



SMS Based School Children Safety Enhancement and Tracking System

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Abstract: In recent years, the number of crimes against children in India has increased tremendously. This system will be useful to provide accurate information about bus arrivals to parents and to the school, leading to increased safety and reduced mental strain. The proposed project presents a system to monitor pick- up/drop- of school children to enhance the safety of children during the daily transportation from and to school and send messages to the school and parents via GSM modem. The system consists of two main units, a bus unit and a school unit. The bus unit the system is used to detect when a child boards and leaves the bus. This information is communicated to the school unit that identifies which of the children did not board or leave the bus and issues an alert message accordingly. The bus unit and the school unit will be connected using a Zigbee Network. The main function of this system is to ensure that the users will be informed about the child's whereabouts in any time and also marks the daily attendance in both the evening and morning session. A hardware model is developed to materialize the proposal.

Keywords: Zigbee, GSM modem

I. INTRODUCTION

The parents are more concerned about the safety of their children and they are intransigent in the matter of their children's security. Nowadays, the accidents against school children are reporting at higher rates. Most of the accidents are occurred during daily transportation of children to the school. There was an incident that a school child is forgotten in the bus due to the irresponsibility of school authority, as a result death of child occurs because of suffocation. To reduce this risk factor, different systems are arrived in the market. Some of the products are more expensive and not at all accurate.

Our paper presents a system that resolves all the concerns of parents about their children's safety. This system monitors pick- up or drop-off of school children to enhance the safety of children during the daily transportation from and to school and sending messages to their parents and marks the daily attendance in the both morning and afternoon session automatically. Our system reduces the concerned of parents at a great extent. In this system we are using RFID technology for tracking the children that transmits the tracking information to a database and a mobile device.

There are many other products in the markets are available for the solution of this present problem. In a product , the children tracking is done by Android terminals that communicates through the Bluetooth technology by forming clusters and these clusters are communicating using WLAN. The main disadvantage of this system is deployment cost is high. Another tracking system that is based on Bluetooth tracking devices are designed on the children worn a bracelet or necklace. This system is connected with mobile application for communicating

with the relevant information by passing messages to the parents. But this system has a disadvantage that system works in limited range. Kid- track biometric system is a tracking system where the children scan their palms using a palm reader when they enter into the bus. It uses an infrared light to image the palm unique pattern. It uses green and red LEDs to ensure the scan works. Then, the scans are sent for cross-referencing against a secure database of pre-registered users patterns. Based on this, the administration can and the information of that bus, where and when it tracked the child, and where the bus was at that time. The disadvantages of this approach is that it is not automatic and difficult for young children to place their palms correctly on the scanner.

This may lead to inaccurate data if the scanner did not detect a child's palm. Our system monitors the daily bus transportation to and from school and thereby enhances the safety and security of the school children. The system aims at automatically detecting when a child boards or leaves the bus and issue an alert message when a child does not board or leave the bus to reduce the parents' concerns about using the bus for the daily transport of their children without being lost or forgotten. This system also marks the daily attendance of the children.

II. SCHOOL CHILDREN TRACKING SYSTEM

Our school children tracking system is more reliable. This system is easy to rec-configure because the design is simple. The deployment cost is less comparatively other products because the cost of components is less. The system architecture is simpler, so any errors in the system can be corrected easily. The function of overall is



automatic and user friendly. So there are no complications in the working of the system.

There are mainly two units for the tracking system. One is bus unit and the other is school unit- bus unit located inside the school bus, and a school unit located inside the school. The bus unit is responsible for detecting the child when he boards and leaves the bus and then this information is sent to the school unit. The school unit is the central unit where it collects data from all the buses, and act as a server, and it sends a text message notification to their parents.

The bus unit is the transmitter section and school unit is the receiver section. The communication of both units is through Zigbee transceiver. The alert message to the parents is given through GSM modem. The block diagram of each section is given below: the transmitter section is given in figure 1 and the receiver section is also shown in fig 2.

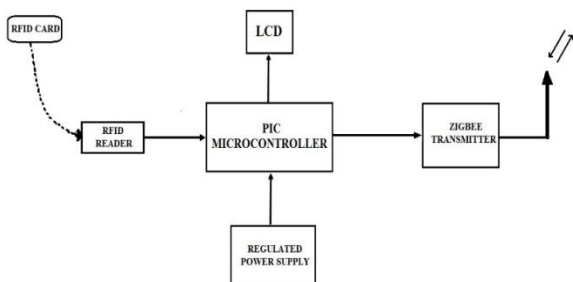


Fig. 1. Block diagram of transmitter section

The receiver section is also shown in fig 2.

