Child Tracking Device

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Abstract- **This paper deals with the tracking device which can be worn by the children. This device does not need any expensive technology and it is user friendly. Both educated and uneducated people can use this device effectively. The main purpose of this device is to trace the location of the child in an easy manner. The child can also send alert message along with their location to their parents. The existing devices use Bluetooth and Wi-Fi for communication. As these two technologies cover only a short range, the communication over the far area is highly impossible. This device uses SMS based technology to overcome this problem. To know the latitude and longitude of the child's location the parents are not in the need of sending any specific code to the device. If they press the key they can receive the SMS. There are two ways to alert the parents and neighbors if the child feels insecure. The alert message is send to the parents or guardian mobile via SMS and the buzzer is activated. It indicates that the child is in danger to the by passer. Hence this paper makes the parents to know the location of their children and their safety.**

Keywords- SMS; Wi-Fi; Bluetooth

I. INTRODUCTION

Embedded system is a computer system with specified functions within large devices with real time computations. It is the combination of both hardware and software. Embedded systems play a vital role in the development of technologies. The integration of hardware and software can be used in many fields such as industries, automobiles, medical and other commercial applications especially in the field of automation. One of the main driving forces to start this wearable device is that the children are more vulnerable to danger and they are frequently kidnapped. In this modern world everyone are chasing behind money so that the parents cannot look after their children on the whole day and also they cannot restrict the children to stay inside the confined area. So for the continuous monitoring of the children's location this device can be used. If the child is missed in any crowd then they can also alert their parent and neighbors. The devices present in the present world to monitor the location and activities of the children uses Bluetooth and Wi-Fi. These are the main drawbacks as these technologies cover only a small coverage area. To reduce these shortcoming SMS (short message service) is used to provide reliable communication. The platform on which the project runs is Atmel89s52 microcontroller. The sending of latitude and longitude information to the parents can be achieved using GSM (Global System for Mobile communication) module. The exact coordinate points can be found using the GPS (Global Positioning System).

The other improvement in the system is that the device is user friendly and the parents are not in the compulsion to remember any particular code just by pressing the key the position can be found. The buzzer in the device is to indicate the presence of missing child in the crowd or to show that the particular child is in danger to the by passers. This device can be made into wearable form like watch and wristband so that the children can use it in an efficient manner.

This device consists of two modules. The first module is with the parents. It comprises of RF transmitter and key which are connected to the battery. The second module is the child module and it is the rest of the device. It comprises microcontroller, emergency key, GPS, GSM, buzzer and LCD display. The LCD display is used to indicate the operation that the device performs. Thus the main objective of this paper is to help the parents to easily track the location or rescue their children when they are in danger.

II. SYSTEM DESIGN AND ARCHITECTURE

The following section deals with the child and parent module of child tracking device.

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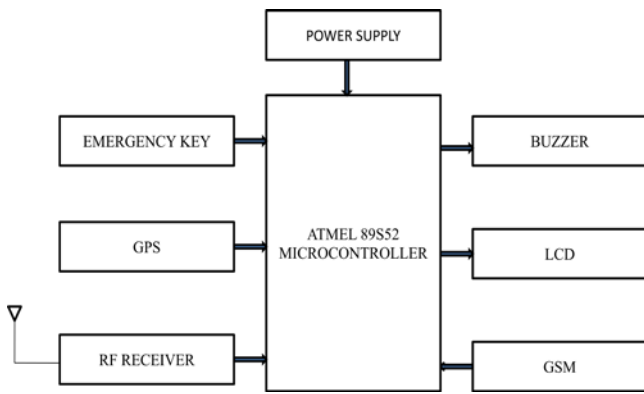**ISSN: 2278-0181**
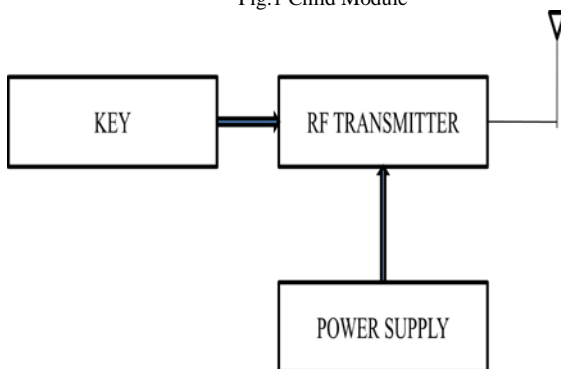**RTICCT - 2018 Conference Proceedings**

