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Implementation of Student Safety System using RFID and GPS

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Abstract: ***Recently, crime against children is increasing at higher rat and it its high time to offer safety system for the children going to school. This paper presents a system to inform parents about the status of their children. The system checks and detects which child enters the wrong bus and issues and alert message to this effect. In addition to this GPS receiver gets the location information from satellites in the form of latitude and longitude. And also Emergency Button to protect the children. Human kidnapping is a shame on Humanity. As per the report of Human Rights commission of india over 40,000 children are reported missing every year of which 11000 are untraced. Another statics report saying 80% of human kidnapping is done for sexual exploitation and rest is for bonded labors. sex traffickers often find pray as children because not only children are vulnerable than adults, but there is a high market demand for young victims. Traffickers target victims most often after school programs. It is painful truth that india is considered as a hub for human trafficking in Asia. Even though it is difficult to eradicate the shame on human society, Here is a small initiative to reduce child trafficking by providing a child safety system. Apart from child security, as a Parent we have to consider and contribute in child education too. There is an ample amount of gap between Parent-Child-education-Teacher. Parents have no clue how to contribute to their child education. How to bring focus to child in education and life. Vital factor of this is parents are busy with their job and no-time to care of their child, in the other hand as a teacher it is difficult to do individual care for student they hold. In olden days the teacher and student ratio will be minimal but it is not the same case now. This leads to minimal interaction between students and teachers. The focus of this project is to deploy security in hotspots like School, Home, Tution centre and also in school buses or students own vehicle or bicycles etc. These system comprse of RFID/NFC communication enabled smart Id card and a child safety device(CSD). The CSD is the combination of most commonly used technologies like GPS/GSM and RFID. The device communicates with the service via GSM.CSD helps to track the student on daily buses and report the parents about his/her activity. It is a combination of GPS and GSM provides the information about the student to parents with the help of CSD and smart cards.***

Keywords: RFID (Radio Frequency Identification), Bus alert system, GSM modem (SIM800L), Buzzer, Arduino, GPS modem

I. INTRODUCTION

The recent scenario shows that humans are discovering new methods which will reduce child kidnapping and increase comfort. In developing the country child security and monitoring child activity is difficult task to accomplish. Nowadays, parents are worried about their children because of the high rate of kidnapping. Moreover, Parents are having long working hours, so they simply do not have as much time to spend for their children Moreover, they will be proceeded by kidnapper before they enter the school. So, it is the responsibility for the school to take care of their students and they also know In-time and able to send an alert message to their parents if the students are not at the school start time. However, it is not easy to do manually. The school authorities cannot check their students individually and cannot send an alert message to their parents.so, the suitable solution for this problem is by designing a system that will alert the students such as ringing buzzer of the student enter the wrong bus. Moreover, An automatic SMS sending system will be needed to send SMS if their children entered the wrong bus.

Latest Technologies enabled advancement in mobile device, Hand full of device available to take and monitor a child. But cost effective systems are very few. To achieve a milestone of the combining cost effective and richer features for general consumers the CSD fulfills the gaps. CSD provides the basic information of students location and helps in monitoring presence of child in hotspots. There are several applications available addressing the security for children's and women's. But with access privilege with smart Id card is unique.The combination of this RFID to serve the society to built a bridge between Parents-Student-Security.

