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Enhanced Child Safety and Security Using IOT Intelligent System

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ABSTRACT

Technology is growing rapidly and providing all essential and effective solutions for every requirement. In recent times, child safety is an important area of concern. We have proposed a system is developed to provide maximum security and ensures child safety through the intelligent system using RFID technology. The system monitors the entry/exit of students from the bus using RFID reader and RFID tag. Sensors are used to sense the temperature, pressure and heart rate of the child, if any abnormalities are found SMS is sent to both parents and school management along with location details. In case of emergency Panic button is pressed and the child's location details and the situation is sent as SMS to parents and school management.

KEYWORD: RFID Reader, RFID Tag, GSM, GPS, LM35 sensor, IoT web page.

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INTRODUCTION

Currently, technology is growing rapidly and providing all essential and effective solutions for every requirement. Now a day's child security is a crucial area of concern. This model is developed to resolve the anxiety of parents regarding their child security. In this scenario, our system ensures maximum security and live tracking of the kids. The paper proposed a bus safety system which was designed to manage the entry/exit of the child from the bus. This technique completes many tasks which includes distinguishing individual data (Eg. Name). RFID (Radio Frequency Identification) tag, which may exchange the data with the RFID reader via radio waves, and displaying each student name into LCD display. this may let the driver to understand the number of children inside the bus and thus children who departed from the bus. Moreover, this technique ensures child safety through smart phones that provides the option to track the location of their children as well as in case of emergency children can send a quick message and its present locality by means of SMS.

In this proposed system we will measure a children's temperature for safety precaution and that we can track the location of children. additionally, it enhances the successful departure and arrival of the bus from the source to destination and can inform the management through an SMS. The key novel feature of the proposed approach is that the utilization of energy efficient systems to support the tasks. Though strictly within the scope, an equivalent data is used to assess the time of departure, arrival and count of children travels a day. School buses are the vital mode of transport for several children across the world. While there are many issues which can disturb the parents regarding the travel safety of school going children, the paper intends to introduce safety access in respect of school buses through bus tracking system which can help the school children's transportation during a very secure and safer way. The routine supervision of the children during their entry and exit from the bus is difficult to be controlled by drivers, which endangers the kid safety. Here, the advanced technology of RFID reader is employed to urge all the knowledge of children and ensures the children safety. Thus, this project will provide a dramatic change within the child safety in the busy and chaos world.

RELATED WORKS

¹Xin Xie, Xiulong Liu, Heng Qi, Bin Xiao, Keqiu Li – The existing systems has used RFID technology in various fields such as supply chain management, warehouse monitoring and inventory control. Geographical correlation-based RFID data collection (GRC) protocol is used in the existing system. GRC is fast because it approximately captures the sensing data of all tags.

²In this IoT device, GSM module is not implemented. Existing system uses WIFI to transmit message which is not reliable as Internet facility is not present this system anytime.

³The existing IoT enabled smart wearables has all kind of sensors, the abnormalities can be detected and notified. They device has to be charged frequently.

⁴In this paper R.C.Jisha, Aishwarya Jyothindanath, and L.SajithaKumary has published about The children missing issue and not coming in time to the home and going to school. To arrive in time the paper has proposed the IOT based school bus tracking and arrival prediction where all technology emerges through IOT and predict the time arrival of the bus to destination by an algorithm, it computes the timing. Parents can monitor through android application.

⁵The paper proposed by Ushashi Chowdhury, Pranjal Chowdhury, Sourav Paul, Anwasha Sen, Partho Protim Sarkar, Shubhankur Basak, Abari Bhattacharya says that the device will use SMS text enabled communication medium for secured communication. If a parent sends an SMS as “HEARTBEAT” then the device will reply back with the speed of heartbeat to the parent. Arduino UNO microcontroller is programmed with all these sensors.

MATERIALS AND METHODS

The ultimate moto of the project is to ensure the child safety and security using RFID technology. It also monitors the child’s health using various sensors (heart rate sensor, temperature sensor, PIR sensor). The proposed system uses RFID reader and tag to sense the child’s presence which also updates the attendance in the webpage. The system is connected with gsm and GPS module to notify the location and update the details through SMS.

The proposed system can also be implemented in the school buses which helps the parents to monitor their children. RFID along with GPS and GSM module helps in sending the message that when their child enters a bus and whenever he/she gets out of it.

Architecture

The Proposed paper work’s architecture is embedded with RFID, LCD display and various sensors which are used to sense various parameters.