Fig.1 Child Module

Fig.2 Parent Module

III. SYSTEM OVERVIEW

The system is controlled by ATMEL89S52 microcontroller. The power supply is used to provide +5V to the microcontroller and RF receiver and +12V to GPS and GSM. The GPS module is being triggered by the GSM shield [1]. The GSM shield is used as an interface to send the data received via SMS to the phone over GSM/GPRS [1].The GSM is connected to the pin 1 of port 3 and GPS to the pin 0 of port 3. The RF receiver is connected to pin 3 of port 1 and it is used to receive the signal from the parents. If the key is pressed by parent or child the GSM stimulate the GPS to obtain the location and the SMS with the latitude and longitude of the child is sent to the parent mobile. The parents can make use of the coordinates to find the location of the children and the distance between them. The additional key factor is the activation of buzzer by the children. This helps the parent to identify the children in the crowd. The LCD data pins are connected to the entire port 2. The use of LCD is to display the present working condition of the device.
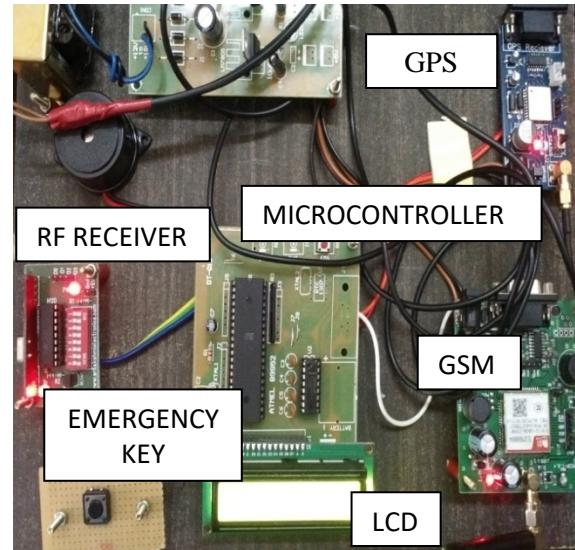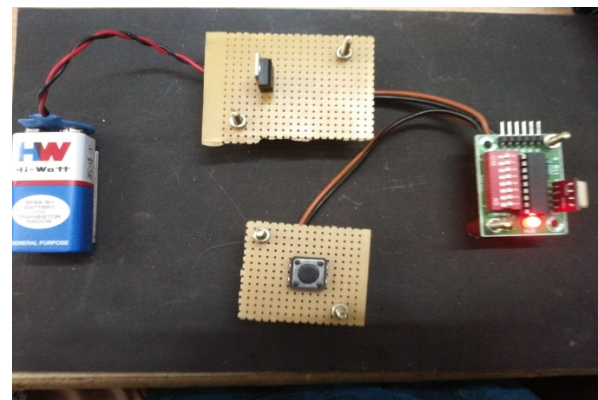

Fig.3 Proposed Child Module

Fig.4 Proposed Parent Module

1) Microcontroller

The microcontroller used in the device is ATMEL89S52. It is a 40 pins microcontroller working in the voltage range of +4V to +5.5V. It is low power, high performance device which can be reprogrammed many number of times. It consists of four ports and they be used for dual purpose. One is for input/output operation and the other is to sense the externally connected sensors or switches. The RF receiver, GPS and key gives input to the microcontroller. The output is displayed in LCD, activation of buzzer and the SMS is send via GSM. The microcontroller is connected to the +5V power supply. The ATMEL89S52 is programmed using Embedded C. The controller works based on the programs.

2) GPS Module

The location of the child can be found using the GPS SKG13BL module. It has super sensitivity with small form factor of 15x13x2.2 mm. The GPS is connected to the 0th pin of port 3. The GPS module receives location information from the various satellites present in the NAVSTAR (American Satellites Timing and Ranging Global Positioning System) GPS system [1]. The obtained GPS signal is given to the antenna input of the module the entire data message in serial format is presented at the

serial interface with custom protocol or National Marine Electronic Association (NMEA) protocol [1]. It is powered by +12V. The GPS module is connected to the 0th pin of port 3 in microcontroller.