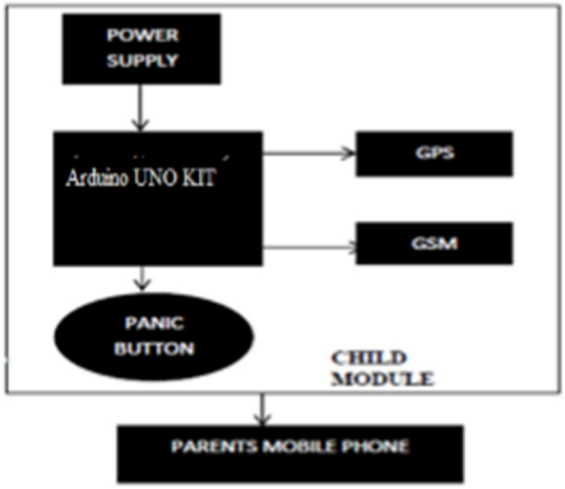


Fig 1: The Proposed Student Safety System

II. SYSTEM ANALYSIS

A. Proposed system feature

In this paper the designed model of children safety satisfies the requirements of human beings in today's world. The main advantage of our model is flexible i.e., we n know the exact location based on latitude and longitude values easily.we can also use the emergency button in any emergency situations this button which is used to provide the safety of children. And all these messages can be viewed on mobile phone. To control all these we are using Arduino , RFID, RFID READER, GPS Receiver and GSM module. In present world parents are busy with their job the main advantage is to know all the information about their children when the child step into bus and the child step down bus with exact location message by simply on mobile phone. It is 100% efficiency as it saves time to parents ,helps to know if the child is in danger situation the parents get the exact location in the form of message to mobile phone and can provide security to the user making the child safe.

B. Network Architecture

Fig 2: Network Architecture

The RFID card will be read by the RFID READER then the reader checks the code and compare the cards data stored in the GSM module which will be in the Bus the radio waves from reader will be sent to Arduino from Arduino transmitter to GSM receiver then it will display on mobile phone from based on SIM card tower. From GPS Module to GPS Receiver then by using trilateration method we receive latitude and longitude values and it will display on LCD and also in the mobile phone when the person is in danger condition also SMS will be displayed in mobile phone.

III. SYSTEM DESIGN AND IMPLEMENTATION

A. What is smart ID card

Using a biometric devices like fingerprint authentication, Retina scanning, password protection are most commonly used technologies but in this project we are mainly focusing on school going child's. We provided a Smart Id card, the card is enabled with Radio Frequency Identification Device chips in it. Tagging school children with RFID chips is uncommon.

Fig 3: The RFID based Unit

B. What is Child Security Device (CSD)

This is the device implemented with components like RFID,RFID READER,GSM Module, GPS Module, Which is connected with the Arduino to fetch the unique data from the Smart Id card and convert into Hexagonal number, which is sent to the Raspberry This device is connected with local intra net of the school or tution centre. The entry and exit of the student is calculated with the Time and status of entry, while swiping the smart card towards the CSD. Each swipe of the card the GSM Module will sent the data of alerting about the student to parents and guardians. This CSD will be implemented in buses and tution centres. The device itself will act as the local sever system if it is enabled with connectivity. Which helps in child tracking and monitoring too. when the student in danger situation also it tracks.

C. Flow chart of the Bus Unit

In this flow chart we also initialize the I/O ports. Firstly, attendance is stored to the temporary table. To determine the absence list by matching student list with attendance list in bus.

Firstly we initialize the I/O ports. Next, the controller will read the student list stored on SD card. Then, the reader read the tag ID. Data is sent to controller device in byte form. The controller will check if read tag ID is matched with the student list stored on SD card. The buzzer will alarm if the ID matched, and send an alert message to parents.

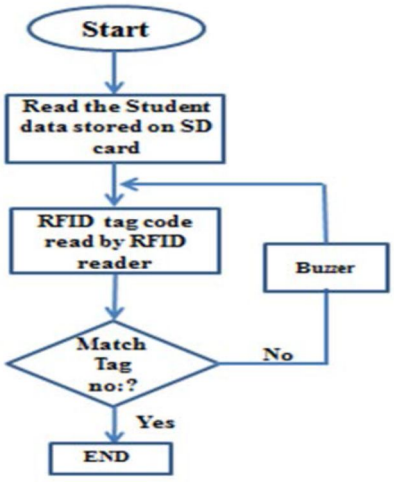


Fig 4 :The Flow Diagram of the bus unit .

The CSD serves the society for Child Security and helps the parents to get information in one touch using mobile device. The system includes RFID,GSM and GPS for uniqueness to communicate between devices. The proposed system helps to bridge between the child and parents with timely updates on Child location,tracking and safe zone messages.

