandabam	suntharapuram	aathupalam	ukkadam

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Fig. 4.3 Bus location after 33b bus cross the bus stop

V. CONCLUSION

In this paper, the bus tracking system is presented which is based on RFID and QR code. The existing system, basically tracks the buses by GPS technology and it is much cost for implementation, So RFID technology is implemented to reduce the expenditure.

By scan the QR code passenger can get the information about the bus number and recently crossed bus stop of their bus in their smart phone are implemented.

VI.   FUTURE SCOPES

1. To cover wide area, the range of the RF transmitter can be increased.
2. An android application can be develop to reduce the necessity of the QR code.

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