

Enhance Safety and Security System for Children in School Campus by Using Wearable Sensor

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ABSTRACT :-The very precious assets of our nation are children . Unfortunately, crime against children has been increasing exponentially. The safety of school children can be maintained in a significant way with support of advance technology. There are several unfortunate incident which are continuously reported in the various media platforms about callous approach by particular schools in accordance to the safety of school children during entry and exit from the school . This events have resulted in major concern respected to the safety of school children. all over the world the children are abused and killed sometimes by the bad people those who are not in good attitude inside the school campus. To resolve and track such incidence and improved security system is required. Hence in this project an enhanced version of security system for children is proposed by using ‘Wearable Sensors’. In this proposed method two wearable sensors nodes such as ‘Staff Node’ and ‘Student Node’ are paired by using ‘GSM’ communication technology and Smart Watch technology is also used to transmit the necessary information to the security sensor or processing node to track the kidnaped childrens location and whether the two different nodes are moved away from the school premises . If the node of the child is inactive for a longer period then it may be notified to the centre and they will inform the issue to the security officers near the place. In the proposed method it may satisfy the school managements need about the staffs behaviour with the students and behaviour of students to avoid unfortunate incidents.In the proposed system there is implementation RFID and sensor technology for children safety and health condition monitoring. This implementation method will overcome the fear for parents in safety zone also health issue during in this pandemic COVID-19 situation.

Keywords – Arduino, Pulse sensor, Temperature Sensor, RFID Tag, RFID Reader, GSM,GPS, Mobile, UART, Buzzer, Power Supply, Arduino

ide.

I. INTRODUCTION

This project is aimed to build a system which can notify the Parent about their Child’s status by using RFID and GSM technology. Radio Frequency Identification (RFID)Card Readers provide a low-cost solution to read passive RFID transponder tags up to 2 inches away. The RFID card reader read the RFID tag in range and outputs unique identification code of the tag at baud rate of 9600bps. The data from RFID reader can be interfaced to be read by microcontroller or PC [5]. The proposed system ensures that a child is safe while commuting from their home to school or vice versa. Parents will be informed when the child enters and leaves school. This information is also stored in the school’s database. For children who walk to school a safe zone is defined, if the child leaves the safe zone an alert is sent to the parent’s mobile phone. At any given time, the parent can check the location of the child using GPS.[7] This GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. The modem can either be connected to PC serial port directly or to any microcontroller. This project is built on PIC micro controller which is interfaced with RFID and GSM module. An LCD is also interfaced in the project which displays the status of the system.[1]

II. LITERATURE SURVEY

Affordable Smart ECG Monitoring Using Arduino & Bluetooth Module-2019. **Mohammed Mahmudur Rahman,Md.Azizul Hoque Rimon, Muhammed Armanul Hoque,Md. Redwan Sammir.**This project uses some sensors and Arduino to design and implement the Affordable Smart ECG Monitoring System.ECG monitoring is now becoming part of everyday life.Bluetooth is limited distance(below 10M) communication medium.In School,we need some other technology

to communicate between students and parents or teachers.[2]

A 1-V CMOS Low Power Resistor Based Temperature Sensor for Human Body Temperature Monitoring-2019. **Nutcha Rajit and Apinunt Thanachayanont**. This paper describes the design and realization of a CMOS fully integrated low power resistor based temperature sensor for human body temperature monitoring application. In this temperature sensor, you need a signal generator, filter, comparator etc. so device size will be large, it cannot be wearable and also it can find out only limited temperature only.[3]

Zhuanghao Si* ,Wei Wei ,Weijie Feng, Bisong Li-2020. **Zhuanghao Si * ,Wei Wei, Weijie Feng, Bisong Li**. This paper designs a wireless + wired underground safety monitoring and management solution to complete real time monitoring and safety management of underground mobile personnel and production equipment. For communication here they use Zigbee technology, but Zigbee cannot connect with mobile

phones and need a computer for getting information through Zigbee.[1]

III. WORKING MODULE

In proposed method we develop a safety system for school children. RFID Tag will be fixed in the wearable band of a student and the signal transmitted from which will be received in the school campus unit which is an RFID reader and it will be monitored in the server which is present in the school unit. Their position of child tracked through GPS and sends to their parents during on entering and exit of the child in School. We proposed a bio sensor for this pandemic COVID-19 situation for monitoring the student's health condition, we place temperature sensor and pulse sensor. If children body temperature goes abnormal or pulse level meets below required level immediate intimation sends to teacher and parents mobile through GSM.