The Proposed system has five modules,

- RFID Reader and Tag
- Health Monitoring
- Communication

- Indication of Emergency situations
- Storage and Accessing

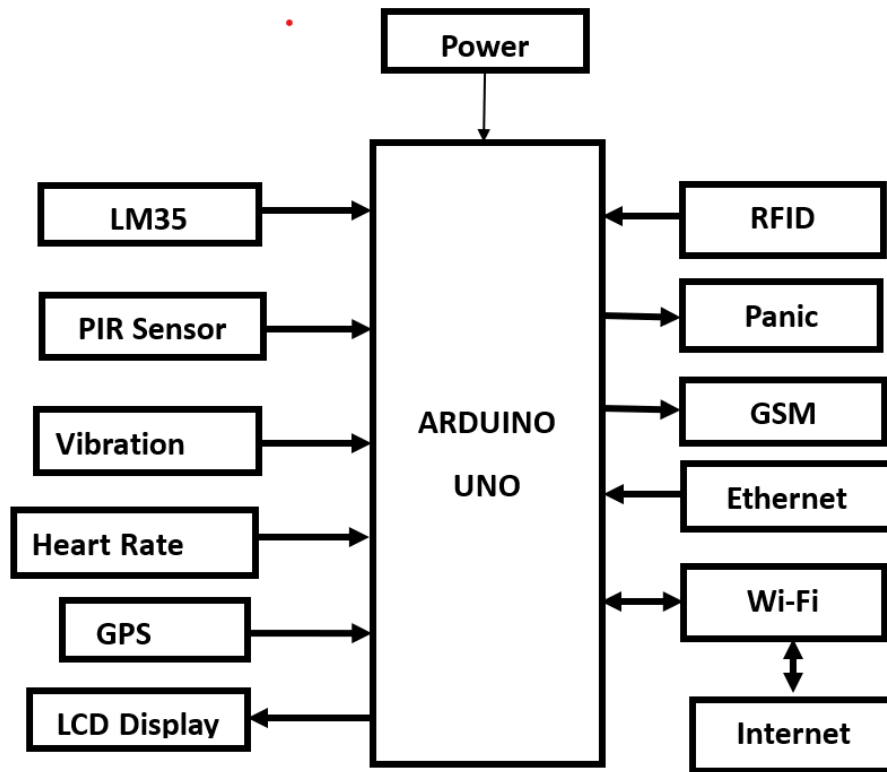


Figure1. Architecture Diagram

RFID READER AND TAG

This module is the most important module of the system. Here we use RFID Reader and Tag to note the presence of the child. The Reader is fixed in the bus which is used to sense the RFID Tag. Each student carries a card that contains registration number given in the school with their name, so once the student start entering the bus, he/ she has to keep the card. RFID reader which is placed near the entry of the bus will read the data, capture their names and display it to LCD. Those details will be updated in the IoT webpage.

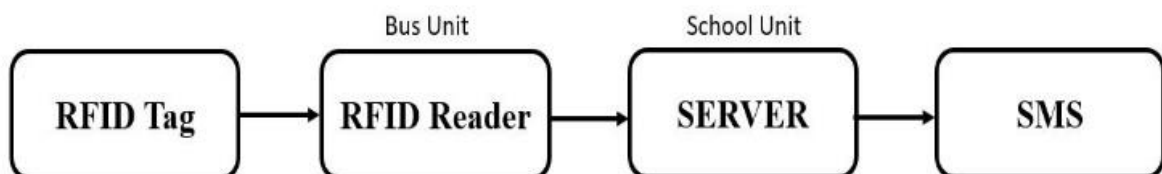


Figure2. RFID Reader and Tag

HEALTH MONITORING

The sensors that are embedded along with the RFID tag are

- ✓ Temperature sensor
- ✓ Heart rate sensor
- ✓ PIR sensor
- ✓ Vibrating sensor

These sensors will detect blood pressure, temperature, heart rate and vibrations. If any abnormalities (above the threshold value) are found, the sensors will detect and display it in the LCD. The Lm35 temperature sensor senses the body temperature of the child and checks whether it is normal which ranges between 33.5 to 36.9 °C (92.3 to 98.4 °F). If the range exceeds the abnormal condition is notified. These sensors will detect blood pressure, temperature, heart rate and vibrations. If any abnormalities (above the threshold value) are found, the sensors will detect and display it in the LCD. The Lm35 temperature sensor senses the body temperature of the child and checks whether it is normal which ranges between 33.5 to 36.9 °C (92.3 to 98.4 °F). If the range exceeds the abnormal condition is notified.

