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Real-Time Student (Kids) In-Out Time as well as Bus Location Tracking System

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Abstract: *Schools are obliged to provide a safe transport system for kids so they can focus on their studies. Parents are as concerned about the safety measures a school has in place as they are about the level of education they expect the school to impart on their child. One way schools can ensure protection for their students is by using a Bus GPS tracking system. A high end GPS system is installed in the school vehicle all the signals from the vehicle are routed to an integrated central server for real time monitoring Information from the server can be transmitted via message alerts and Emails, or can be checked on the web or using mobile apps. What are the features of School Bus GPS Tracking System. The parent is informed estimated arrival time of their child's bus before it reaches the stop before/after school. Guardians can track the area of the transport progressively utilizing the application. Parents without smart phones can use the know your bus feature to receive a text message which informs them of the current location of their child's bus. In case there is a traffic jam, natural calamity or any other problem, an text message is immediately dispatched to the parent informing the reason for delay Benefits of GPS Tracking for School Buses. The advantages of using GPS tracking systems in school buses are plenty. The most important benefit is the peace of mind it provides parents as they are continually updated of their child's where about. School management will have access to detailed reports such as distance moved by each vehicle, time of arrival at each stop etc which can prove to be in valuable. The school admin can review routes to ensure that the drivers are sticking to planned routes and aren't missing any stops. The transport manager is also informed via alerts if the drivers over speed or if the vehicle has been in an accident.*

Keywords: School Buses, Child Safety, GPS Location Tracking, RFID Tag Reader

I. INTRODUCTION

Millions of children need to be moved from home to school and vice versa every day. For parents, obtaining a safe transport for their children is a crucial issue. The students ride their bicycles, take buses, and arrive in vehicles with one purpose getting to and from school safely. A research undertaken by the Scottish Executive Central Research Unit with the purpose of increasing the proportion of non-car travel to school reveals that travelling by bus or coach appears to be by far the safest mode. Statistics suggest that a child travelling by car is seven times more likely to take part or be involved in a road traffic casualty than a child travelling by bus [1]. Many children find themselves locked in a school bus in the bus parking lot after falling asleep on their way to school, miss the bus, step into the wrong bus, or leave at the wrong station with no method to track them. This research tested the applicability of radio frequency identification (RFID) technology in tracking and monitoring children during their trip to and from school on school busses. The child safety system developed in this research utilized the passive RFID tracking technology due to its efficient tracking capabilities, low cost, and easy maintenance. To explore the technical feasibility of the proposed system, a set of tests were performed in the lab and with the public. These experiments showed that the RFID tags were effective and stable enough to be used for successfully tracking and monitoring children using the bus. When asked to give their feedback of the solution through a questionnaire, more than 95% of the parents see that such a solution will take their anxiety and worry away and will provide them a tool to track their kids during commuting to and from their schools.

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II. LITERATURE SURVEY

For A vehicle tracking system is very useful for tracking the movement of a vehicle from any location at any time. In this work, real time Google map and GPS based vehicle tracking system is implemented. These are some of the technical literature in engineering and technology where people have tried to implement similar kind of Systems which are mentioned below with their shortcomings with respect to our Application

[1] Leonardo D'Errico[1] says that a system for increasing children's safety is proposed. The meeting point is on the everyday 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.

SanaulHaque [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. implemented the system "Real Time Bus Tracking System".

III. METHODOLOGY

In this Project, school bus tracking and monitoring has been proposed. RFID is used for the identification of the children. Each student has their individual RFID tag with the help of the RFID tag the student can monitored by their

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parents and also by school. When the student enters or exits from the bus the reader records and transfer data in the database. For every entry and exit RFID tag is sensed by the RFID reader. The number of students can be counted in the bus. Here front door is considered as the entry door and rear door is considered as the exit door. Sensor is fixed on both the doors and the sensor counts the exit and entry of the student. Only one person can entry or exit at a time. The RFID readers read the tag and send an alert message to their respective parents through GPS. The front door sensor increases the count. The rear door sensor decreases the count and both the sensor calculates the total number of students present. Fire sensor is used to detect if any fire accident occurs, it will send an alert message to parents, school, and fire engine. The tracking system details will be sent to the server at the school side for storage and on the mobile device to the parents