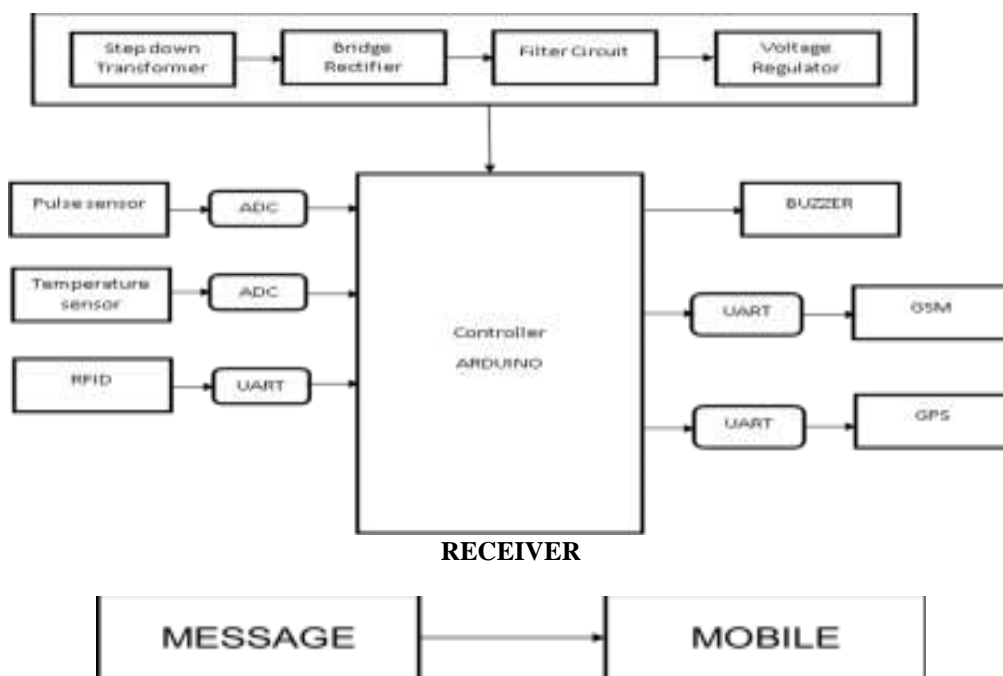


Figure 1: Block diagram of safety and security system.

IV. COMPONENT REQUIRED

Components are explained below,

1. ARDUINO --The **Arduino Uno** is a microcontroller board based on the ATmega328. It has 20 digital input/output pins (of which 6 can be used as PWM outputs and 6 can be used as analog inputs), a 16 MHz resonator, a USB connection, a power jack, an in circuit system programming

(ICSP) header, and a reset button.[4]



Figure 2: Arduino.

2. PULSE SENSOR --Pulse Sensor is a well-designed plug-and-play heart-rate sensor for Arduino. The sensor clips onto a fingertip or earlobe and plugs right into Arduino with some jumper cables. It also includes an open-source monitoring app that graphs your pulse in real time.[6]

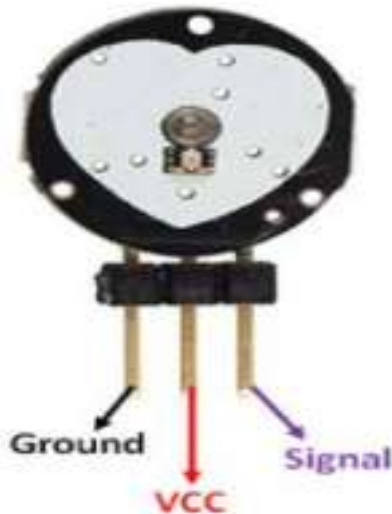


Figure 3: Pulse sensor.

