

Smart Pick and Drop Intimation System of School Children

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Abstract—Due to the raise in number of kidnaps and road accidents, it is essential for the parents and school authorities to take necessary safety measures to avoid these plausible mishaps. Each child is provided with a Tag for the daily bus transportation to tag on a RFID reader present in the bus. It reads the tag value and sends the information to RPi3, which is then redirected to the GPS module; it can identify the location of the bus and send the information to parent's mobile through GSM providing the location of their child accordingly.

Keywords— :RFID, Intimation, Video Streaming, Students Information and safety.

I. INTRODUCTION

In recent past, many unpleasant incidents relating to school buses have taken place questioning the safety of children using that services. So, it's become vital for the parents to monitor their children throughout their travel. In this paper, we focus on a particular risk associated with the daily bus trip to and from school. There have been previous incidents where a child is forgotten in the bus and eventually die because of suffocation [1-2].

In this paper, the design of an efficient system is presented, which allows parents to watch over their children, their bus journey directly by providing them with location and continuous live video streaming. Every child is provided with a Tag for the daily bus transportation to tag on a RFID reader present in the bus. It reads the tag value and sends the information to RPi3, which is then redirected to the GPS module; it can identify the location of the bus and send the information to parent's mobile through GSM providing the location of their child accordingly. At any moment, if parents want to know their kid's location, they can simply send a request message as "Where" to the authorized phone number on the bus.

The location of the bus at that current moment is identified by the GPS, and a message is returned to the parent's mobile providing the same along with date and time. The proposed system also provides a live video streaming option to the parents, using a sanctioned IP address which also provides the student's detail database making easy even for the school administration to monitor the location of buses and children travelling in them.

II. LITERATURE SURVEY

K. Vidyasagar Proposed 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 [3].

Maryam Said Al-Ismaili Proposed another solution to solve the problem by developing a bus safety system that will control the entry and exit of students from the buses through an energy efficient methodology. His system will control the entry and exit of students to and from the bus using RFID (Radio Frequency Identification) and GSM technologies to ensure the entering and exiting of all students to and from the school bus in a safer manner [4].

Anwaar Al-Lawati Proposed web-based database-driven application that facilitates its management and provides useful information about the children to authorized personal. A complete prototype of the proposed system was implemented and tested to validate the system functionality [5].

M. Navya et.al Proposed GSM-GPS technology to track the children students. GPS is used for identifying the student location. GSM is used to send the information to the parent android mobile. Monitoring database is provided at the control room of the school [6].

III. SYSTEM DESIGN & ARCHITECTURE

Block diagram of the proposed system is shown in Figure 1. This system uses Raspberry Pi3 as the chief module. RFID Tags are worn by the each student by which every parent can track their respective kid's current location. RFID reader used reads the Tag's value which is a 12 digit code and sends the results to RPi3 Module. GPS provides reliable positioning and timing of the children. GSM sends the information to parents accordingly. USB web camera provides live stream of students inside the bus; this video monitoring and student's data information is provided to parents and school administration via IP address.

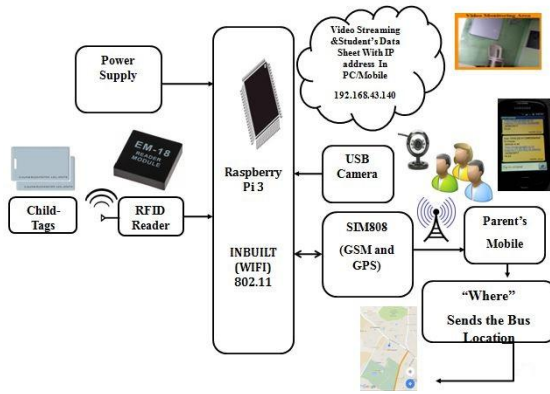


Fig 1. Block Diagram of the System

A. DESIGN REQUIREMENTS:

This system design requires Some Hardware and Software Components those are mentioned below

Hardware:

- Power Supply
- Raspberry Pi 3 Module.
- RFID Reader
- RFID Tags
- SIM808 Module
- USB Camera

Software:

- Python Programming Language
- Raspbian Based Linux Operating system

B. OVERVIEW OF RASPBERRY PI3

The proposed system is implemented using a Raspberry Pi 3 Model B. Raspberry pi is a mini computer. It is a Credit – Card Sized Computer Manufactured and Designed in the UK by the Raspberry Pi Foundation. It is capable of several things such as, spreadsheets, word-processing and high-definition videos and games. It has a Broadcom BCM2837, an ARM Cortex-A53 64bit Quad Core Processor System-on-Chip and Linux-based operating system as Raspbian and Debian. It can do multifunctionalities at a time [7].

