SCHOOL BUS TRACKING AND SECURITY SYSTEM

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ABSTRACT

In current point in time, due to more in number of kidnap and accident cases, parents always worry about their children, even their children using school bus for transportation. The proposed system recommends a SMS based application which consists parents to track their children location in real time. Initially the details of the students are collected and stored in the database. The details are converted into QR code and embedded with children's identity card. When the children enters the bus, the QR code is scanned by the mobile application and the timing, stop details will be sent to the parents as notification. Later on, when the bus gets started, the GPS in the mobile phone is turned on and send the location updates to the parents to easily track the bus location. Thus our proposed system is capable of notifying parents through SMS once the child enters/leaves the school, enabling parents to trace the bus, helping smooth and safer rides to the school.

Keywords: QR code, GPS location tracking, SMS notification.

I. INTRODUCTION

Children's security has always been a priority problem whose solution must constantly be improved. Children safety is importance to their parents even if they have most excellent precautions, children, due to their lack of skills to protect themselves. School bus play an essential role in carrying most of children everyday all over the world. While there are several problems that might disturb the parents with respect to the travel of school going kids. This system is especially focused on children's movements from home to school entrance, trying to solve a little part of the school-age children's security problem.

QR code is a way of encoding more information than a traditional barcode. The bar code can be replaced by QR code so that one can easily insert or make a link to more information. A QR code contains of black squares arranged in a square grid on a white background, which can be read by an imaging device such as a camera, and processed using Reed– Solomon error correction until the image can be appropriately interpreted. QR codes are now used in the fields like commercial tracking applications and convenience-oriented applications aimed at mobile-phone users (termed mobile tagging). QR codes may be used to display text to the user, to add a vCard contact to the user's device, to open a Uniform

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Resource Identifier (URI), or to compose an email or text message. The QR code has become one of the most-used types of two-dimensional code.For example the QR code can be linked to the web address or some other web link so that anyone can get more information easily. The proposed system aims to provide an efficient SMS based Application for giving information about the departure of a School bus from the starting point as well as ending point. By means of GPS, this system has ability of tracking current position of the School bus in any specific time.

II. LITERATURE SURVEY

Leonardo D'Errico[1] says that a system for increasing children's safety is proposed. The meeting point is on the every day path from home to school and vice versa, presumptuous the make use of school buses. IoT paradigm is exploited together with different localization techniques i.e. RFID and GPS, with the purpose of aim to a clarification for parents ready to generate convinced of their child's following the main steps to school or home, In this paper the applicability of RFID technology efficient tracking capabilities is tested in children's tracking and monitoring during their trip to and from school by school buses .is conferred. In conclusion a analysis phase is prospective to verify.

Anwaar Al-Lawati[2] says that a system to monitor pick-up/drop-off of school children to enhance the safety of children during the daily transportation from and to school. The system consists of two main units, a bus unit and a school unit. The bus unit is used to detect when a child boards or leaves the bus. The system has a developed database-driven application that facilities its management and provides required information about the children to authorized personal. A complete prototype of the proposed system was implemented and tested to validate the system functionality.

The another Juan Zambada[3] says, school transport is used by millions of children worldwide. However, not a substantial effort is done in order to improve the existing school transport systems. This paper presents the development of an IoT based scholar bus monitoring system. The development of new telematics technologies has enabled the development of various Intelligent Transport Systems. However, these are not presented as ITS services to end users. This paper presents the development of an IoT based scholar bus monitoring system that through localization and speed sensors will allow many stakeholders such as parents, the government, the school and many other authorities to keep real time track of the scholar bus behavior, resulting in a better controlled scholar bus.

Shah Shraddha [4] recommends a SMS based solution which assists parents to track their children location in real time. To track the location GPS module is used and to identify the identity of the child a RFID card is used which is in built in the system. Whenever a child boards a bus, the RFID tag located in his identity card will be detected by the reader present in the bus and the system will identify the child and will send a text message to the parents consisting the current location and time. In this way the parents will be able to keep record of their kid's whereabouts. The paper also proposes security system such as drunk and drive prevention system and speed control mechanism.

Sanaul Haque [5] says that Educational institution in developing countries is a vast sector and it is expanding rapidly. With the rapid growth of technologies, educational institutions are still lagging behind. For identification of students they still lie on manual handwritten ID card and files. If proper ID card system is introduced then it would be much easier to identify a student and can track his/her progress. Therefore, in this research we implemented advanced using of QR code and student ID generation. QR code is attached into ID card and student personal details can be found by scanning the QR code with smart phones QR code is said to be the next generation of bar code and using QR code with ID card brought positive outcomes. While using software tools, identity cards works fine and suitable for an educational institution as it is free.

