

Safety Gadget for Child Security Monitoring and Notification Using IoT

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ABSTRACT

Infants or toddlers need parents' attention 24×7. In this present era, the cases regarding missing children have been increasing day by day, which was the main motivation that comes for the safety of little children. However, the parents cannot continuously monitor their babies' conditions either in normal or abnormal situations. Still, certain incidents like infant attacks have been reported, it is necessary to protect the baby. Child and women safety is a challenging problem nowadays due to antisocial elements in the society. The crime rate is day by day increasing. Schools and working places need high surveillance for ensuring the safety among children and women. Smart phones are playing major role for ensuring the safety, where some mobile based applications provide alert systems. During the emergency, mobile apps alert the control room of nearby police station or caretakers of children. The literature shows that location tracking devices are available in the market, but it does not provide the complete solution to the problem. The solution to this problem is to design an IoT device, which senses the child's location and environment and during emergency, it should send the alert to the parents automatically

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I. INTRODUCTION

Through the proposed system, immediate actions can be taken forthwith in case the child is threatened. Thus, child security is guaranteed, crime rate related to children is reduced and eventually, parents can rest assured. In fact, reduction of crime rate brings about long-term positive effects such as improving country's reputation and quality of life, increasing community security, safety, and cohesion as well as generating economic benefits for individuals, committee and taxpayers.

Besides, the proposed system makes ample use of IoT, proving IoT is evolving which can be included in multiple areas. comprising the child security field. Throughout the research, it is clearly explained the IoT concept, child safety issues and the need of using child security system. Some previous studies have been included for designing the IoT-based child security smart band. It assists parents to monitor their children remotely. In case situations happen, notifications will be sent to parents so that actions can be taken. Through this, child safety can be ensured and crime rate will be reduced. However, the proposed device is not robust enough and does not contain sufficient functions to operate like a mobile phone.

MODULES DESCRIPTION

A module is a software component or part of a program that contain one or more routines. One or more independently developed modules make up a program. The project "IOT BASED CHILD MONITORING" consists of two main modules they are,

- ✓ Hardware
- ✓ Software

HARDWARE:

1. ARDUINO UNO

The Microcontroller used here is an Arduino UNO. The UNO is a Microcontroller board based on ATMEGA 328P.

The ATMEGA 328P has 32kB of flash memory for storing code. The board has 14 digital input and output pins, 6 analog inputs, 16 MHz quartz crystal, USB, an ICSP circuit and a reset button. The UNO can be programmed with the Arduino software.

2. RFID

RFID TAGS:

These tags comprise of a semiconductor device for storage of its distinctive range and a coil that acts as an antenna for diverging its hold on information. It should or might not have electric battery relying upon its sort either active or passive

severally. Passive tags are used that doesn't have electric battery. As presently because the tag comes within the RFID reader coverage vary, Reader emits radio signals which supplies power for passive tags and it re-emits the radio-based signal with information to the reader. Purpose of RFID tags is to unambiguously establish merchandise.

RFID READER:

EM-18 is employed that operates at 5volts DC and fewer than 50mA. The frequency at that it works in 125 kHz. It will cover a distance of 10cm. It ceaselessly emits RF signals throughout its range and whenever an RFID tag is within its area, it retrieves the knowledge held on within the tag. Purpose of RFID reader is to retrieve the merchandise information from their RFID tags.

SOFTWARE:

1. CHILD SAFETY

There are sensors all around—in our homes, smart phones, automobiles, city infrastructure, and industrial equipment. Sensors detect and measure information about the Geofence area and updates the server

2.ANALYZE AND VISUALIZE DATA

Storing data in the cloud provides easy access to your data. Using online analytical tools, you can explore and visualize data. You can discover relationships, patterns, and trends in data. You can calculate new data. And you can visualize it in plots, charts, and gauges. Storing data in the cloud provides easy access to your data. Using online analytical tools, you can explore and visualize data. You can discover relationships, patterns, and trends in data. You can calculate new data. And you can visualize it in plots, charts, and gauges:

1. Convert, combine, and calculate new data
2. Schedule calculations to run at certain times
3. Visually understand relationships in data using built-in plotting functions
4. Combine data from multiple channels to build a more sophisticated analysis

KEYWORDS

IoT, LCD Display, Arduino Board, MQ2 Sensor, DHT11 Sensor, Flame Sensor, GSM, ESP8266 WIFI, Power Supply, DC Water Pump, Buzzer, Relay.