C. RFID READERS AND RFID TAGS

RFID Readers:

Radio Frequency Identification is a technology that can use radio-frequency waves to transfer data between reader and a movable item to identify or track etc. Generally a RFID system consists of 3 parts those are: Readers, Antennas and Tags (transponders)[8].

IV. INTERFACING ALL THE MODULES WITH RASPBERRY PI

Interconnections and interfacings for this system are shown in Figure.2. In This Paper every student has unique tag that contains 12 digit code specifying the child's identity. This Child tag tags on the RFID reader, it reads the tag value and sends the information to RPi3, which is then redirected to the GPS module; it can identify the location of the bus and send the information to parent's mobile through GSM providing the location of their child accordingly. At any moment, if parents want to know their kid's location, they can simply send a request message as "Where" to the authorized phone number on the bus. The location of the bus at that current moment is identified by the GPS, and a message is returned to the parent's mobile providing the same along with date and time. The proposed system also provides a live videostreaming option to the parents, using a sanctioned IP address which also provides the student's detail database making easy even for the school administration to monitor the location of buses and children travelling in them.

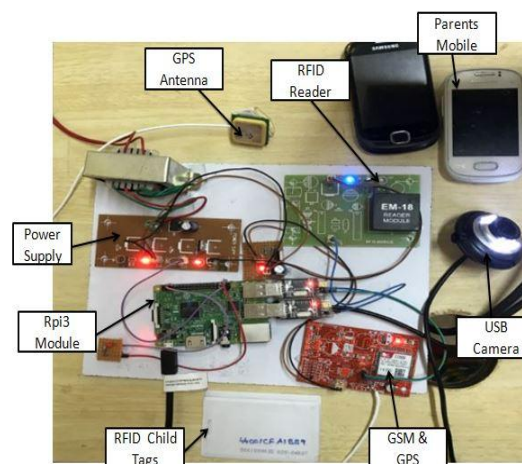


Fig 2. Interconnections of the System

Above Figure represents the entire system interfacings with all the modules connecting to RPi3. Power supply is given by the micro USB power input; upgraded switched power source that can handle up to 2.5 Amps. RPi3 40(GPIO 21) used for LED activation. GPIO 6 and 9 Pins are used for ground. USB1 can be connected to USB camera for the video monitoring of the student in the school bus. USB2 can be connected to SIM 808 Module which consists of GPS receiver and GSM Module together. USB3 can be used for receiving data from RFID reader. USB2 and USB3 are connected in TTL to serial converter can be used for Transmitting and Receiving of the data. Table.1. shows the RPi3 connections with all modules.

In this system all processes are running on python language. Video monitoring and student data information pages are designed with html.

TABLE 1RPI3 CONNECTIONS WITH ALL MODULES

Module	Pins /USB Connections	Purpose of Pin Connection
Power Supply(5V)	2	Power Supply
LED	40(GPIO21)	For Indication
Ground	6 and 9	Ground
Reader Module	USB Rx To RFID Tx	To Read The Tag Value
SIM808 Module(GSM&GPS)	USB Tx To SIM808 Rx	To Get the Parent Request
	USB Rx To SIM808Tx	To Sending The Messages To Get the locations
USB Camera	USB Camera Tx To USB4 Rx	To Capture The Video

V.EXPERIMENTAL RESULTS

The Raspberry Pi board is interfaced with all modules; it is driven by 230V AC power supply, transferred through step-down transformer and reduced to 12V AC power further transferred through bridge rectifier and converted to 12V DC power supply. Filter capacitors are used for smoothing the waveform received from the rectifier. A Voltage regulator is a device which converts varying input voltage into a constant regulated output voltage of 5V DC. This 5V is given to all modules of this system.

After first process, child tag can tag on the RFID reader; it can access the tag value and then that reading can be sent to RPi3 module. It can verify the child tag which is accessed by reader to check the child who got into or got down the bus, based on the counting of the reader and get the position of the child is received by GPS receiver from SIM808 module. This result can be sent to parent’s mobile through GSM. Whenever child gets into the bus parents get a message, it is shown in figure 3. It shows ‘Your child started to school’ vehicle position with longitude and latitude values.



Fig3. SMS when Child got into the bus

Whenever child gets down the bus parents get message, shown in figure 4. It shows ‘Your child started to house’ vehicle position with longitude and latitude values.

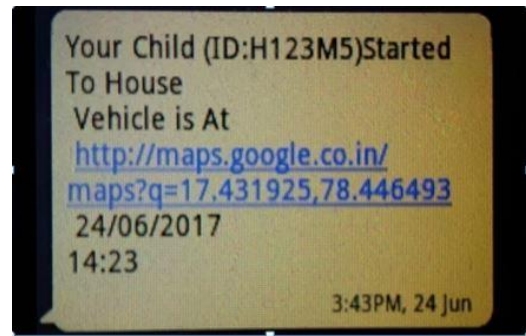


Fig 4. SMS when Child got down the bus

At any moment, if parents want to know their kid’s location, they can simply send a request message as “Where” to the authorized phone number on the bus.

