STUDENT SAFETY MONITORING AND ATTENDANCE SYSTEM

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Abstract--- This paper presents safety of school children in the absence of parents. Children due to their lack of awareness to protect themselves may end up in situation that endangers their life. In this paper, a system is designed to monitor the pickups and drop-offs of the school student while travelling through the school bus. The location of children can be tracked when the student's board into the bus by means of showing their RFID card which is kept at the door. The time duration for the student from home to the school will be specified. Once if the student doesn't reach the school within the specified time, the location of children is tracked using GPS and the corresponding information will be communicated to the parents through the SMS until the student mark their attendance in school.

Keywords---attendance, RFID, location tracking, system monitoring.

I.INTRODUCTION

Children safety is most important to their parents. Despite the best safety measures, children due to their lack of awareness to protect themselves, may end up in a situation that endangers their life (e.g. crossing the road without paying attention to traffic). 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. To improve transportation safety, some schools employ a bus supervisor to look after the children inside the bus. But it is not full safety for children. This paper presents a system to monitor the daily bus pick-up/drop-off of children to enhance the overall safety of the daily bus transportation to/from school. 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 within the specific time and also track the location of child, to reduce the parent's concerns about using the bus for the daily transport of their children without being lost or forgotten. This paper include automatic attendance management in school.

The rest of this paper is organized as follows. Section II reviews the most relevant work to the theme of this paper. In section III the overall system design is presented. Section IV gives a detailed description of system implementation and testing. Finally, section V concludes the paper.

II. THEME OF THIS PAPER

In the hurry world, parent's doesn't have time to pick up and drop the children from the school, so kidnapping and missing of the children increases. In the world scenario 72.8 % of children missing and kidnapping every year. Therefore children safety is important. And manual attendance manage is time consuming. Hence, this paper proposed to enhance the safety and monitoring the attendance of the students.

III. SYSTEM DESIGN

1. System Requirements and Design constraints

Our System is designed with the following engineering requirements:
- The system should recognize each child and detect when every child boards or leaves the bus.
- The system should have a database to store student's information.
- The system should be easy to re-configure.
- The communication should be reliable.
- The system should be track the location accurately.
- Children's information should be available for authorized personal.
- The system should not be harmful for child.

2. Description of proposed system

The system is divided into two main units: 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 or leaves the bus and information is send to the parents.

Fig.1: The Proposed System Architecture

The advantages of proposed system are:

- The system uses RFID tags for children detection which is not harmful since it uses frequency ranges that are safe and legally approved.
- The deployment cost is reasonable.
- The system is automatic and user friendly.

A. The Bus Unit Description

Bus unit uses RFID technology. This unit consists of a reader, tags and GSM. The student show their tag to the reader.The bus unit is responsible for sending relevant tag information to parent's.

Fig.2: The bus unit Architecture

B. The School Unit Description

School unit consists of reader, GSM. Once the student reaches the school and shows their tag to the reader message will send to the parent's mobile through GSM. In school unit system contains database about student detail, parent's mobile number, depend on the student presences and absence the attendance will found automatically.
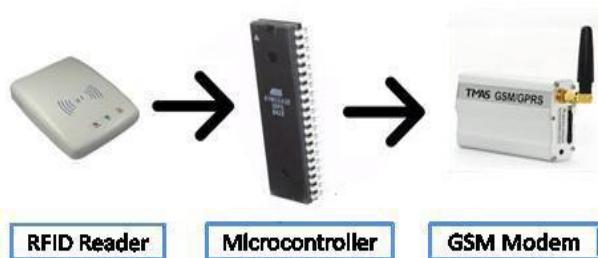
Fig.3: The school unit Architecture

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Student contain RFID tag, GPS, GSM. Once the student reach the school with the specified time the message will send to the parent, if the student does not reach the school with the specific time GPS detect the location automatically and send to the corresponding parent about the location.

IV. IMPLEMENTATION AND TESTING

The proposed system consist of PIC 16F877A, RFID, GSM and GPS. Once if the student boards the bus they have to show their RFID card into to enter into the bus. The time travel for the student to reach the school will be specified using the controller. The starting of the time travel will be indicated using the switch. Once if the student does not reach the school in the particular time then the GPS location of the student will get tracked down and the information will be given to the microcontroller and the concerned message will be send to the parents through GSM Modem. Also enhancing automatic attendance system in the school. Here, attendance of the student store automatically like a database, whether present or absent.