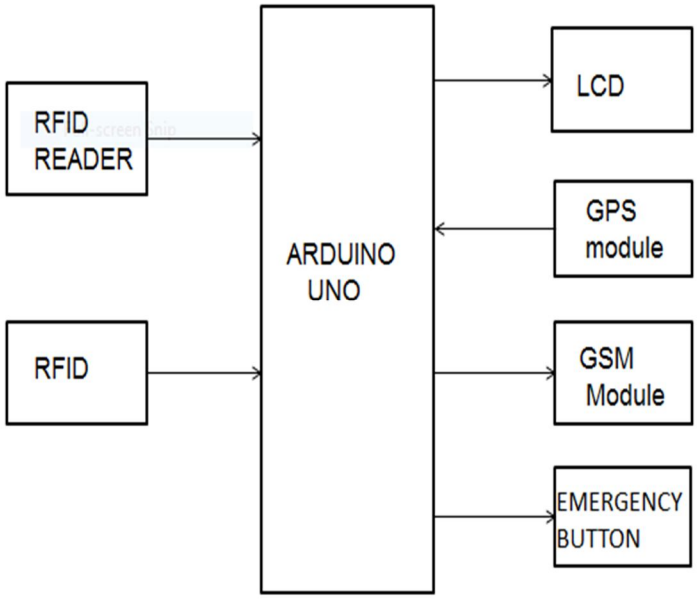


Fig 5: Functional Block Diagram

Overall,system comprise of a mobile application and child security devices along with smart Id cards.All these components are directly or indirectly connected to each other with help of network technologies.
Technologies namely RFID,RFID READER,GSM/GPS,are widely used to achieve the security of children.

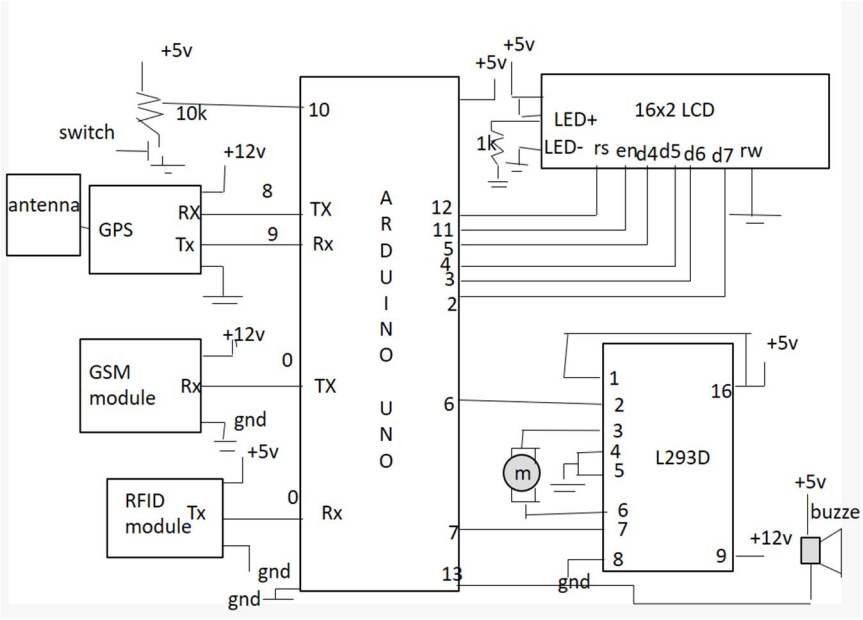


Fig 6: Basic Block Diagram of Implementation of Student Safety Using RFID and GPS

The full description of this project is shown in Fig.6.Here we are using step down transformer and rectifier which is used tp convert alternating current into pulsating direct current. For the controlling of voltage regulator is used. After connecting the hardware design by using RFID controlling the student safety system.Based on GSM the Latitude and Longitude values and also emergency SMS will be send as SMS mobile phone.

D. Implementation Setup

Here we have designed an Experimental setup for student safety system using RFID and GPS asa shown in Fig7.we have tested in our experimental setup.This Experimental setup is working accurately without any error

