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Design and Implementation of a Children Safety System Based on IOT Technologies

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ABSTRACT: This system is intended to design for tracing the where about of children is an effective solution for the use of real-time information on Internet of Things, track access, updates information technology, which utilizes the most high- profile of RFID radio frequency technology, which is a non-contact automatic identification system. In this system, a combination of the RFID tag chip data reading, RFID automatic acquisition, cloud storage, wireless sensor networks and wireless remote positioning and other functions, to simulate the real scene of the incident, and security risks can be pre-estimate of the corresponding proposed solution. Through the output, we hope to try and improve, and make appropriate promotion and expansion, loss of practical help to families of children and social harmony and stability, combating trafficking of children. In this system a system for increasing children's safety is proposed. The focus is on the daily route from home to school and vice versa, assuming the use of school buses. IoT paradigm is exploited together with different localization techniques i.e. RFID and GPS, in order to design a solution for parents willing to make certain of their child's following the main to school or home, i.e. taking the school bus and entering school or leaving school and entering the school bus. In this paper the applicability of RFID technology efficient tracking capabilities is tested in children's tracking and monitoring during their trip to and from school by school buses. The proposed solution is discussed in terms of technologies and architecture and the first prototype is presented.

KEYWORDS: RFID, children's safety, GPS

I. INTRODUCTION

The Internet of Things System (IoT) refers to the set of devices and systems that stay interconnected with real-world sensors and actuators to the Internet. IoT 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 IoT: 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 focuses 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 wearable 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.

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II. LITERATURE REVIEW

1. Child safety wearable device

Author: Akash Moodbidri, 2017

This paper discusses the concept of a smart wearable device for little children. The major advantage of this wearable over other wearables is that it can be used in any cellphone and doesn't necessarily require an expensive smartphone and not a very tech savvy individual to operate. The purpose of this device is to help parents locate their children with ease. At the moment there are many wearables in the market which help track the daily activity of children and also help find the child using Wi-Fi and Bluetooth services present on the device. But Wi-Fi and Bluetooth appear to be an unreliable medium of communication between the parent and child. Therefore, the focus of this paper is to have an SMS text enabled communication medium between the child's wearable and the parent as the environment for GSM mobile communication is almost present everywhere. The secondary measure used in this project is the people present in the surrounding of the child who could instantly react for the child's safety till the parents arrive or they could contact the parents and help locate them. The secondary measure implemented was using a bright S-S Light and distress alarm buzzer present on the wearable device which when activated by the parents via SMS text should display the SOS signal brightly and sound an alarm which a bystander can easily spot as a sign of distress. Hence this paper aims at providing parents with a sense of security for their child in today's time.

2. Smart Wearable Device Using Arduino GSM Shield

Author: Kota Srinivasa Rao, 2018

To enhance the convenience of life, connecting most sensors with microcontrollers can be a good solution. Hence, in this research, the IOT based Smart Wearable Device by using AT - mega328p microcontroller with an Arduino Uno bootloader and GPS. There are many android applications for the safety of people but they're not as much as efficient. So in order to solve this issue of people safety, we developed a prototype which is easy to use and which is effective to provide one of the main advantages of this project is we did not require any expensive smart Phone and more knowledge to operate. It will work on any cellular device including small CDMA phones, tablets, personal device assistant (PDA) s. The prime motto of this project is one can track others location moments even when they're not around them. The person can know the location and other environmental conditions around the victim by just sending a text message using keywords such as Location, Temperature, UV radiation, Buzzer alarm, SOS emergency.

3. Design and Development of an IOT based wearable device for the Safety and Security of women and girl children

Author: AnandJatti, 2016

The aim of this work is to develop a wearable device for the safety and protection of women and girls. This objective is achieved by the analysis of physiological signals in conjunction with body position. The physiological signals that are analyzed are galvanic skin resistance and body temperature. Body position is determined by acquiring raw accelerometer data from a triple axis accelerometer. Acquisition of raw data is then followed by activity recognition which is a process of employing a specialized machine learning algorithm. Real-time monitoring of data is achieved by wirelessly sending sensor data to an open source Cloud Platform. Analysis of the data is done on MATLAB simultaneously.