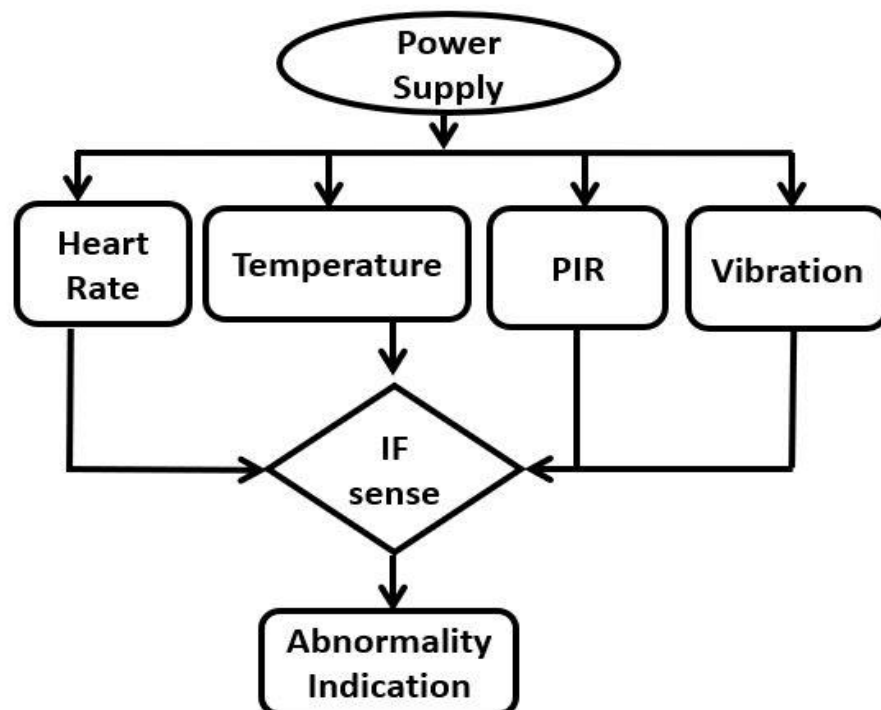


Figure3. Flowchart for Abnormality Indication

COMMUNICATION

Using the GPS, the location of the child will be detected. The entry and exit of the child in the bus will be notified as SMS using GSM module to their parents. When the child is not boarded into the bus the RFID reader detects and also the system to send SMS to parents and school management with the location URL of the child.

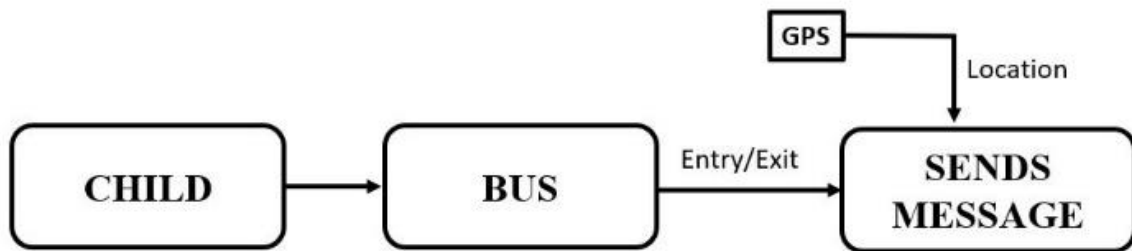


Figure4. Communication Module

INDICATION OF EMERGENCY SITUATIONS

Panic Button: It is an ordinary switch implemented in the school bus for emergency purpose like accidents, panic situation, and sexual harassment. It is used to notify that the situation is panic. It also sends the message to the school and, their parents and sends the location from GPS module so that they can take the necessary action.

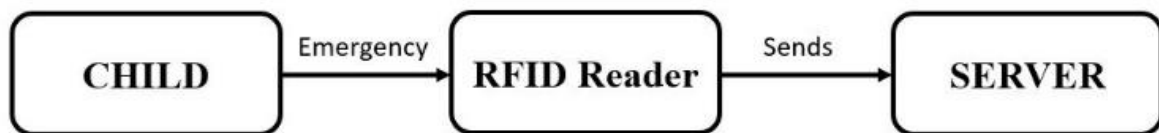


Figure5. Panic Button Module

STORAGE AND ACCESSING

The attendance details read by the RFID reader are stored and displayed in the IoT webpage. The attendance details can be accessed from it. The location travelled by the child, its entry/exit in the bus and the data sensed using sensors are also stored and accessed from the webpage.

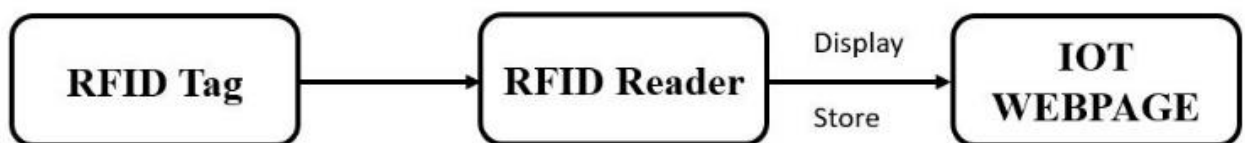


Figure6. Storage and Accessing Module

DISCUSSION

Designed an intelligent system using IOT which mainly focuses on child's safety and security during the travel towards the school from home and back. The above explained system gives a hope to the child's parent. The system uses RFID technology. Radio Frequency Identification (RFID) uses electromagnetic fields to automatically tracks tag which is carried by child makes the system reliable to check the presence of the child. As we have used Arduino uno which consists of a greater number of pins so that various sensors can be embedded easily.

CONCLUSION

We have proposed an IOT enabled intelligent system for child safety and security as well as to monitor the health of the child. to achieve the utmost safety and continuous monitoring of the kid, we use the radio frequency identification (RFID) system and sensors. GPS module helps the parents to locate and monitor their children. if any abnormal values are read by the sensors used, then an SMS is sent to the parents, school management. The longer-term scope of the work is to implement the intelligent system which ensures the whole solution for child safety problems.

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