Safety System for School Children Using RFID

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Abstract: Nowadays with the increase in the crime rate and accidents, parents worry about their children when they are going to school. This project recommends a SMS based solution which assists parents to track their children location in real time. To track the location GPS module is used. This project makes use of the applicability of radio frequency identification (RFID) technology for tracking and monitoring children during their trips to school, at the school and back home on school busses. And RFID has the advantage of efficient tracking capabilities, low cost, and easy maintenance. The individual RFID tags are effective and are used for tracking and monitoring children. Whenever a child boards a bus or enters a classroom the RFID tag located at his wrist i.e., on wristband, will be detected by the reader present in the bus or classroom. And the system will identify the child and will send a text message to the parents consisting the current location and time by using GSM technology. This system also makes use of sensor to detect the presence of wristband on child's hand. In this way the parents will be able to keep record of their kid's whereabouts.

Keywords: RFID- Radio Frequency Identification Technology, GSM- Global System for mobile, GPS- Global Positioning System, Node-MCU- Node Micro-Controller Unit.

I. INTRODUCTION

In present time due to increase in number of kidnapping and road accident cases, parents always worry about their children. Road accidents are increasing day by day. School bus plays an essential role in carrying most of the children every day all over the world. While several problems might disturb the parents concerning the travel of school-going kids; the project aspires to look into initiating the safety with respect of school buses through bus tracking and security system that will help the school children' transportation in a protected and more secure way. This project makes use of the applicability of radio frequency identification (RFID) technology for tracking and monitoring children during their trips to school, back home and in school premises. RFID has the advantage of efficient tracking capabilities, low cost, and easy maintenance. The individual RFID tags are effective and are used for tracking and monitoring children. This project 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 tag is used which is in built in the system. Whenever a child boards a bus or enters a classroom the RFID tag located at his wrist i.e., on wristband, will be detected by the reader present in the bus or classroom. And the system will identify the child and will send a text message to the parents consisting the current location and time using GSM technology. This will help the parents to keep record of their kid's location.

II. PROBLEM DEFINITION

At present time due to the increase in the number of kidnapping and road accident cases, parents always worry about their children's security. This project recommends an android based solution which assists parents to track their children's location in real-time. To track the location Active RFID module is used and to identify the identity of the child a biometric identification is used which is built in the system. Whenever a child boards a bus and the system will identify the child and a notification will be sent to their parents which consists of current location and time. Parents can see the location of the bus; they will be notified when the children are getting into a bus or getting down from a bus.

III. LITERATURE SURVEY

International Research Journal of Engineering and Technology (IRJET) Volume: 06 Issue: 02 | Feb 2019- Mr. Mahesh S. Dabhade, Suraj S. Jadhav, Bhaskar B. Chauhan, Wasim E. Shaikh "REVIEW ON ADVANCE STUDENT IDENTITY CARD WITH GSM-GPS-RFID FOR CHILD SECUIRITY" With the increase of the crime rate, children's security is the one of the big problems. The safety mechanism to the transportation bus and to the children travelling from home to the school and resume back to home and the android application which will keep track on the student location whenever needed by the parents and to the school management. Also, the application will get notification after going out of safe zone. This paper aims to provide the total security for school children. Range and Obstacle detection and accident detected sensors are implanted on the front surface of the bus in order to avoid collision with another vehicle on the Road. Each student is tagged with unique code and GSM chipset. Wireless communication technology (IEEE 802.4.15) is used to inform the status of the bus to the school principal and the student status to the concerned parents. The absentee record of the student will be sent to the concerned parent before leaving the children entry point. The return information is also informed to the parent using GSM technology. The results are favorably good to meet the challenges of the security issues.

Communications on Applied Electronics (CAE) – ISSN: 2394-Volume 2 – No.2, June 2015 –" K. Vidyasagar, G. Balaji, K. Narendra Reddy "RFID-GSM IMPARTED SCHOOL CHILDREN SECURITY SYSTEM" With the advancement of the crime rate security is having its alarming significance for school children's. The safety mechanism to the transportation bus and to the children travelling from home to the school and resume back to home is a standalone component to the parents and to the school management. This paper aims to provide the total security for school children. Range and Obstacle detection and accident detected sensors are implanted on the front surface of the bus in order to avoid collision with another vehicle on the Road. Each student is tagged with unique code. Two counters used at the entrance and exit location of the bus. Wireless communication technology (IEEE 802.4.15) is used to inform the status of the bus to the school principal. The absentee record of the student will be sent to the concerned parent before leaving the children entry point. The return information is also informed to the parent using GSM technology. The results are favorably good to meet the challenges of the security issues.

