SURVEY PAPER ON

Smart device for child safety and tracking using GSM module

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ABSTRACT

This paper describes the concept of smart device for child safety and tracking using GSM module. The main advantages of this over other wearable is that it can be used in any cellphone. In this word of advanced technology and smart electronics it is required to have a simple and cost effective safety gadget that helps the victims during unforeseen dangers. This paper covers descriptive details about the design and implementation of prototype for an electronic gadget which as the potential to serve as a safety wear in the coming years. Thus in this paper an alternative method is proposed for child security that may serve as abetter alternative to rest of the available security methods. The device consist of a switch microcontroller(ATmega328P), GSM module (SIM900),GPS module(Neo6M),buzzer, and pulse sensor (SEN-11574). The main working of this project is that any time a child senses danger the pulse rate of the child increases at that time the message will pass to the parents they can ON the camera see what the child is doing at that time, if the child is in danger then they can take the immediate action. The measure of pulse rate and temperature is useful for the parents to know whether the child is feeling well or not .The SOS which is used in this is helpful for the parents to find there child if the child is lost in the fair.The SOS makes the beep sound by this sound the near by people for the child comes to know the child is in trouble and it is lost and there by they can help the them.

II.INTRODUCTION

The Internet of Things System (loT) refers to the set of devices and systems that stay interconnected with real-world sensors and actuators to the Internet. loT includes many different systems like smart cars, wearable devices and even human implanted devices, home automation systems and lighting controls; smartphones which are increasingly being used to measure the world around them. Similarly, wireless sensor networks that measure weather, flood defenses, tides and more. There are two key aspects to the loT: the devices themselves and the server-side architecture that supports them. The motivation for this wearable comes from the increasing need for

safety for little children in current times as there could be scenarios of the child getting lost in the major crowded areas. This paper focusses on the key aspect that lost child can be helped by the people around the child and can play a significant role in the child's safety until reunited with the parents. Most of the wearables available today are focused on providing the location, activity, etc. of the child to the parents via Wi-Fi and Bluetooth . But Wi- Fi and Bluetooth seem a very unreliable source to transfer information. Therefore it is intended to use SMS as the mode of communication between the parent and child's wearable device, as this has fewer chances of failing compared to Wi-Fi and Bluetooth. The platform on which this project will be running on is the Arduino Uno microcontroller board based on the ATmega328P, and the functions of sending and receiving SMS, calls and connecting to the internet which is provided by the Arduino GSM shield using the GSM network. Also, additional modules employed which will provide the current location of the child to the parents via SMS. The second measure added is SOS Light indicator that will be programmed with Arduino UNO board to display the SOS signal using Morse code. The different modules stay enclosed in a custom designed 3D printed case . In the scenario, a lost child can be located by the parent could send an SMS to the wearable device which would activate the SOS light feature on the wearable. Therefore alerting the people around the child that the child is in some distress and needs assistance as the SOS signal is universally known as the signal for help needed. Additionally, the wearable comes equipped with a distress alarm buzzer which sets to active by sending the SMS keyword "BUZZ" to the wearable. Hence the buzzer is loud and can be heard by the parent from very considerable distance. Also the parents via SMS can receive accurate coordinates of the child, which can help them locate the child with pinpoint accuracy. Some of the existing work done on these similar lines are for example the low-cost, lightweight Wristband Vital [2] which senses and reports hazardous surroundings for people who need immediate assistance such as children and seniors. It is based on a multi-sensor Arduino micro-system and a lowpower Bluetooth 4.1 module. The Vital band samples data from multiple sensors and reports to a base station, such as the guardian's phone or the emergency services. It has an estimated battery life of 100 hours. The major drawback for the Vital band is that it uses Bluetooth as the mode of communication between child and the parent. Since the distance between the two in some cases could be

substantial and the Bluetooth just won't be able to establish a close link between the two. Some more of the similar wearable devices are the Mimo, Sproutling, and iSwingband having their several drawbacks. Therefore, the wearable device proposed will be communicating with the parent via SMS which would ensure that there is a secure communication link. Also, customization of the wearable is possible as per our needs by reprogramming the Arduino system.

