

SMART SCHOOL BUS MONITORING SYSTEM

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Abstract—On reviewing the past work of school bus tracking, monitoring and alerting system, there is a possibility to categorize various methodologies and identify new trends. One among them is a challenge for vehicle tracking, monitoring and alerting system. 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, or leave at the wrong station. This project makes use of the applicability of radio frequency identification (RFID) technology for tracking and monitoring children during their trip to and from school on school busses. And it has the advantage of efficient tracking capabilities, low cost and easy maintenance. The individual RFID tags are effective and it is used for tracking and monitoring children. The system consists of three main units, bus unit, GPS unit and RFID unit. The bus unit is used to detect when a child enters/exits from the bus using RFID Card and display the student information on LCD display.

Keywords - Global Positioning system, Radio frequency identification, ARDUINO UNO R3, LCD display.

I. INTRODUCTION

When it comes to public transportation, time and patience are essential. In other words, many people using public transport buses have experienced time loss because of waiting at the bus stops. Millions of children need to travel from home to school and vice versa every day. For parents, obtaining a safe transport for their children is a critical issue. Crime against children is increasing and every parent is requesting the respective school for the security of their child while traveling from school to home and vice versa in school bus.

In this paper, smart bus tracking system has been proposed that when any student dropped out from the bus he/she should be verified by using their RFID tags. Millions of children need to moved from home to school and vice versa every day. For their parents, getting a safe transport for their children is a crucial issue. At present days all are very much aware about the safety concerns. At the same time parents can send their children to schools which have high reputation and all facilities.

Now-a-days all schools have bus facilities, even by their child are going to school through school bus parents have some worry about their child, whether they reached safely or in a dangerous situation. This system gives an alerts when child boards and leaves the bus using the RFID tag wore by the child by placing that tag before the RFID reader. The RFID reader and GPS are interfaced with Microcontroller.

Each RFID tag has an information about and individual children which was sensed by an RFID reader. The outputs of this controller board are given to LCD display.

For instance, the Australian College of Road Safety says that bus travelling in the safest form of road transport system is safer than the private car for the children, and that the record for school bus travel in particular is very good. Global Positioning System is designed for tracking and positioning the school bus. Also, the research undertaken by National Highway Traffic Safety Administration in USA notes that when comparing the number of fatalities of children aged 5 to 18 years during normal school transportation hours, school buses are 87 times safer than private cars.

However, headlines like “Girl dies in bus tragedy” from the May 18, 2010 issue of the Peninsula newspaper in Qatar seems to be repeated several times every year in different places of the world. This system will alert the driver that if the student is not boarded at the correct stop.

The proposed system shows that the RFID tracking technology is a practical option for monitoring and tracking the child during their trip to and from school on school bus. The system tracks the school bus by the GPS Module. The GPS Module is used for Live.

II. LITERATURE SURVEY

The project idea is to put an end to incidents like Innocent children are ending their lives for unworthy reasons. There are many systems which provide security to the school children. The use of RFIDs makes it easier to maintain and use, but could not give the certain information about the situation in the bus i.e. this system does not provide any information when children are in dangerous situations . To track the live location of the bus for the speedy recovery when it is subjected to accidents.

The system monitors the children inside the bus in a safer manner. It uses the combination of RFID (Radio Frequency Identification), GPS (Global Position System) technologies. Each Student carries a unique RFID card embedded in each of the student’s school bags. When the student enters or exits from the bus the reader records and transfer data in the database.

Radio Frequency identification (RFID) is used to transmits the Information of a using radio waves.

After this information consists of unique digital number which differentiates various objects. An RFID system is made up of two different parts viz. RFID tag and RFID reader. There is a microchip antenna inside tag; This chip consists of useful data in different forms. A study has showed that, the performance of reader decreases child will allowed carries the unique RFID card. This RFID card is embedded on his own smartcard. When children in or out from school bus, reader will verify the data.

The system shows an efficient and systematic way of using RFID tracking applications coupled with smart phone technologies to fulfill the key security and monitoring purposes. In order to optimize the proposal, this paper investigated the effects of variable localization of RFID tags from reader and power loss, inefficiency and distance constraints caused due to equal power allocations to the tags. Reducing the number of reader by using smart antenna in RFID and increasing coverage area, several other sectors will be hopefully able to leverage the benefits of RFID technology.