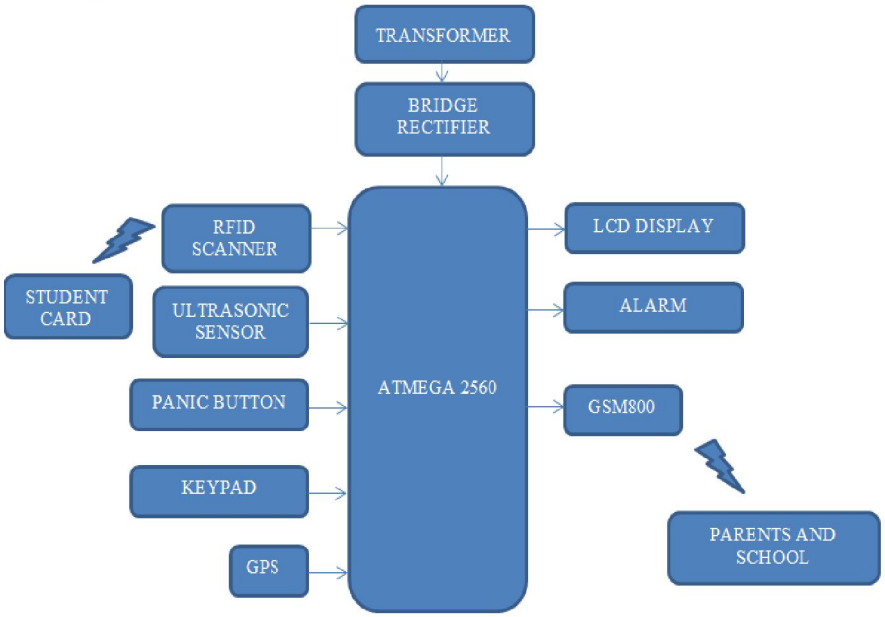

Fig. 1. Block Diagram

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ATMEGA 2560 Microcontroller

The The Mega 2560 R3 is an open source precise microcontroller board Successor to the Mega based on the ATmega2560 SMD chip.The Mega 2560 R3 also adds SDA and SCL pins next to the AREF. In addition, there are two new pins placed near the RESET pin. One is the IOREF that allow the shields to adapt to the voltage provided from the board. The other is a not connected and is reserved for future purposes. The Mega 2560 R3 works with all existing shields but can adapt to new shields which use these additional pins.

This Board has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller. Using the board is also very easy, simply connect it to a computer with a USB cable or power it with DC adapter or battery to get started. The Mega 2560 R3 board is compatible with most shields designed for Genuino Uno and the former boards Duemilanove or Diecimila.

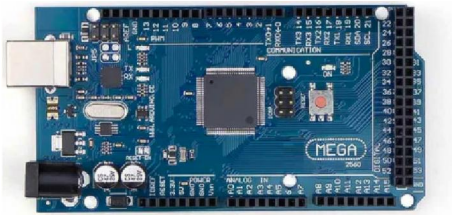

Fig. 2.ATMEGA 2560

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LCD Display

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD

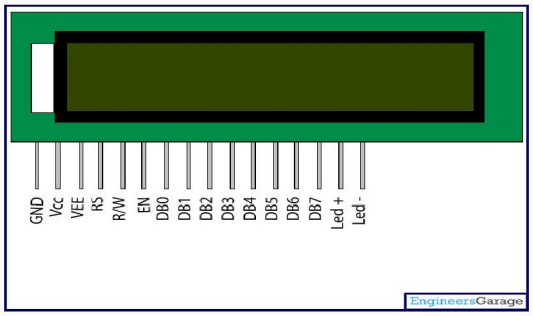

Fig. 3. LCD Display

GPS Module

Photovoltaic The new NEO 7 series introduces the Ublox Neo 6M GPS Module, a highly sensitive and low-power module offering 56 channels for precise position updates at a rate of 10Hz. Featuring a protective moulded plastic case, this module is perfect for aerial applications on aircraft or quadcopters, shielding it from the elements.