III.LITERATURE REVIEW

Dongare Uma, Vyavahare Vishakha and Raut Ravina proposed a voice keyword recognizing app to recognize the user and activate the app functionality even when the mobile keypad locked. The GPS module tracks the longitude and latitude to trace an exact location of a user and sends the pre-stored emergency message including

location to the registered contact numbers. The Audio Recording module starts the recording of the conversation for five minutes and stored with the registered keyword.

Magesh Kumar.S and Raj Kumar.M proposed an emergency response situation recognizing app called as IPROB to provide child safety even in the situation like terrorist attacks or natural disaster, by just shaking the mobile above the predefined threshold value automatically activate the system. It starts capturing the surrounding voice to test and confirm the unsafe IPROB situation where it raised the notification and user fail to respond in predefine time then the message alert sends to the register contacts. If the mobile profile at the receiver is in silent mode then convert it into the General profile to give the voice notification as ―YOUR

CHILD IS IN TROUBLE PLZ HELP...PLZ HELP …‖ continuously like a ring tone, until they stop it. If a register contact confirms a PROB then appropriate emergency services like ambulance, fire brigade are alerted. If a register contact responds with an audible notification, then it automatically connects and enables the speakerphone at the victim side. An integrated tri-axial accelerometer used to evaluate the unique movements that a phone experiences as threshold.

Bhaskar Kamal Baishya proposed an android app to provide security different situations as follows. The module provide security to child at Emergency Situations propose a Save Our Souls (SOS) app to provides the security on a single click of SOS button for the child. No need to unlock the screen, instead by just pressing the power button it directly triggers the application to run at the background, to send the emergency message including the location in the form of latitude and longitude to the registered contacts.

Archana Naik et al proposed an app, in which a single click of SOS sends a message containing the location and/ or audio- video call to the guardian number. At receiver touch the location URL in the message to view it in the Google Map. It also provides different help tools like First-Aid help, Fake Call Help and video call. The First-Aid help tool provides the help on various health issue problems occurred at an accidental or emergency situation during the night time. First aid help for various problems are as: unconscious and not breathing, then I can leave this place‖ . Fake call rings tone same as that of emergency situation taken by the user where user unable to speak or tell the circumstances.

B. Systems designed as a device with the help of Microcontroller The IEEE real project by Thooyavan V proposed an automated highly reliable child security device which consist of the advanced sensors embedded in a wearable dresses. It consist of advanced sensors, GSM and ATMEGA8 microcontroller with ARDUINO tool which keep user under observation at all the time. It monitors the heart beat-rate, temperature and vibration in body through sensors to check for uneasy situation. In such situation it will activate the GPS module to track the location and wireless camera to capture the images that get send to the control room of

the receiver through GSM modules to take necessary actions. At the same time processor activate the mice unit with amplifier which strengthens the voice of the child to screams or shout above the threshold limit.

Archana Naik et al. proposed a portable device as a belt which is automatically activated base on the pressure difference crosses over the threshold in unsafe situation. A GPS module track the location and sends the emergency messages to three emergency contacts every two minutes with updated location through GSM. The system also activates the screaming alarm that uses a siren, to call out for help and also generates an electric shock to harm the attacker for self-defense which may help the victim to escape. The device mainly consists of micro controller on the ATMega328 board which programmed using the ARDUINO programming language.

Nishant Bhardwaj and Nitish Aggarwal proposed the child security device called as ―Suraksha‖ which is an easy to operate device. This device can be activated through Press a switch key and shock (i.e. when the device is thrown with force, a force sensor used to activate the device). In emergency situation it will send the message including instant location to the police, via the transmitter module and registered numbers via a GSM module. Currently the work is under process to embed it in jewelries, mobile or other carrier like belt etc. It can play a major role in the propose projects where all the police stations are connected and share the normal incoming call ring and once call accepted it stop ringing. It also supports Fake Hang Up option. The guardian contacts are by-default for this app, but it able to search the cops, firemen, hospitals contacts nearby to your location. It also sends the audio-video choking, bleeding heavily, burns, heart attack, diabetes etc. The Fake call help to escape from the meetings- parties at a time when women start feeling uncomfortable and think that, ―if someone calls me recording via Email-Gmail of criminal records, crime investigating cases etc.