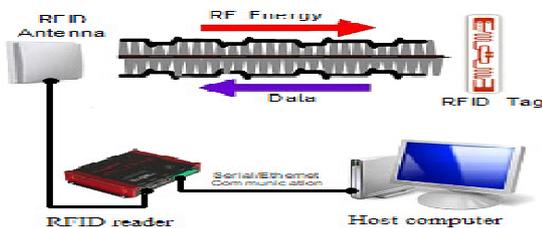


Figure 1. Typical Passive RFID System

The RFID reader consists of an antenna, power supply, processor, transceiver and an interface for connecting it to a host computer (i.e. via serial port, or Ethernet). The RFID tag has an antenna, a transceiver, and an Integrated Circuit (IC) with memory. The performance of the RFID tag is determined by factors such as IC technology used, the read/write capability, the read range, the radio frequency, and external factors such as the environment and packaging.

III. PROPOSED SYSTEM

In this system ATMEGA328P microcontroller has been used. The system consists of RFID Reader, GPS module and LCD display. Buzzer will be placed as an output in order to alert the driver. The ATMEGA328P low power microcontroller is used in the ARDUINO UNO R3 board.

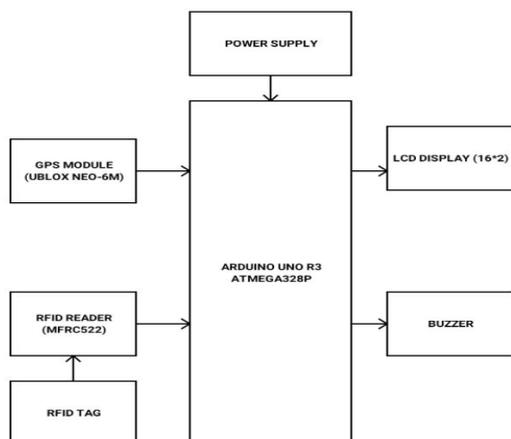


Figure 2. Block diagram

The information of RFID tag is read by RFID reader. The reader transmits corresponding information. RFID tag is used to send an alert message like the location of a person to the LCD display. In this system GPS is used to track the position of the bus and to identify the children locations.

LCD stands for Liquid Crystal Display is a flat panel display technology commonly used in TVs and computer monitors. It is also used in screens for mobile devices, such as laptops, tablets, and smartphones. The backlight in liquid crystal display provides an even light source behind the screen. This light is polarized, meaning only half of the light shines through to the liquid crystal layer. The liquid crystals are made up of a part solid, part liquid substance that can be "twisted" by applying electrical voltage to them. They block the polarized light when they are off, but reflect red, green, or blue light when activated.

A DC Power Supply Unit (commonly called a PSU) deriving power from the AC mains (line) supply performs a number of tasks: It changes (in most cases reduces) the level of supply to a value suitable for driving the load circuit. It produces a DC supply from the mains (or line) supply AC sine wave. It prevents any AC from appearing at the supply output. Power supplies in recent times have greatly improved in reliability but, because they have to handle considerably higher voltages and currents than any or most of the circuitry they supply, they are often the most susceptible to failure of any part of an electronic system.

GPS is a satellite navigation system used to determine the ground position of an object. Each GPS satellite broadcasts a message that includes the satellite's current position, orbit, and exact time. A GPS receiver combines the broadcasts from multiple satellites to calculate its exact position using a process called triangulation.

IV. IMPLEMENTATION

In this paper, 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 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 exit RFID tag is sensed by the RFID reader. The RFID reader read the tag and sends the data to microcontroller and it compares with the GPS data. The tracking system details will be sent to the ARDUINO board.

The proposed system is used to intimate the driver about the child boarding to the school bus. The system addressed the problem faced by parents of waiting on the bus stop for long duration. The system includes RFID for unique identification and the GPS is used for the location tracking. The complete location and children details are stored in the database.

The GPS continuously tracks the bus location and sends to the microcontroller and when the child boards from the bus they verify their tag by placing it at RFID reader. The microcontroller compares the RFID data with GPS coordinates. If the data was matched then no buzzer will be alarmed else buzzer will be alarmed.

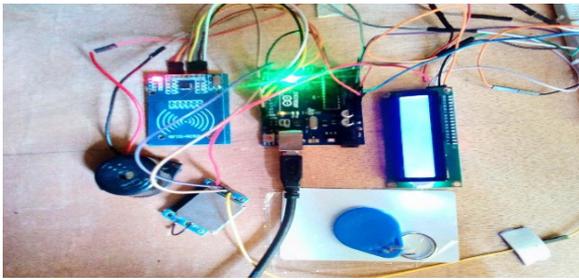


Fig.3 Practical implantation

V . CONCLUSION

This proposed system aims at enhancing the safety of children during the daily transportation to and from school. RFID Reader located inside the bus detects the RFID tags of the child. The admin can add stops, and generate an optimized route and can have a live tracking of the bus. Further this system can be enhanced by Parking Management System, having VANET for bus to bus communication. This system can be extended for full-time monitoring of children that will be helpful for parents and guardians at minimum cost.

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