J.Saranya [6] says that, these systems give information about the children group and not about each child resulting in low assurance about their child safety to parents. The system includes a child module and two receiver modules for getting the information about the missed child on periodical basis. The child module includes microcontroller, Global positioning system (GPS), Global system for mobile communication (GSM), Voice playback circuit. The second module includes Android mobile device in parent's hand and the other as monitoring database in control room of the school. Finally, implementation results for the proposed system are provided in this paper.

Süleyman Eken [7] says when it comes to taking the public transportation, time and patience are of essence. In other words, many people using public transport buses have experienced time loss because of waiting at the bus stops. In this paper, any passenger with a mobile device with the QR (Quick Response) code reader can scan QR codes placed at bus stops to view estimated bus arrival times ,buses current locations, and bus routes on a map. Anybody can access these maps and have the option to sign up to receive free alerts about expected bus arrival times for the interested buses and related routes via SMS and e-mails. They used C4.5 (a statistical classifier) algorithm for the estimation of bus arrival times to minimize the passengers waiting time. GPS (Global Positioning System) and Google Maps are used for navigation and display services.

The sneha [8] says that the information about the departure of the subscribed bus from the starting point or the passengers can also subscribe for the number of stops from which he wants the notifications. This is done using a VMD (Variable Message Display) which tracks the coordinates of the bus and sends this information to the Server. By checking the passenger's needs, a notification about the location of the bus with the time is broadcasted to GSM module of all the passengers who have subscribed for similar type of service. For subscribing for a bus and to get the notification, a Mobile Application based on Android OS is developed. The application is tried on less number of buses first and later it will be tested on huge transportation system.

III.SCHOOL BUS MONITORING A.SYSTEM REQUIREMENTS

The system is implemented with two main software namely Java SDK, Android studio. .

HARDWARE REQUIREMENTS

• 3GB RAM minimum, 8GB RAM recommended plus 1 GB for the android emulator
• It runs on AMD E2-7110 (quad-core, up to 1.8 GHz2MB,1.2 cache).

SOFTWARE REQUIREMENTS

- The Android SDK and JDK .
- JAVA SE's API provides the core functionality of the JAVA language.
- JAVA SE platform consists of virtual machine, development tools, deployment technologies and other class libraries and toolkit commonly used in java technology application.
- Apache Ant (Another Neat Tool) is an open source tool which automates aspects of the Android build process.
- Gradle (An advanced build toolkit that manages dependencies and allows the custom build logic)

IV. SYSTEM DESCRIPTION
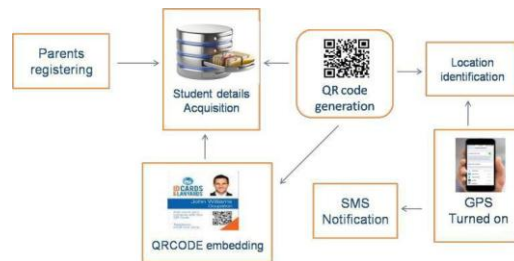
A. SYSTEM DESIGN

Figure 4.1 : System design

B. System Architecture

There are five modules in our application:

1. Database Acquisition

2. QR code generation

3. QR code scanning

4. Location identification

5. Notification

STUDENT DETAILS ACQUISITION

QR CODE SCANNING

Figure 4.2: Children Details Acquisition

Figure 4.3: QR Code Generation

- A database is an organised collection of data. SQl can retrieve ,insert, update, delete, create data from database. .SQL can permissions on tables, procedure and views.

- SQL is an ANSI standard they all support at least the major commands such as select ,delete, insert, update etc

- There are lot of ways to query the db

- raw Query() directly accepts an sql select statements as input. This method return the cursor object which points one row of query results.

- Initially the Student details like student id, section, contact no, stop details ,city, area, email id are collected and stored in the database.

QR CODE GENERATION

Figure 4.4: QR code Scanning

• A QR code is a type of barcode that contains a matrix of dots. It can be Scanned using a QR scanner or smart phone with built in camera. Once Scanned software on the device converts the dots within the code number or a string of characters.

• When the student enter into the school bus the QR code is Scanned by the driver into the student identity card. These details are stored into the database. Based on the Scanning details the parents are know about the presence of child inside the bus or not.