IV.DESCRIPTION

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 Readers can be used in a wide variety of hobbyist and commercial applications, including access control, automatic identification, robotics navigation, inventory tracking, payment systems, and car immobilization. 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. This GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. Advantage of using this modem will be that use of its RS232 port to communicate and develop embedded

applications. Applications like SMS Control, data transfer, remote control and logging can be developed easily. The modem can either be connected to PC serial port directly or to any microcontroller. This project is built on 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. Along with these feature project includes child safety mechanism by providing mild shock through vibrator and tear gas dispatcher .

Software Tools:

- Embedded C
- MPLAB for developing micro controller code
- EXPRESS PCB for designing schematics

- FLASH MAGIC for dumping the hex file in to controller

Hardware Tools:

- PIC 16F877A/LPC2148
- GSM
- GPS
- DRIVER UNIT
- Vibrator

V.FUTURE SCOPE

As the technological changes or new requirement from user to enhance the functionality of product may requires new version to introduce. Although the System is complete and working efficiently, new modules which enhance the system functionality can be added without any major changes to the entire system. By keeping this ability of the product 1 mind, an incremental process model has been used to design and develop the system. These are as follows :

1. Primary School Children Safety: As the school children safety are major concerns for parents as well as school management due to the recent incidents of child crimes like children missing, abuse etc. This module monitors the child safety when they are travelling in school buses. Once they reached the school the device gets deactivated by school authority and message send the parents that, ―the child reaches the school safely‖ . At return journey again the device is activated by school authority and when they reached the home, the acknowledge message is send to the school when parents deactivate the device. The device is capable of audio recording when activated that can be listening by the parents or authorize person.

2. Vehicle Safety System Module: The Safety of four wheeler car is also a major concern in the society due to the increase in the crime rate of stolen car. The intrusion detection module can be modified according to the requirement of vehicle safety system module.

3. Mobile and other valuables Safety System Module: The missing rate of mobiles is high while travelling from bus, train or crowed public area. The area zone module functionality further enhances to provide safety. A small device needed to keep either in same pocket or within the range of few centimetres. As you kept the mobile and forget to pick up or someone stolen it then due to small range the siren of mobile as well as device gets ON for user attention. Also the same device can attach to our luggage, hence in case of forgetting to pick back or try to stolen by someone can be easily noticed by the module and make the attention of user through the siren alarm. Hence, the advance technology makes the system more robust and reliable. As the new modules provide the functionality which enhance the safety and security. Thus it helps to fulfil the purpose of the project. Finally, the system will be implemented in a real scenario in order to test its actual performance.

VI.CONCLUSION

The child safety wearable device is capable of acting as a smart loT device. It provides parents with the real-time location, surrounding temperature, UV radiation index and SOS light along with Distress alarm buzzer for their child's surroundings and the ability to locate their child or alert bystanders in acting to rescue or comfort the child. The smart child safety wearable can be enhanced much more in the future by using highly compact Arduino modules such as the LilyPad Arduino which can be sewed into fabrics. Also a more power efficient model will have to be created which will be capable of holding the battery for a longer time.

REFERENCE

[1] 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.

[2] 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.

[3] S. Nasrin and P. 1. Radcliffe, "Novel protocol enables DIY home automation," Telecommunication Networks and Applications Conference (ATNAC), 2014 Australasian, Southbank, VIC, 2014, pp. 212-216.

[4] 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.

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[5] Jun Zheng; Simplot-Ryl, D.; Bisdikian, c.; Mouftah, H.T., "The internet of things [Guest Editorial]," in Communications Magazine, IEEE , vo1.49, no.ll, pp.30-31, November 2011 doi: 10.1109/MCOM.2011.6069706

[6] 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 assistancevia 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

[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. [Online]. Available:http://www.wareable.com/parenting/the-best -wearab lesbabies-smart-baby-monitors.

[8] "WiFi and WiMAX - break through in wireless access technologies," Wireless, Mobile and Multimedia Networks, 2008. lET International Conference on, Beijing, 2008, pp. 141145.6