Children Safety and School Bus Tracking Solution

[1]Mayur Bhor, [2]Nikhil Kadam, [3]Dinesh Shinde, [4]Pranoti Mane

[1,2,3] B.E. Students - EnTC, MESCOE, PUNE, Maharashtra, India
[4]Associate Professor, Dept. of Electronics & Telecommunication, MESCOE, PUNE, Maharashtra, India
Email: [1]mayurbhor7@gmail.com, [2]kadamdknikhil@gmail.com, [3]dineshshinde184@gmail.com,
[4]pranoti.mane@mescoepune.org

Abstract — Despite the strict majors taken for children safety by the authorities the crimes over children are increasing on significant amount. To restrict these crimes it is important to enhance security for children . Mishaps and missing of children are causing parent to worry about their children. School authorities may be penalized heavily for these mishaps, So school bus monitoring is an effective major to restrict these mishaps. This paper proposes an embedded system which focues on children safety, tracking of school bus and exact location of school bus with the help of longitude and altitude positioning of GPS and sending information through SMS. Each student possesses an RFID tag on his own smartcard which is useful for identifying the student. Two IR sensors are used to check whethera student is arriving or leaving bus.We also provide speedometer which checks speed of bus. Hence,we have proposed"LPC 2148" based embedded system which provides a complete solution to children safety and school bus tracking.

Keyword —Children safety, school bus tracking , RFID, GPS, GSM.

I. INTRODUCTION

Large number of children travels through bus daily in various countries of world. Safe and secure transportation of children is top priority for school authorities. This paper intends to introduce access safety an d school bus tracking system which will ensures safe transportation of children to the school. Supervising children during their in and out from the bus can be difficult at times. In some cases kids forgot to leave the bus. This has often led to death of many children due to lack of attention of drivers.

A system is proposed for safety along with entering or exiting of student from bus. It identifies children on basis of information stored in a RFID tag itself, this information is exchanged over radio waves. Name of each student is displayed on LCD display which will in turn let driver know whether a child is still inside or not by counting through IR sensors. In case of over speed of school bus buzzer is provided, let driver to know speed should be minimized for safety of children. Along with RFID another elements such as GPS, GSM are used in monitoring system. The combination of GPS and GSM is found effective for various another real time working systems, so it found compatible along with proposed work.

As our prime aim is Children safety, According to this school bus tracking is also essential for Children safety. In different fields tracking system are running now-a-days enhancing overall system performances.

By using this system, it is possible to analyze the location of school bus and information about driver and Children whether it follows a track. Thus proposed system should be able to enhance efficacy of system.

This paper is sectioned in VI sections, Section I gives brief introduction about topic. The Literature survey is presented in section II. Methodology is explained in section III. Section IV describes sensors used in this system. Simulated and experimental results are shown in Section V , while section VI throws light on Future Scope and concludes the paper.

II. LITERATURE REVIEW

Radio Frequency identification is used to transmits

Information of an subject using radio waves [1].This information consists of unique digit number which differentiates various objects. An RFID system is made up of two different parts viz. RFID tag and RFID reader[2]. 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 rapidly with increase in a distance[3]. Children carries an unique RFID card. This RFID card is embedded on his own smartcard. When children in or out from school bus, reader will record a response and this information is being pressed for further implementation. This secured data does not require any action from driver and student.

The system will notify parents by SMS whenever children enters or leaves school bus, this will make assure parents that children is safely reached to destination[4]. Along with notifying parents school management also receives a SMS of each student travelling. Count through IR sensor will ensures that is school bus is vacant or still any children is inside school bus[5]. If any children are still inside school bus proper

action can be taken immediately to avoid further accident.

GPS technology is used in large number of applications today. One of the applications is tracking your vehicle and keeps regular monitoring on them[5]. This tracking system is useful to inform you about location and route travelled by vehicle, this information can be analyzed from any remote location. This system permits us to track object in any climatical conditions.

Ismaili [3] , presented system which will ensures children safety using RFID along with advanced system to notify parent is school bus is arriving late or in time.10 minutes before SMS will be received to parents to notify school bus is arriving. This includes of a complete school bus tracking in real time and if necessary notifying current location, number of children inside school bus and total tracking of a school bus.

III. METHODOLOGY

Fig. 1 describes proposed system in a block diagram as below

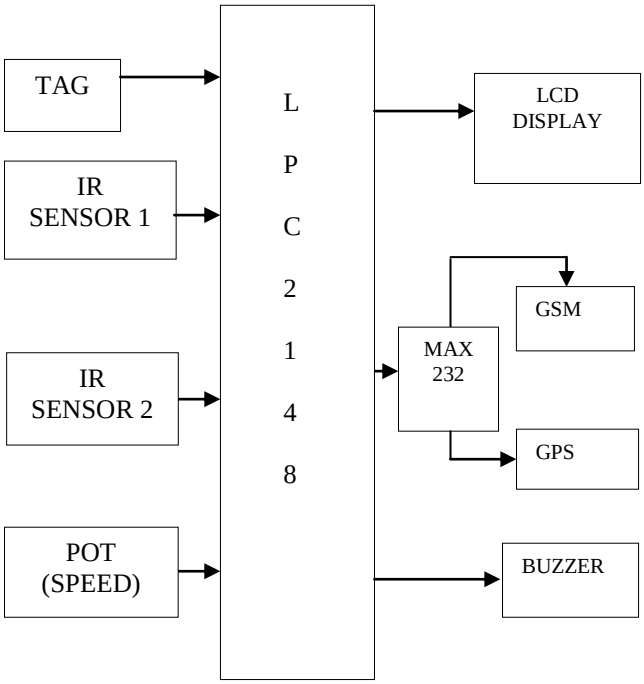

Fig. 1 Block Diagram.