3)   RF Transmitter and Receiver

Radio frequencies are used mainly because of the following reasons. It does not require the Line Of Sight for communication and it has a wide range of operating voltage. The RF transmitter and receiver module is made with HT12E and HT12D. It operates normally in 433 MHz RF frequency. The carrier frequency is fully suppressed and the transmitter draws no power when the logic 0 is sent. The carrier is about 4.5mA when the logic 1 is sent. The transmitter sent the data in the serial way and it is received by the tuned receiver. The RF transmitter is used to send the signal from parents that they need to know the location of their children. The receiver receives the signal and triggers the GPS and GSM to send the latitude and longitude of the children to them via SMS.

4)   Emergency Key

The emergency key is associated with the child. If they feel insecure or lost in the crowd they can activate the buzzer by just pressing the emergency key. Once the key is pressed the location is sent to the parents. This helps the parents to find the children and rescue them if it is necessary.
 The parent also has the key with them. When this key is pressed the RF transmitter transmits signal which activates the child module and in turn the location of the children is obtained.

5)   GSM Module

The GSM Module used is SIM800A. It is interfaced to microcontroller via RS232 which is used to convert the serial data to TTL logic. This is needed because the microcontroller can work only with TTL logic. The primary reason for using the GSM shield as the mode of communication over Wi-Fi and Bluetooth was that this device was aimed at being accessible to any cell phone user and not necessarily an expensive Smartphone user [1]. It is user friendly so there is no need for the parent to learn about new technology.

6)   LCD

   The LCD used to display the function of the device is 16x2 LCD. 16x2 represents it can display two lines. Each line can hold 16 characters. The LCD contains command and data registers. If the value of RS=0 then command register is activated and RS=1 data register is activated. The address 0x40 to 0x47 contains the first character and prints it to the screen by sending 0 command and the address 0x48 to 0x55 contains the second character and it gets printed when command 1 is given to LCD.

IV. RESULT

Steps were taken to confirm various components are working in a correct way.

A.   Microprocessor

The microprocessor is stimulated using PROTEUS8.1 software. The Proteus stimulates the microcontroller by applying Hex file to the microcontroller part. It does not need any hardware for simulation.
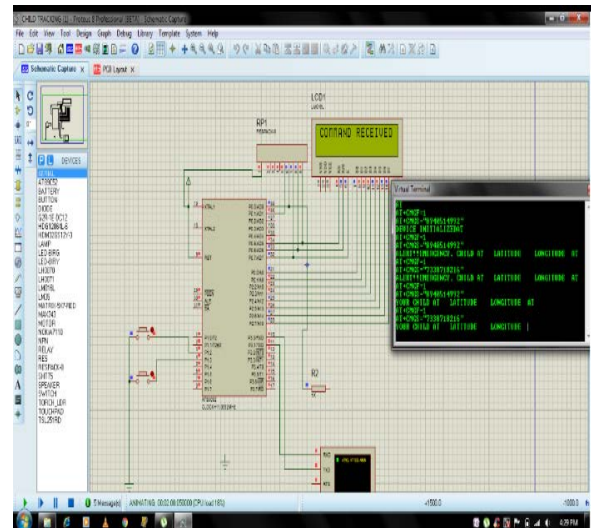

Fig. 5 Stimulated Output of microcontroller.

B.   GPS SENSOR

The GPS sensor was tested many times and it displays the coordinates that is latitude and longitude is sent and displayed in LCD in a correct way. The parents can use the latitude and longitude values in Google map to find the exact position of the child. The SMS is sent to parents within a minute. Both the parents and child can able to trigger the GSM module to send the exact location.

Fig.6 LCD displaying longitude value of child.

Fig.7 LCD displaying latitude value of the child.

EMERGENCY...
THE CHILD IS AT:
LATITUDE: 11.20.7097, N
LONGITUDE: 77.43.2668, E

Fig. 8 SMS send to parent mobile

C.   Buzzer

When the child presses the key the buzzer is activated along with sending the location to parents. The sound of the buzzer can audible to nearby passers so that the child can be rescued in an easy manner.

V CONCLUSION

This Child Tracking Device can be used to obtain the real time location of the child by parents. The location can be send to desired number of users. The alarm can indicate the discomfort of the child and the persons near them can help the child. This device uses SMS based technology so the parents are able to use it more efficiently. In future this device can be improved in battery life time. The camera can also be attached so that the accurate environment where the child lies can be monitored by the parents.