Block Diagram

The system consists of power supply, RFID tag, RFID reader, GPS, GSM, LCD, microcontroller, keypad.
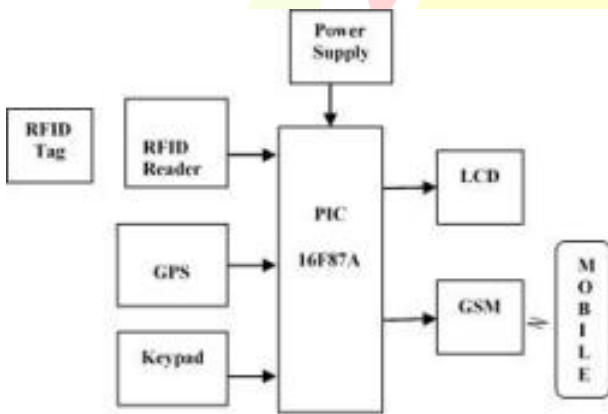

Fig.5: Block diagram of proposed system

Power Supply Unit

AC voltage of typically 230v RMS is connected to a transformer voltage down to the level to the desired ac voltage. A Bridge rectifier is used to convert the AC supply into DC supply. A regulator circuit can use this dc input to provide dc voltage that not only has much less ripple voltage but also remains the same dc value even the dc voltage varies somewhat, or the load connected to the output dc voltage changes.

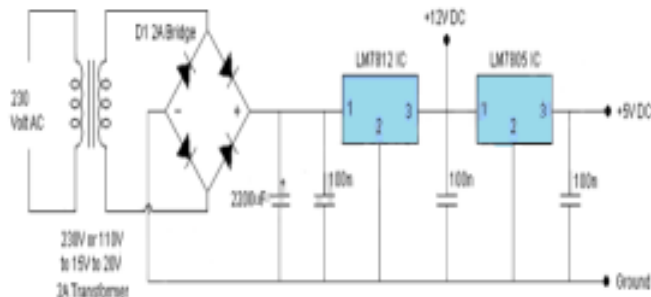A 5V power supply is required to operate the PIC16F877A and RFID Reader.

Fig.6: Circuit diagram of power supply unit

The given 230 V AC supply is step down to 12V AC using the using the step down ttransformer. The bridge rectifier are used to convert the AC supply into DC. The regulator LM7805 is used to produce constant 5V DC supply to operate the PIC16F877A microcontroller and Alcohol Sensor. The regulator LM7812 is used to produce constant 12V DC supply to operate the Relay.

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RFID TAG

Radio-frequency identification (RFID) is wireless use of electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. The tags contain electronically stored information. Some tags are powered by electromagnetic induction from magnetic fields produced near the reader. The RFID tag in this process is used as the unique identification for the user to get into the details about the student.

Fig.7: RFID tag

RFID READER

RFID stands for Radio Frequency Identification. RFID is one member in the family of Automatic Identification and Data Capture (AIDC) technologies and is a fast and reliable means of identifying objects. There are two main components: The Interrogator (RFID Reader) which transmits and receives the signal and the Transponder (tag) that is attached to the object. An RFID tag is composed of a miniscule microchip and antenna. RFID tags can be passive or active and come in a wide variety of sizes, shapes, and forms. Communication between the RFID Reader and tags occurs wirelessly and generally does not require a line of sight between the devices. An RFID Reader can read through most anything with the exception of conductive materials like water and metal, but with modifications and positioning, even these can be overcome. The RFID Reader emits a low-power radio wave field which is used to power up the tag so as to pass on any information that is contained on the chip. In addition, readers can be fitted with an additional interface that converts the radio waves returned from the tag into a form that can then be passed on to another system, like a computer or any programmable logic controller. Passive tags are generally smaller, lighter and less expensive than those that are active and can be applied to objects in harsh environments, are maintenance free and will last for years. These transponders are only activated when within the response range of an RFID Reader. Active tags differ in that they incorporate their own power source, where as the tag is a transmitter rather than a reflector of radio frequency signals which enables a broader range of functionality like programmable and read/write capabilities.