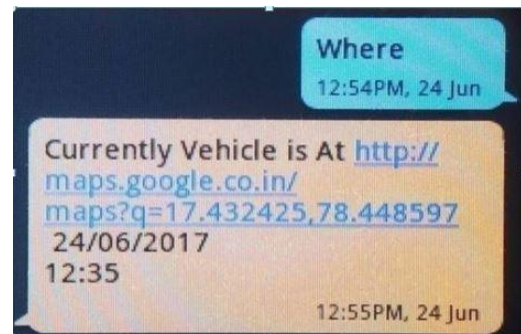
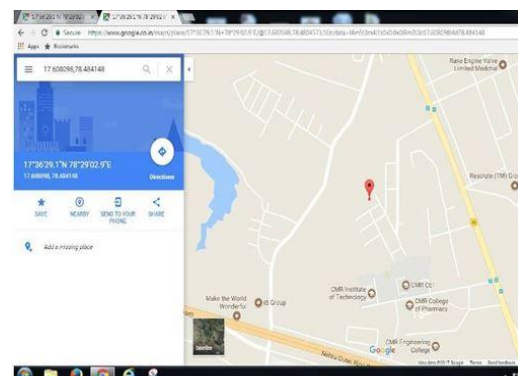


Fig 5. Parent Request

The location of the bus at that current moment is identified by the GPS, and a message is returned to the parent’s mobile providing the same along with date and time Parents can view child’s current position by clicking the link received in the message in Google maps. Child’s position can be shown in Figure 6.



Parent being informed that child has arrived providing the location and time at which he/she boarded the bus

Fig 6. Location map of the child

This system can also provide the information of the child’s location through continuous live streaming and student’s data information can be is provided in



Fig 7. Live Video Streaming inside School bus

[6] M.Navya, "Android based children tracking system using voice recognition", International journal of Computer science and information technology, Vol 4 (1): pages 229-235, Jan 2015.

[7] "The Official Raspberry Pi projects book" Available at: https://www.raspberrypi.org/magpi-issues/Projects_Book_v1.pdf

[8] Sridhar Iyer, "RFID: Technology and Applications", Available at: <http://www.it.iitb.ac.in/~sri/talks/rfid-05.pdf>

[9] Cisco, "RFID Tag Considerations", May 2008, Available at: <http://www.cisco.com/en/US/docs/solutions/Enterprise/Mobility/wifich6.pdf>

[10] SIMCom, "SIMCOM.EE smart machines, smart decision" SIM808, Available at: <http://simcom.ee/modules/gsm-gprs-gnss/sim808/>

VI. CONCLUSION

The implemented system focuses on monitoring child's position and sends it to their parents respectively; it also responds to parent's requests, providing their child's current location. Parents can access student's data information and live monitoring continuously using a web page with an IP address. Implementation cost is reasonable, Smart and user friendly. The security level can be extended at any place in the school, e.g. Libraries, and Classrooms. This can be made even more secure using Biometric measures, which can be used at any Educational Institutions.

REFERENCES

[1] "4 year old, forgotten in a school bus, dies". Available at: <http://www.muscatdaily.com/Archive/Oman/4-year-old-forgotten-in-a-school-bus-dies> [Accessed: 11 Aug. 2014]

[2] Toumi, H., "Four-year-old girl left alone in school bus dies". Available at: <http://gulfnews.com/news/gulf/qatar/four-year-old-girl-left-alone-in-school-bus-dies-1.628394> [Accessed: 11 Aug. 2014]

[3] K.Vidyasagar G. Balaji K. Narendra Reddy Dept. of ECE, SSIT Sathupally, T.S, India, "RFID-GSM IMPARTED SCHOOL CHILDREN SECURITY SYSTEM" Communications on Applied Electronics (CAE) – ISSN : 2394-4714 Foundation of Computer Science FCS, New York, USA Volume 2 – No.2, June 2015

[4] Maryan Said Al-Ismaili, Ali Al-Mahruqi, Dr. Jayavrin da Vrindavanam, Department of Computer and Electronic Engineering, Caledonin College of Engineering, "BUS SAFETY SYSTEM FOR SCHOOL CHILDREN USING RFID AND SIM900 GSM MODEM" "International Journal of Latest Trends in Engineering and Technology (IJLTET)

[5] Anwar Ali-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, "RFID BASED SYSTEM FOR SCHOOL CHILDREN TRANSPORTATION SAFETY ENHANCEMENT" proceedings of the 8th IEEE GCC Conference and Exhibition, Muscat, Oman. 1- 4 February, 2015.