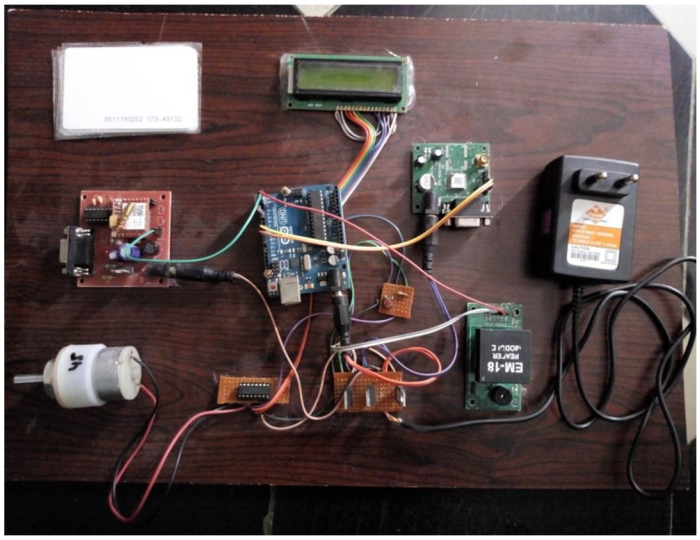
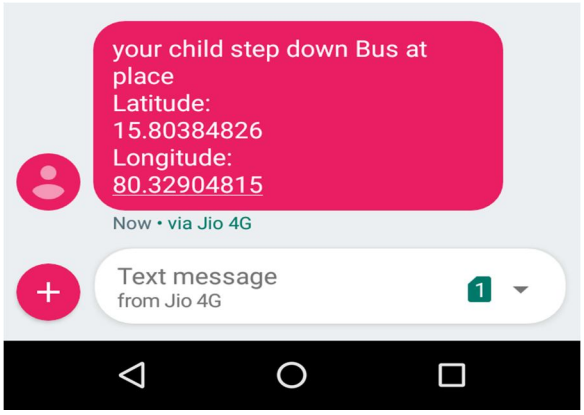


Fig 7: Experimental Setup

Lets have the detailed explanation of each and every components involved in the system.

E. GSM Module

The GSM Module is connected to the Arduino .This GSM is a type of modem that accepts SIM card,and operates through a subscription to a mobile operator.it works like a mobile phone for sending and receiving SMS through radio waves. The microcontroller contain the AT commands, written in C, for sending SMS. The code was verified using a terminal program to ensure that microcontroller sent the correct AT commands to GSM modem. It is also responsible for notifying the students in case of emergencies by sending SMS to parents.The SMS will be seen in mobile phone which is shown in below figure.

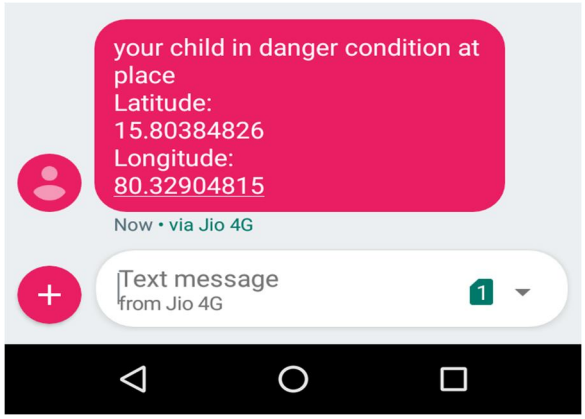


F. GPS Module

Latest Technologies enabled advancement in mobility devices,handful of devices available to track and monitor a child. But it is the cost effective systems and give accurate value of child place.

G. Emergency Button

Lets consider a situation of child missing, In case of chid not found in the appropriate hotspots on certain time period,CSD will involve a buzz to intimate the student in emergency situation to parents. The Buzz contains the message of saying from where it is triggered and information about the child name and place. If suppose, a child is found in sttreets normally peoples will inform to the school or police station with the information provided in the school Id card the card fetches the GPS location and other basic information from the device to parents,guardians. It helps locating the child in Emergency situation.



IV. CONCLUSION

In This project we implemented an alert if the children enter the wrong bus.RFID-based detection unit located inside the bus detects the RFID Tag worn by the children.The system checks and detects which child enter the wrong bus and isuues an alert message to parents.In addition to this the GPS exact location of the children when student step down bus at place is send as SMS.We believe that promosing foundation by utilizing the mobile technologies to know the student going to school or not by this parents are contributing in child education too.

In this project we presented a new feature incorporated into Child safety system that enables social contribution. In an emergency situation the emergency button will sends out emergency messages and your last location in just one click!Emergency button is necessary tool to protect your children,parent,guardians and anyone you care.