LOCATION IDENTIFICATION

Figure 4.5: Location Identification

- QR code (Quick Response Code) is the trademark for a type of matrix barcode designed for the automotive industry in Japan.

- A QR code uses four standardised encoding modes (numeric,alphanumeric , byte/binarykanaji) to efficiently stored data.The student details are stored in the database and embedded into student Id card.

- A GPS tracking system uses the Global Navigation Satellite system network. This network incorporates a range of satellites that uses microwave signal that are transmitted to GPS devices to give information on location ,bus speed, time and direction.

- Later on, when the bus gets started, the GPS in the mobile phone is turned on and send the location updates to the parents to easily track the bus location

PARENT NOTIFICATION
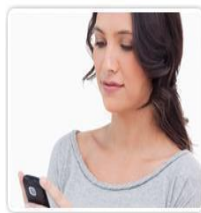
Parent Notification

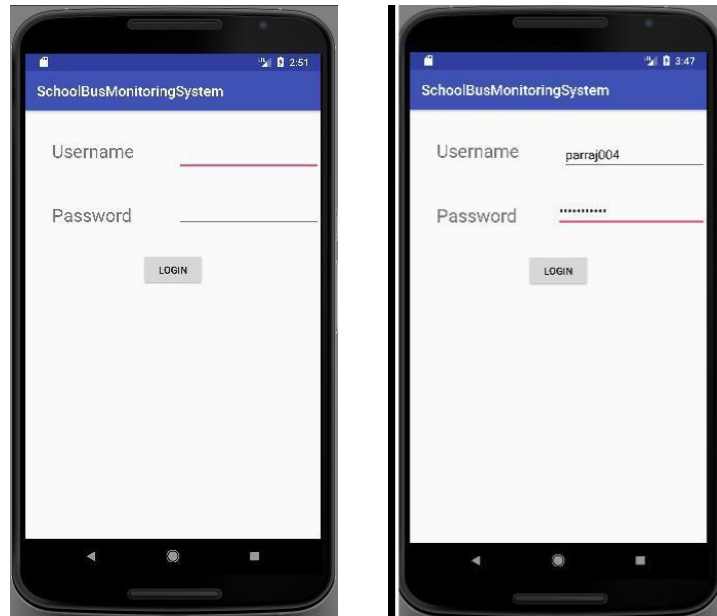**Figure 4.6: Parent Registration Page**

Figure 4.7: Parent Login Page

- Short Message Service(SMS) is a service component of most telephone, World Wide Web and mobile device systems.

- It uses standardized communication protocols to enable mobile devices exchange short text message.

- This system is capable of notifying parents through

SMS once the child enters/leaves the school, enabling parents to trace the bus, helping safer ride to the school
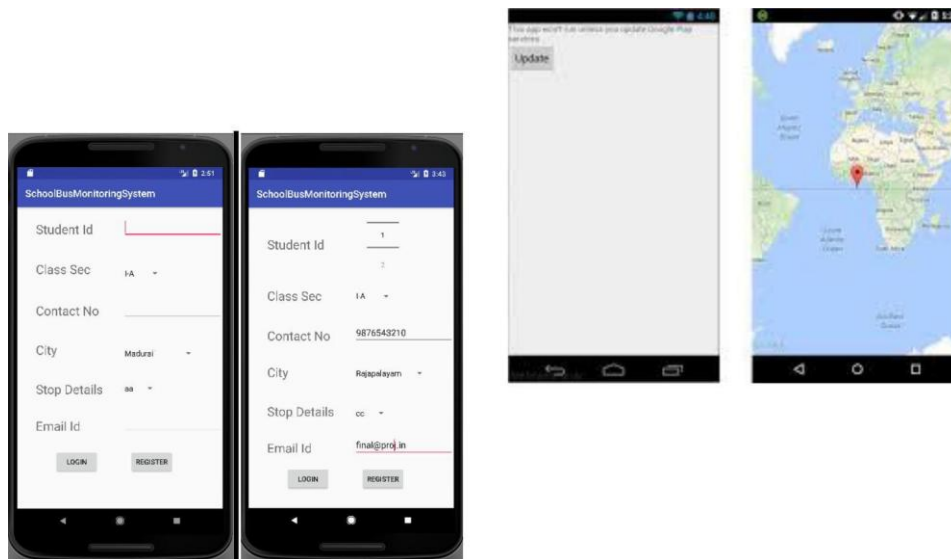
C.IMPLEMENTATION