Features:

- 5Hz position update rate
- Operating temperature range: -40 TO 85°CUART TTL socket
- EEPROM to save configuration settings
- Rechargeable battery for Backup
- The cold start time of 38 s and Hot start time of 1 s
- Supply voltage: 3.3 V
- Configurable from 4800 Baud to 115200 Baud rates. (default 9600)
- Super Sense ® Indoor GPS: -162 dBm tracking sensitivity
- Support SBAS (WAAS, EGNOS, MSAS, GAGAN)
- Separated 18X18mm GPS antenna

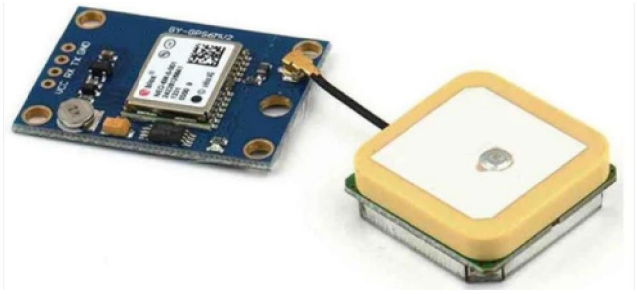

Fig. 4.GPS Module

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RFID Tag Reader

Horizontal **Radio frequency Identification i.e. RFID** is a wireless identification technology that uses radio waves to identify the presence of RFID tags.

Just like Bar code reader, RFID technology is used for identification of people, object etc. presence.

In barcode technology, we need to optically scan the barcode by keeping it in front of reader, whereas in RFID technology we just need to bring RFID tags in range of readers. Also, barcodes can get damaged or unreadable, which is not in the case for most of the RFID.

RFID is used in many applications like attendance system in which every person will have their separate RFID tag which will help identify person and their attendance.

RFID is used in many companies to provide access to their authorized employees.

It is also helpful to keep track of goods and in automated toll collection system on highway by embedding Tag (having unique ID) on them.

Fig. 5.EM18 RFID Tag Reader

GSM SIM 800

The Sim800C GPRS/GSM Shield with Antenna provides you with a way to use the GSM phone network to receive data from a remote location and it is compatible with all boards which have the same form factor (and pinout) as a standard Arduino Board. This shield can also be applied to DIY phones for calling, receiving and sending messages, making GPS trackers or other applications like Smart home, etc.

Fig. 6.GSM SIM 800

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IV. CONCLUSION

This research showed that RFID tracking technology is a practical option for monitoring and tracking the children during their trip to and from school on school busses. Lab and field trials confirmed that the RFID tags functioned well under different conditions. The readings were consistent and resulted read ranges that were acceptable within the constraints of locating children stepped into the bus, stepped into the wrong bus, left the bus, and left behind in the bus. In addition, the cost associated with tagging of materials is relatively low. It should be noted that the work completed in this research is the first phase of the project. Future work including combining RFID tracking with an information management system will result in detailed children tracking that will provide different application to the users. Once the next phases are complete, the system will be capable of notifying parents via SMS when the child enters/leaves the school, enabling school authorities, fleet owners and parents to keep track of the bus online, helping transporters and authorities to plan and manage the bus routes better, saving money and ensuring smooth and quick rides to the different destinations.

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REFERENCES

[1] Leonardo D’Errico, Fabio Franchi, Fabio Graziosi, Claudia Rinaldi, Francesco TarquiniCenter 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, MedhatAwadalla 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 GPS and GSM Based Vehicle Tracking and Employee Security System,” International Journal of Computer Applications (0975-8887), Vol. 62, No.6, January, 2013.

[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. SüleymanEken, 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.

[8] 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.