RELATED WORK

Siyuan song, Ibukun Awolusi presented an Industrial Safety Management Using Innovative and Proactive Strategies is becoming an emerging technology due to the rapid use of internet. Safety is

considered a top priority due to its significance in safeguarding human lives and properties, especially in high-risk industrial sectors such as aviation, oil and gas, construction, transportation, steel manufacturing, and mining industries. These industries are plagued by workplace injuries, illnesses, and fatalities because of the dangerous work environments. As such, it is very vital to integrate safety into every work process in any industrial environment just like quality is built into products and services. It is important to establish and execute an effective safety management system to prevent the risks of irreversible accidents. This chapter begins with a background to safety management in industrial engineering and a discussion of the various issues of industrial safety management. It follows with an extensive description of existing and commonly used safety performance measurement methods. Several case studies are used to explain the methods and explore the important application areas relevant to most industrial sectors. The techniques and tools for safety data collection, analysis, and sharing are introduced together with their applications for safety management. The last section explains how emerging technologies can be implemented in most industrial sectors to enhance safety management.

Industrial work environments are often characterized by dynamic resources including interactions between mobile equipment and pedestrian workers. The hazardous work environment characteristic of industrial facilities is evident in the high rates of workplace injuries and fatalities experienced regularly. These high-risk industries include construction, steel manufacturing, oil and gas, aviation, agriculture, forestry, fishing, and hunting, etc. For instance, the construction industry remains one of the most hazardous and unsafe industries with fatality and incidence rates considerably higher than the all-industry average in many countries. Incident statistics indicate that construction workers have consistently incurred more fatal injuries than in other industries. Despite the efforts to improve safety performance, the construction sector continues to account for disproportionate injury rates accounting for the most on-the-job fatal injuries. In the United States, construction remains the most hazardous industry in terms of the aggregate number of fatalities. Thus, innovative intervention strategies are being continuously explored by researchers and practitioners to enhance management controls as well as modify human behavior and work environment to improve construction safety. Steel manufacturing is one of the most hazardous industries because of its complex socio-technical system. The steel manufacturing process involves the use of high

technology and physical labor, making safety management a complicated task. Members of the U.S. steel manufacturing industry continue to experience a significant number of injuries, illnesses, and fatalities. The combination of intricate technology and physical labor creates a complicated challenge for safety managers in steel manufacturing. The fundamental goal of measuring safety performance is to create and implement intervention strategies for potential avoidance of future accidents. Recognizing signals before an accident occurs offers the potential for improving safety; many organizations have sought to develop programs to identify and benefit from alerts, signals, and prior indicators. Traditional measures of safety performance rely on some form of accident or injury data, with actions being taken in response to adverse trends in injuries. Many organizations rely heavily on failure data to monitor performance. The consequence of this approach is that improvements or changes are only determined after something has gone wrong. In most cases, the difference between whether a system failure results in a minor or catastrophic outcome is purely a matter of chance. Effective management of major hazards requires a proactive approach to risk management, so information to confirm that critical systems are operating as intended is essential. Transitioning the emphasis in favor of leading indicators to confirm that risk controls continue to operate is an important step forward in the management of major hazard risks. Accurate safety performance measurement facilitates the evaluation of ongoing safety management and the motivation of project participants to improve safety.