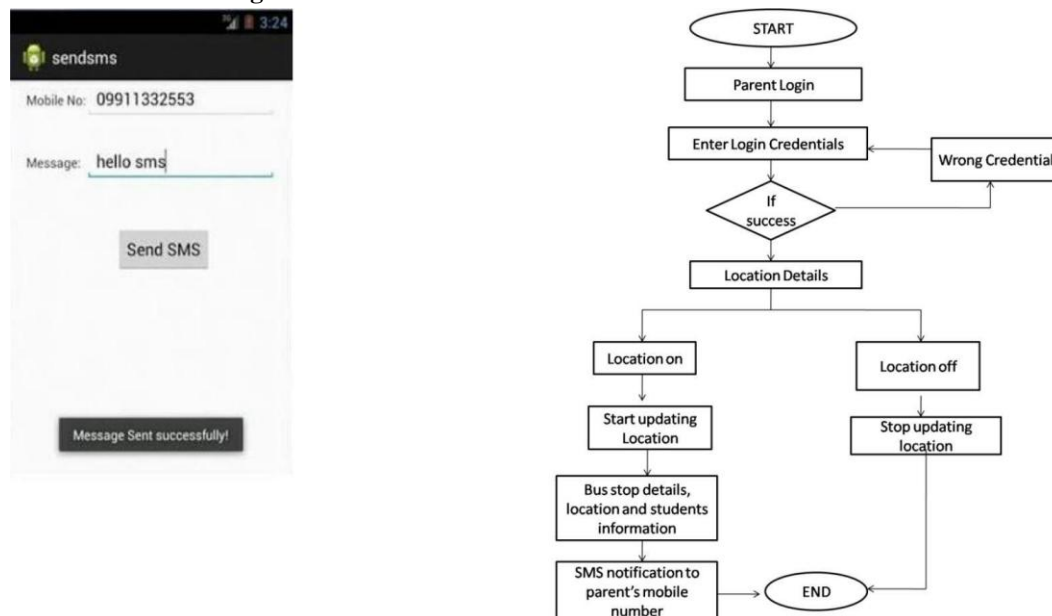**Figure 4.8: Exact Location Details of Children**

Figure 4.9: Sending Notification to Parent
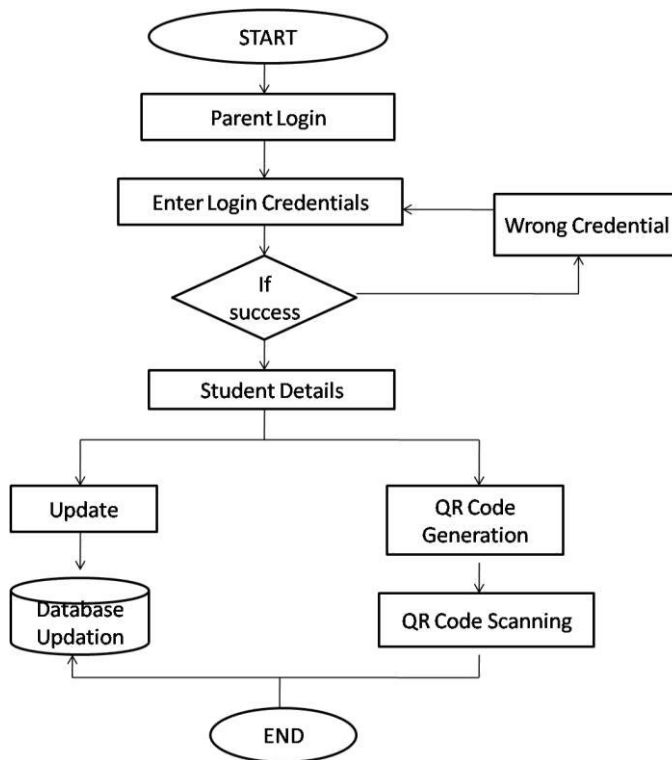
D.FLOW DIAGRAM

Figure 4.11: Flow Diagram

The above flow diagram represents the step by step process of Location Identification., When the students enter into the bus Location detail , bus stop details, presence of the child inside or not to send SMS notification to the parent's mobile number.

V. CONCLUSION

We developed an Android Application to track the school buses and provide relevant information to their student's. This paper has described the design and architecture of our school bus monitoring system. Our system is composed of smart phones . The system is able to demonstrate its performance to track school bus from any area. Furthermore, our system is low-cost as it doesn't require any external hardware for location tracking.

VI. FUTURE ENHANCEMENT

Figure 4.10: Flow Diagram

The above flow diagram represents the step by step process of parent's registration, QR code Scanning of students information. and embedding into student's identitycard.