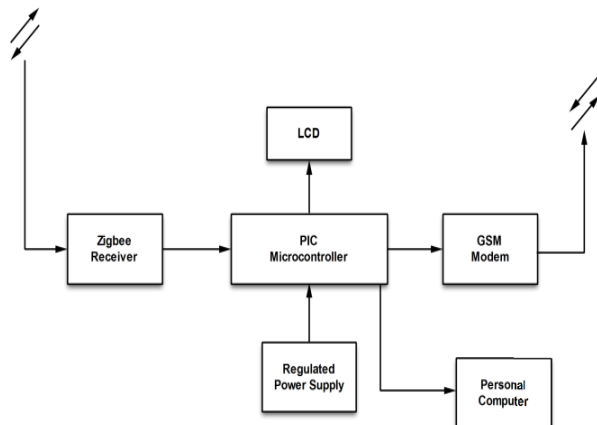


Fig. 2. Block diagram of receiver section

The bus unit consists of a RFID card, RFID reader, PIC microcontroller with LCD display and a Zigbee transmitter. The bus unit will detect the children when they board and leave the bus. It will use RFID technology to identify the student. This technology consists of a reader and tags which is located inside the school bus by the entrance. But if the child was outside near the bus, the reader will not detect him. Each child will wear a card with RFID tag attached to it. The bus unit is responsible

for sending relevant tag information to the school unit where it will be stored and send it to the school unit.

When the card shows to the reader LCD screen shows the identity number using PIC microcontroller is connected using USB RS232. This identity number as the information inside the card. Zigbee transmitter in the bus section sends this information to the school unit. School unit consists of Zigbee receiver which receives information from the bus unit, PIC microcontroller 16F877A, GSM modem and personal computer which act as the Server. Identity number which as the information detects the student by the microcontroller and personal computer displays the student's details.

Using Zigbee receiver receives the information as the radio waves. LCD screen in the school unit shows the identity number. PIC microcontroller identifies the student and connected with the personal computer as the server. Personal computer shows the details of the students which contains the photo, class, boarding point and identity number

III. HARDWARE AND SOFTWARE DESIGN

For the hardware design, the components used are RFID tag and reader, PIC16F877A, Zigbee transceiver and GSM 900 modem. The overall system of the tracking system is shown in figures below. The figure of Bus section is shown in figure 3 and that of school section is shown in figure 4.

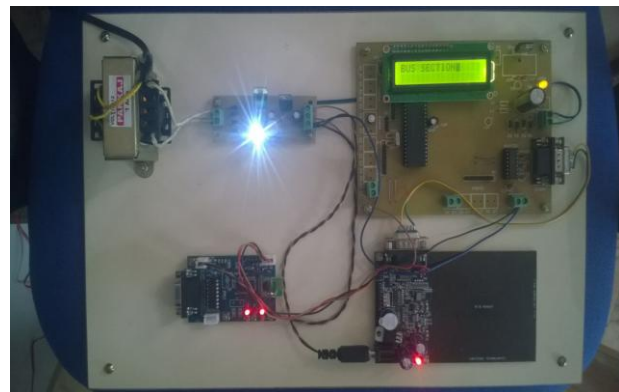


Fig. 3. Bus section of the system

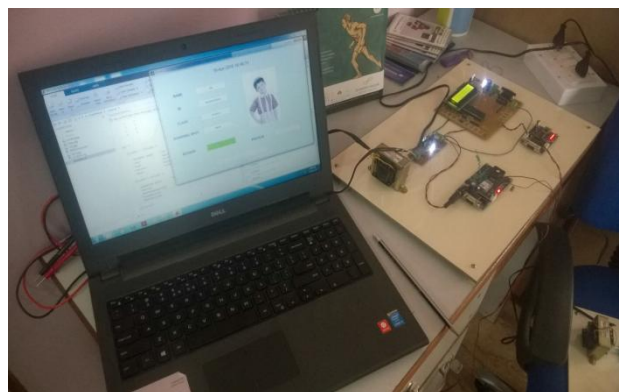


Fig.4. School section of the system

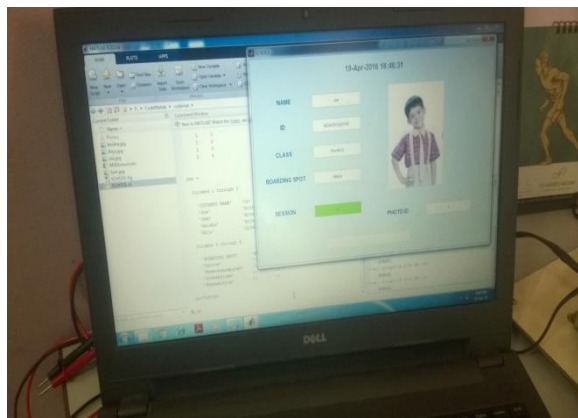


Fig 5: Database of the children using MATLAB

In the software section, the database of the children is created by using MATLAB2013a. When the card is read by the reader, the server in the school section shows the database of the each children and also marks daily attendance by stimulating the MATLAB.

IV CONCLUSION

In our paper, the system monitors the pick-up/drop-off of school children to enhance the safety of children during the daily transportation from and to school. This system also marks the daily attendance of the children. This reduces parents concerned and also reduces the risk, thereby enhances the safety of the children. This system is reliable and deployment cost is less.

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