3. TEMPERATURE SENSOR --A temperature sensor is an electronic device that measures the temperature of its environment and converts the input data into electronic data to record, monitor, or signal temperature changes.[3]

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Figure 3: Temperature sensor.

4. RFID TAG --RFID tags are a type of tracking system that uses smart barcodes in order to identify items. RFID is short for “radio frequency identification,” and as such, RFID tags utilize radio frequency technology. An RFID tag may also be called an RFID chip.[5]

5. RFID READER --A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader. RFID is a technology similar in theory to bar codes.[5]

6. GSM -- GSM is the most widely accepted standard in and it is implemented globally. GSM is a circuit-switched system that divides each 200 kHz channel into eight 25 kHz time-slots.[1]

7. GPS --The Global Positioning System (GPS), originally Navstar GPS, is a satellite based. The description above is representative of a receiver start-up situation.[7]

8. UART -- Universal asynchronous receiver-transmitter (UART) is one of the simplest and oldest forms of device-to-device digital communication.

9. BUZZER --A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.



Figure 4: Buzzer.

10. ARDUINO IDE --The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board. Refer to the getting started page for installation instruction.[4]

V. IMPLEMENTATION AND RESULTS KIT PHOTOGRAPHY:

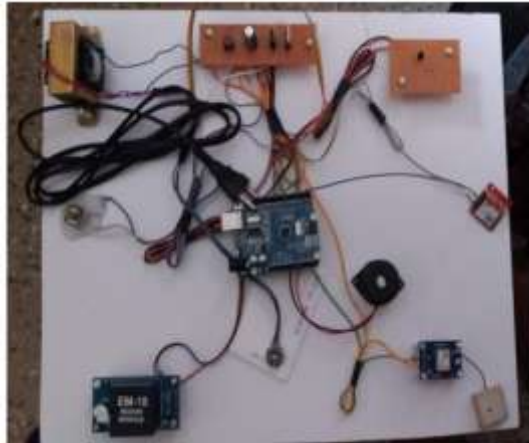


FIGURE 3: Working of Safety and Security System for School Children.

WORKING --The system develops the safety system for school children .RFID tag will be fixed in the wearable band of a student and the signal transmitted from which will be received in the school campus unit which in an RFID reader and it will be monitored in the sensor which is present in the school unit.The position of child tracked through GPS and sends report to their parents during on entering and exit the children in school.

RESULT -- Result of the design works that were carried out in this project.At the end of the design unconstruction, the system was tested to ensure that it meets the desired stated objectives and specifications that guided the entire project work.

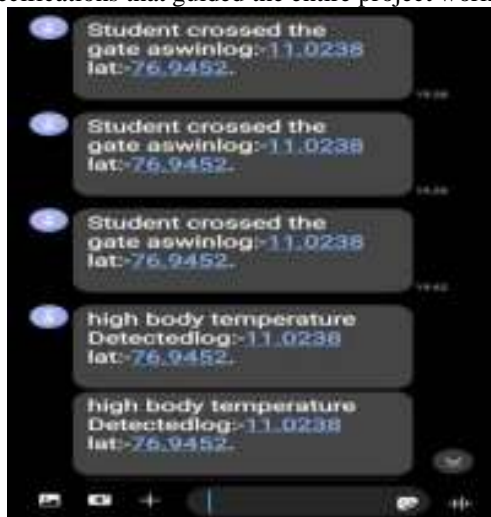


FIGURE 4: Screenshot of Output Messages

VI. CONCLUSION

This project of children security and tracking system using GSM and GPS technology

has been successfully developed. The result and analysis of the data obtained from the project testing have been carried out that this project has achieved the objective and the purpose of this project being developed. This device can help parents to track the location of their children. This device can send the message through the GSM to the mobile phone when the any abnormalities found. The GPS module gets the coordinate of the device and sends into the smartphone by using SIM900A GSM module. This GSM module can send the message that contains coordinate. This device can be used easily to the parentsto help them find the location of their children.

VII. FUTURE SCOPE

Future scopes include Geo-fencing that sends SMS alerts when bus nears a pick-up/drop-off point, Active RFID tags, camera for live monitoring installed in the bus connected to the server and Android application linked to the database for a user-friendly experience to parents and school authorities.

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