In future we have to implement a application for all the industries who are all using the transport system. We have to implement some other safety measures. We also have a plan to implement live stream where user can view what is happening inside the bus.

REFERENCES

[1] Leonardo D'Errico, Fabio Franchi, Fabio Graziosi, Claudia Rinaldi, Francesco Tarquini Center of Excellence DEWS, University of L'Aquila, Via Vetoio, 1 67100, L'Aquila, Italy, "Design and implementation of a children safety system based on IoT technologies".

[2] Anwaar Al-Lawati, Shaikha Al-Jahdhami, Asma Al-Belushi, Dalal Al-Adawi, Medhat Awadalla and Dawood Al-Abri Department of Electrical and Computer Engineering, Sultan Qaboos University Box: 33, Al-Khod 123, Oman , "RFID-based System for School Children Transportation Safety Enhancement ", roceedings of the 8th IEEE GCC Conference and Exhibition, Muscat, Oman, 1-4 February, 2015 .

3] Juan Zambada, Ricardo Quintero, Ramon Isijara, Ricardo Galeana, Luis Santillan Computer Science Department Technological Institute of Culiacan.Sinaloa, Mexico, "An IoT based scholar bus monitoring system

[4] Shraddha Shah, Bharti Singh, "RFID Based

[5] J.Saranya , J.Selvakumar, "Implementation of Children Tracking System on Android Mobile Terminals", International conference on Communication and Signal Processing, April 3-5, 2013, India.

[6] Md. Sanaul, Richard Dybowski School of Architecture, Computing & Engineering University of East London University Way, London, E16 2RD, "Advanced QR Code Based Identity Card: A New Era for Generating Student ID Card in Developing Countries", 2014 First International Conference on Systems Informatics, Modelling and Simulation. Süleyman Eken, Ahmet Sayar, Kocaeli University Kocaeli, Turkey , "A Smart Bus Tracking System Based on Location- Aware Services and QR Codes", 978-1-4799-3020-3/14/$31.00 ©2014 IEEE.

[7] Sneha, Chaitra N, Department of Computer Science & Engineering, R V College of Engineering, Bangalore, India, "Darideepa: A Mobile Application for Bus Notification System", 978-1-4799-6629-5/14/$31.00c 2014 IEEE.

[9] R.K. Pateriya, Sangeeta Sharma, "The Evolution of RFID Security and Privacy: A Research Survey," in *IEEE* International Conference on Communication Systems and Network Technologies, 2011.

[10] Abid Khan, Ravi Mishra, "GPS-GSM Based Tracking System," International Journal of Engineering Trends and Technology, Vol, 3, Issue 2, 2012

[11] Dhivya M. and Kathiravan S., "Hybrid driver safety, vigilance and security system for vehicle," *Innovations in Information, Embedded and Communication Systems, 2015 International Conference on*, Coimbatore, 2015, pp. 1-6.

[12] S.S Pethakar, N.Srivastava, S.D.Suryavanshi," GPS and GSM Based Vehicle Tracking and Employee Security System," International Journal of Computer Applications (0975-8887), Vol. 62, No.6, January, 2013.

[13] F. A. Johnson, J. Farmenincsusjnjcom, H. B. Gs, L. Burstein, P. D.Impinj, J. D. Procter, B. Hogan, and G. S. Us, "The EPCglobal Architecture Framework," tech. rep., 2007.

[14] K. Traub, S. Bent, T. Osinski, S. N. Peretz, S. Rehling, S. Rosenthal, and B. Tracey, "The application level events (ALE) specification, version1.0," EPCglobal Proposed Standard (Feb. 2005), pp.1–71, 2004.

[15] Mosquitto.org, "MQTT Version 3.1.1," 2014.Available at http://mosquitto.org/.

[16] EPCglobal, "EPC Tag Data Standard," 2010.

[17] Gs1, "GS1 General Specifications," Tech. Rep.2, 2013.

[18] C.-W. Tseng and C.-H. Huang, "A uniform epc scheme design of ieee 1451 transducers for iot applications," in Ubiquitous and Future Networks (ICUFN), 2014 Sixth International Conf on, pp. 255– 260, July 2014.

[19] "Iso/iec/ieee standard for information technology – smart transducer interface for sensors and actuators – part 2: Transducer to microprocessor communication protocols and transducer electronic data sheet (teds) formats," SO/IEC/IEEE 21451-2:2010(E), pp. 1–130, May 2010.