VI ACKNOWLEDGEMENT

VII REFERENCES

[1] Child Safety Wearable Device (IEEE 2017, Akash Moodbidri, Hamid Shahnasser)

[2] End to end safety solution for children enabled by a wearable sensor vest(*Journal of Ubiquitous Systems & Pervasive Networks,2015, Mirjami Jutilaa, Pekka Karhulab*)

[3] B. Dorsemaine, 1. P. Gaulier, 1. P. Wary, N. Kheir and P. Urien, "Internet of Things: A Definition and Taxonomy," Next Generation Mobile Applications, Services and Technologies, 2015 9th International Conference on, Cambridge, 2015, pp. 7277.

[4] WSN/RFID architecture for children monitoring (*Real-Time Systems and Networks Laboratory   Kore University of Enna,Giovanni Pau, Gianfranco Scata*)

[5] Implementation of child tracking system using mobile terminals (*International Journal of Advanced Research in Computer Engineering & Technology (IJARCET), 2015*)

[6] H. Moustafa, H. Kenn, K. Sayrafian, W. Scanlon and Y. Zhang, "Mobile wearable communications [Guest Editorial]," in IEEE Wireless Communications, vol. 22, no. 1, pp. lO-l1, February 2015

[7] "Digital parenting: The best wearables and new smart baby monitors. The latest smart baby monitors and connected tech for your peace of mind,'Tech. Rep., 2015.

[8] K. Braam, Tsung-Ching Huang, Chin-Hui Chen, E. Montgomery, S. Vo and R. Beausoleil, "Wristband Vital: A wearable multi-sensor microsystem for real-time assistance via low-power Bluetooth link," Internet of Things (WF-IoT), 2015 IEEE 2nd World Forwn on, Milan, 2015, pp. 87-9l. doi: 10.1109/WF-IoT.2015.7389032

[9] "Digital parenting: The best wearables and new smart baby monitors. The latest smart baby monitors and connected tech for your peace of mind,'Tech. Rep., 2015.

[10] F. A. Silva, "Industrial Wireless Sensor Networks: Applications, Protocols, and Standards [Book News]," in IEEE Industrial Electronics Magazine, vol. 8, no. 4, pp. 67-68, Dec. 2014.

[11] PankajVerma, J.S.Bhatia "Design and development of GPS and GSM based tracking system with Google map based monitoring", International journal of computer science engineering and applicationJune'2013.

[12] Jang H, Choe SP, Hwang I, Hwang C, Nachman L (2012) Rubber Band augmenting teachers awareness of spatially isolated children on kindergarten field trips. In: Proceedings of the 2012 ACM conference on ubiquitous computing.

[13] Kim J, Kim K, Park J, Shon T (2012) A scalable and privacy preserving child-care and safety service in a ubiquitous computing environment. Adv Theory Pract Cryptograph Future Secure 55(1–2):45–57

[14] Peng Wang, Zhiwen Zhao, ChongbinXu, Zushun Wu, Yi Luo," Design and Implementation of the Low-Power tracking System Based on GPSGPRS Module" proposed in 2010 5th IEEE conference on Industrial Electronics and Applicationsis

[15] Lijun Jiang lim nan heo Lay Leong Loon "Integrated UWB and GPS Location Sensing System in Hospital Environment", proposed in 2010 5th IEEE conference on Industrial Electronics and Applicationsis.

[16] Saranya , J. Selvakumar ,"Implementation of children tracking system on android mobile terminal", International conference on communication and signal processing , April-2013,India.

[17] Peng Wang, Zhiwen Zhao, ChongbinXu, Zushun Wu, Yi Luo," Design and Implementation of the Low-Power tracking System Based on GPSGPRS Module" proposed in 2010 5th IEEE conference on Industrial Electronics and Applicationsis.

[18] Ervasti M, Kinnula M, Isomursu M (2010) User experiences with mobile supervision of school attendance. Int J Adv Life Sci 2 (no. 1 and 2):29–41

[19] K. Fishkin and J. Lundell. RFID in healthcare. In S. Garfinkel and B. Rosenberg, editors, RFID: Applications, Security, and Privacy

[20] Ma J, Yang L, Abduhan B, Huang R, Barolli L, Takizawa M (2005) Towards a smart world and ubiquitous intelligence: a walkthrough from smart things to smart hyperspaces and UbicKids. Int J Pervasive Comput Commun 1:53–68