V. FUTURE WORK

We believe that not only the security about a school child is concern which leads to the Gap between parent,Child and Teacher.Another important factor affecting the relationship between these entities are studies.how to contribute in a child education is a ultimate question in parents mind.To solve that issues we are planning to incorporate the Learning Management System and Learning record storing in the system. Which helps the parents to better understanding of child education too. LRS helps in capturing in learning activity of a student which helps in providing a better support and guidance.And also we are able to track the student anywhere at any time

The feature is planned to enhanced with sending pictures and Video clips of the location where the child found. Which gives detailed information about the location and situation to the parents and teachers and also finding the location of person at all the time.

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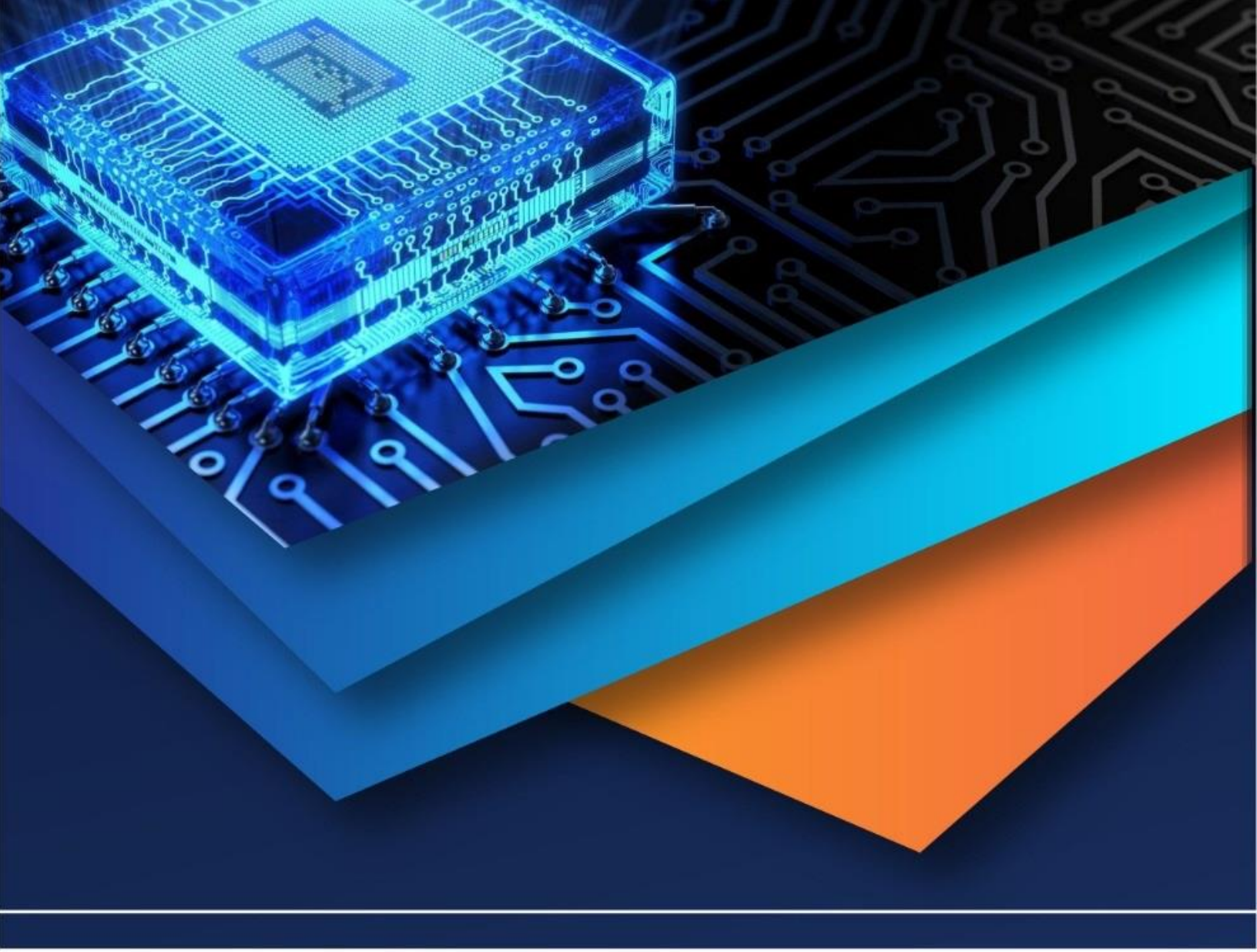

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