IV. OUR NEW SYSTEM

This project introduced the idea of child monitoring system by making the use of RFID-Radio Frequency Identification Technology to detect child's current location. This project recommends an android based solution which assists parents to track their children's location in real-time. Whenever a child boards a bus or enters a classroom the RFID tag located at his wrist i.e., on wristband, will be detected by the reader present in the bus or classroom. And the system will identify the child and will send a text message to the parents consisting the current location and time using GSM technology.
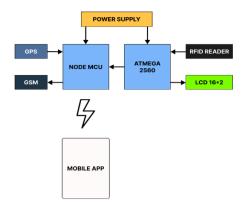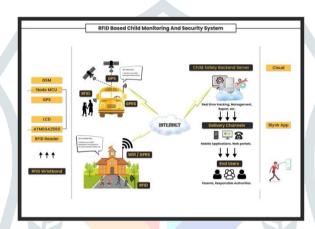
Fig 1. System Block Diagram

Fig 2. System Architecture

The circuit includes ATMEGA2560, Node-MCU, GSM, GPS, RFID Wristband, RFID Reader.

ATMEGA2560: The Mega2560 is a microcontroller board based on the ATmega2560 which is 8-bit board with 54 digital pins, 16 analog inputs, and 4 serial ports.

Node-MCU: An open-source platform based on ESP8266 which can connect objects and let data transfer using the Wi-Fi protocol. It has an internal antenna and contains 13 GPIO pins, 10 PWM channels, I2C, SPI, ADC, UART and 1-Wire.

RFID READER: The RC522 RFID module is designed to create a 13.56MHz electromagnetic field to communicate with RFID tags. Reader communicates with a microcontroller over a 4-pin SPI (data rate-10 Mbps) and supports communication over I2C and UART protocols with read range of 5 cm and logic pins that tolerates 5-volt voltage.

RFID WRISTBAND: Contains a 'smart tag' made up of an RFID chip and antenna. Tag can be in the form of visible card or it can be embedded in other wristband materials. It works by transmitting unique data between a tag and a computer system. Embedded in a wristband a tag passes information by communicating with an RFID scanner via intelligent radio signals.

GPS: The NEO-6M GPS module is a well-performing complete GPS receiver with a built-in 25 x 25 x 4mm ceramic antenna, which provides a strong satellite search capability. Equipped with power and signal indicator lights and data backup battery.

GSM: SIM900A GSM/GPRS Module can work with any GSM network operator SIM card just like a mobile phone with its own unique phone number. SIM900A modem uses AT commands to work with supported features like voice call, SMS, Data/Fax, GPRS etc.

V. OBJECTIVE AND SCOPE

- ➢ To design IoT based school bus tracking system.
- ➢ To use an RFID system for tracking and monitoring children during their trip.
- ➢ To detect child's entry and exit.
- ➢ To process and translate large data perfectly.

VI. METHODOLOGY

Methodology in this proposed work, the RFID reader reads the data from tag and sends the card UID number to Arduino microcontroller for comparison, if the card is valid then Arduino microcontroller display access granted else, access denied on the screen of LED Display. After getting data in Arduino microcontroller data is send to Node MCU with the help of serial communication and then we compare our reader data to existing data. In Node MCU with Arduino data we are reading GSM and GPS data. We are detecting GPS location and then converting it into hexadecimal form to update Latitude and Longitude to their parents.

VII. FUTURE SCOPE

We can use it on large scale for multiple schools at a time. We can set time limit for rescan card to exit bus after entering the bus according to distance from school to home or vice versa. We can enhance our login and signup security by using OTP verification.

VIII. CONCLUSION

This project presented an RFID-based system that aims at enhancing the safety of children during the daily bus trip and at the school.

1. RFID-based detection unit located inside the bus and at classroom detects the RFID tags worn by the children. It then sends, the relevant data via a GSM modem.
2. The system checks child's boarding from bus / classroom and issues an alert message to this effect.
3. A Smartphone application can be downloaded by the parents which will continuously show the location.

IX. REFERENCES

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