RFID READER :

A RFID reader consists of magnetic coil which produce magnetic field, which will read tag whenever it comes in contact with it. To create carrier signal frequency, transmitter consists of the oscillator. Receiver demodulates data and restore and also amplified by amplifier for boosting signal which got weak due to propagation loss. A control unit is formed by LPC 2148 which saves data and then sends to network.

RFID TAG :

In this experiment RFID tag used is of 12 digit unique Identity number which is able to detect from a specific distance and data sends to reader. RFID having different structures as a label card having a printed barcode on it. The RFID tag is useful for industrial applications .The best feature is that it can be attached to clothing or wearing accessories to determine identity of a person. RFID tag are of two different kinds active and passive.It is white in colour and of rectangular shape sizes ID card.

GSM MODEM :

SIM 900 is used in this experiment, It permits to send SMS to parent authority as well as school management system. It functions as a mobile phone for the purpose of sending SMS through a radio waves. It is slim and compact in size. Low power consumption is major advantage to choose this one.

16×2 LCD DISPLAY :

A 16×2 LCD is used in this system. It is economical and easily programmable so it is chosen for system. It display's 16 different characters each row on two different line. This contains of two registers. It is not of high voltage requirement, easy to transport and also comfortable for vision as compared to regular screens. This is used to display message on driver side.

MAX 232 :

A MAX 232 is an IC which converts signals from TIA 232 serial port to TTL logic signal which is compatible to digital logic circuit. The RS 232 is an dual transmitter and reciver used for convert the RX, TX, CTS and RTS signals. Typically first driver / reciver pair of the MAX 232 is used for TX and RX signals, and second one for CTS and RTS signals.

IV. SENSORS

The IR sensor used in this experiment is IRA E700ST0.The supply voltage required for this is within range of 2-15 V DC. It can be operated at -40^{o} to +70^{o} C. IRA series exhibits high sensitivity and reliable performance .Realizes cost benefits and higher performance are made possible using IRA series.

- Features

1. Excellent S/N ratio and high sensitivity

2. More stability for the temperature varations

3. Immune to external noise and robous

4. Affordable

- Rating (25˚C)

Part Number	IRA-E700ST0
1. Supply Voltage	2 to 15V
2. Operating Temperature	-40 to 70D
3. Storage Temperature	-40 to 85D
4. Field of View	θ1=θ2=45°
5. Responsivity (500K, 1Hz, 1Hz)	4.3mVp-p

V. RESULTS

When children enters to school bus, through RFID information about children is read by RFID reader and through GPS exact location is detected and through GSM complete information is sent to parent and school authority through SMS.

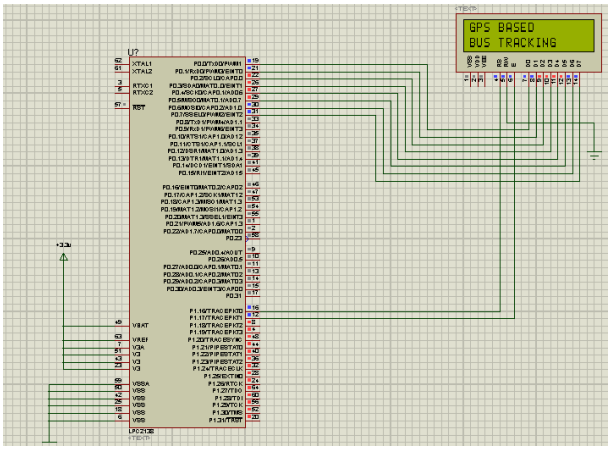

Fig. 2

IR sensors will count number of children entering or leaving a school bus and count will be displayed on LCD screen. Buzzer will beep when speed is exceed by school bus .

PARAMETER	DISPLAY
1. In/Out	i. Nikhil Present / Mayur Present.
2. Parent's Message	i. Nikhil entered at hh : mm am / pm ii. Mayurentered at hh : mm am / pm
3. School Authority Message	i. Nikhil entered at hh : mm am / pm ii. Mayur entered at hh : mm am / pm
4 . Speed	*Overspeed

*Only when Speed is Exceeded. Location will be sent via GPS .

VI. CONCLUSION AND FUTURE SCOPE

In proposed paper we worked on children safety through module kit consisting of RFID , GPS and GSM to get exact location and time of individual children. We also implemented over speed detection of school bus. For installing this system initial cost is high, but maintaince of this system is not of much cost. This system is going to be helpful for the parents as well as school system. Students are keep on tracking and current location of a child can be detected using this system in any case of the mishap or kidnapping case of a child.

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