Fig.8: RFID Reader

Microcontroller

The Microcontroller is a small computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals. Microcontroller PIC 16F877A is used in this process. In this proposed system the microcontroller is used to receive the signal from RFID reader and the received data can be viewed using LCD Display.
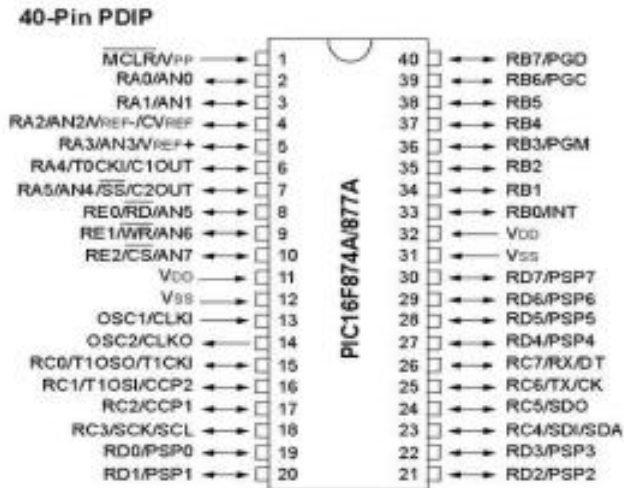
Fig.9: Pin diagram of PIC microcontroller

LCD

LCD is an electronic display module. A 16x2 LCD display module displays 8 bit. It contains 8 data pins along with 3 control pins. One ground two power pins are also there. D0-D7 used to send information to the LCD.
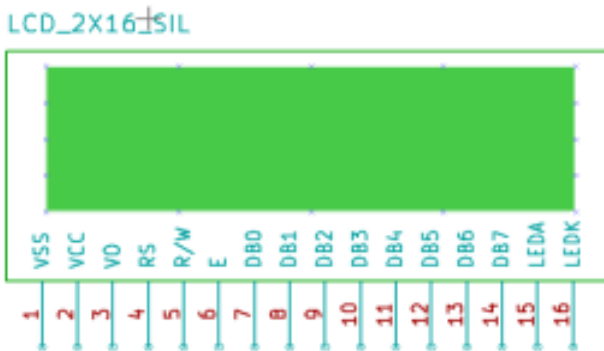

Fig.10: Pin diagram of display unit

GSM

The SIM 900 is a compatible Quad - band cell phone, which works on a frequency 850/900/1800/1900 MHZ and which can be used not only to access the internet, but also for oral communication (provided that it is connected to a microphone and a small loud speaker) and for SMSs. GSM solution in a SMT module which can be embedded in the application. It is an ultra-compact and reliable wireless module.
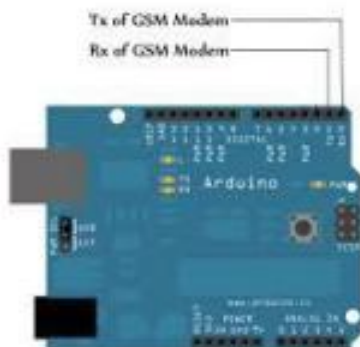
Fig.11: GSM

GPS

GPS is a satellite based navigation system. It uses a digital signal about 1.5 GHZ from each satellite to send data to the receiver. The user can then deduce its exact range from the satellite, as well as the geographic position (GP) of the satellite. The GP is the location on the earth directly below the satellite using line of position (LOP).

Fig.12: GPS

Attendance management unit

This paper also present the automatic attendance management system. Hear, stored the full detail of the children who are studied in the school like a database. It also describes the total attendance percentage of the every student. The system must capable to record student's attendance using generating reports.

V. CONCLUSION

This paper presented an RFID-based system that aims at enhancing the safety of children during the daily bus trip to and from the school. RFID-based detection unit located inside the bus detects the RFID tags worn by the children. It then sends, via a GSM modem, the relevant data to the system database server. The system checks and detects which child did not board or leave the bus and issues an alert message to this effect. In addition, the system checks the children attendance and updates the database.

It reduces the overhead in the compilation of attendance. With the help of this proposed model, one can easily monitor data from any remote location via SMS, there is no need of direct contact, internet or any kind of request send by user as it is push based technique.

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