EXISTING SYSTEM

Real-Time Child Abuse and Reporting System In the existing system, we use a voice recognition module in which the alert commands from the child are stored and kept for further reference. If the same child delivers the same command, it will compare with the alert command which was previously stored and sets an emergency level according to the alert command. The GSM has a SIM which is used to send an alert message or an alert call to the trusted peoples. GPS is used to track the live location and it is used when needed. The server will search the respective device ID from the database and search for respective contacts according to that device ID and helps in alerting the registered guardians. The disadvantage of this project are,
i. The child could not produce the exact alert command during a panic condition.
ii. The command produced may not match with the previously stored command.

iii. This project requires manual intervention. emergency response systems in times of fire hazard.

DRAWBACKS

- Requires an Internet connection for remote monitoring.
- Some Prior knowledge of the system is needed for the Supervisor/Manager.
- Installation should be done based on the range of the industry.
- Impacting Load shedding.

PROPOSED SYSTEM

✓ In the existing system, manual intervention was required. But in the proposed system, we make every action autonomously

✓ We can use both web application as well as mobile application or either one of it as the front end user interface, cloud, and database as the back end for storing and retrieving information, and a device for monitoring.

✓ GPS is used to track the live location of the child who is wearing that device. With the help of GPS, we can easily perform Geo-fencing concept, in which we will be able to feed a particular boundary to that device.

✓ If the child goes beyond that particular boundary specified, the respective guardians will receive an alert call using GSM. In our system, we use several components like,

- ✓ Temperature sensor
- ✓ Pulse sensor
- ✓ GPS
- ✓ GSM
- ✓ Web camera
- ✓ Raspberry pi microprocessor.

MERITS

- Ensuring safety of personnel.
- Protecting Assets.
- Reducing Risks.
- Improving compliance.
- Enhancing Reputation.
- Reduce damage to Personnel.
- Prevent harm to personnel.

MODULE DESCRIPTION

A module is a Hardware and software component or part of a program that contain one or more routines.
GPS

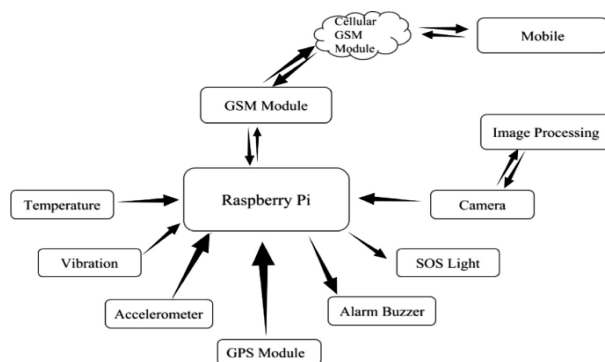
SIM808 module is a GSM and GPS two-in-one function module. It is based on the latest GSM/GPS module SIM808 from SIMCOM, supports GSM/GPRS Quad-Band network, and combines

GPS technology for satellite navigation. This GSM-GPS Modem is perfect for projects which require both GSM Modem & GPS Module.

It features ultra-low power consumption in sleep mode and integrated with charging circuit for Li-Ion batteries, which make it get a super long standby time and convenient for projects that use rechargeable Li-Ion battery. It has high GPS receive sensitivity with 22 tracking and 66 acquisition receiver channels. Besides, it also supports A-GPS that available for indoor localization. The module is controlled by AT command via UART.

SENSORS

A sensor is a device, module, machine, or subsystem whose purpose is to detect events or changes depends upon transducer in its environment and send the information to other electronics, frequently a microcontroller. A sensor is always used with other electronics.



Temperature Sensor

A thermocouple is comprised of two conductors, each made of a different type of metal, that are joined at an end to form a junction. When the junction is exposed to heat, a voltage is generated that directly corresponds to the temperature input. This happens on account of the phenomena.

The thermoelectric effect. Thermocouples are generally inexpensive, as their design and materials are simple. The other type of contact temperature sensor is called a thermistor. In thermistors, resistance decreases as temperature increases..



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