4. Enhanced open monitoring environment for child

Author: balavignesh s, 2018

Nowadays the most common causes of death in children over years is due to playful activities which help to communicate, socialize and understand the surroundings. Falls; fires; scalds and burns; glass-related accidents; poisoning; suffocating and steps are the major factor which leads to babies accident. Even at this young age, new born are ready to learn about the world around them. But some time the play become tragedy and danger. Many accidents and harmful scenarios are happening while playing. Their mother has to monitor the children continuously to avoid the danger and problem occurring on the children. In our system child safety advice, the OMEC was implemented to avoid

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the children accidents and hazards. The wireless long way communication system enhanced to track the children location and the mother can get the alert about the children; the voice alert will be received by the mother. in case the children were reaching the dangerous zone, the siren system has been enhanced alert via the buzzer and the voice alert will be given to the mother.

III. EXISTING SYSTEM

Internet of Things has plenty of spaces to grow as a new industry. From two aspects prospects of Internet of Things: First, from the economy, the domestic have many studies blank area in this regard, fewer competitors, have great profits to be made, we can first step in the line. secondly, from the development of society, the child safety issues related to the future of the country, associated with social stability connected the family is happy, we put Internet of Things applied to solve real life problems will get strong support from the government, society and all walks of life. Therefore, the product information Things collection, tracking, etc.

RFID technology has greatly improved the position of timely access to information and timely updates and other efficiencies, which in addition to bulk read, but also has a small size, large capacity, long life, reusable, fast read and write, non-visual identification, mobile identification and so on. By labeling each child in the body, laminated or implantable RFID tag, you can always learn to identify the child is location information, real-time tracking, to help reduce the harm to children.

DISADVANTAGES

- Only Manual location can be tracked.
- Location may or may not be tracked at the depth of bore wells.
- Alerting guardian was not implemented this may lead to loss of lives
- They can simply wear it as a band or cloth and it can function very accurately and they only need a very little training to use it.

IV. PROPOSED SYSTEM

- Children's security has always been a priority problem whose solution must constantly be improved. The Smart Cities paradigm clearly takes into account the need of providing a more favorable environment for children's living and learning, but focusing on this aspect it has also to deal with challenges due to cities complex environments. According to the incomplete statistics of news reports, the school-age children security accidents in recent years can be classified into four types:
 - 34.7% of accidents happening outside the schools
 - 11.7% of children's misconnections
 - 29.8% of school bus drivers carelessness
 - 23.8% of children's losses.

ADVANTAGES

- Preventive measures are implemented with a minimum amount of time.
- Human loss and property loss will be reduced.
- Information will reach at right time by using GPS module.
- Anyone can operate it easily.

V. METHODOLOGIES

4.3.1 Remote Server Maintenance Module

The remote server is handled via IOT module, which helps us to Push a Sensor values dynamically to server and provides the possible response as a outcome. For this purpose, we use NodeMCU ESP8266 module as a core, which gathers the ability via WiFi and enable our IOT module to active for pushing a value to server. NodeMCU is an

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open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. The term "NodeMCU" by default refers to the firmware rather than the dev kits.

4.3.2 RFID Reader - EM18 Module

This module directly connects to any microcontroller UART or through a RS232 converter to PC. It gives UART/Wiegand26 output. This RFID Reader Module works with any 125 KHz RFID tags

Specifications

- 5VDC through USB (External 5V supply will boost range of the module)
- Current: <50mA
- Operating Frequency: 125Khz
- Read Distance: 10cm
- Size of RFID reader module: 32mm(length) * 32mm(width) * 8mm(height)

4.3.3 USB-to-TTL RS232 Serial Communication Cable

- The USB TTL Serial cables are a range of USB to serial converter cables which provide connectivity between USB and serial UART interfaces. A range of cables are available offering connectivity at 5V, 3.3V or user specified signal levels with various connector interfaces. All cables feature an FTDI FT232R device integrated within the cable USB type 'A' connector, which provide access to UART Transmit (Tx), Receive (Rx), RTS#, CTS#, VCC (5V) and GND connections. All cables are fully RoHS compliant and are FCC/CE approved. The cable is easiest way ever to connect to your microcontroller/Raspberry Pi/WiFi router serial console port.

4.3.4 GPS with 3 Meters Antenna

The Global Positioning System (GPS), originally Navstar GPS, is a satellite-based radio navigation system owned by the United States government and operated by the United States Air Force.[2] It is a global navigation satellite system that provides geo-location and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. Obstacles such as mountains and buildings block the relatively weak GPS signals. The GPS does not require the user to transmit any data, and it operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information

VI. 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.

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