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Iot-enabled safety system for child and aged people

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Abstract
This project proposes a secure child and aged people monitoring system. This project addresses this important concern and proposes an architecture model of the smart child safety tracking. In and around the world the children are abused and also killed in sometimes by the people those who are not in good attitude. To track and resolve such issues an enhanced security feature system is required. It uses Raspberry Pi microcomputer, GPS and a Pi camera in order to capture real time video where Python software are used. This system provides security and safety in monitoring their children and senior citizens remotely.

Keywords: raspberry PI, sound sensor, vibration sensor, moisture sensor, heartbeat sensor, temperature sensor, RFID reader, camera, power supply

Introduction
Large number of children travels to the school every day in India. Children go in different modes of transportation. Parents are always worried about the safety and security of their child. This paper intends to provide location and health tracking system which ensures the safety of the school going children. Parents can monitor the child's location and health in real time so that they can ensure that their child is safe. In some cases kids forget to leave or enter school bus or even miss the bus from school. The proposed system will helps the parents/guardian to know the location of the child in case of any missing happens. This system will provide guidance for the user where they can track the location of the child and monitor the speed, distance; pulse rate of the child, as well as it shows the path travelled by the child. In case of emergency situations parent receives notifications from the system through an application and can send alert information to the concern authorities. Android developer studio is one of the best tool or environment to create android applications to mobile. In this proposed system we are building a child and simultaneously for the senior citizens monitoring system that can be accessed. In current trend, parents may have an opportunity to track their children locations and their health issues by using the GPS tracker devices and this device will also send the picture of the accused person, in this parents can monitor their children from a remote place and if children under any problems in the school campus simultaneously, if the aged person facing any health issues they may get the alert message immediately.

Significance of the System
The significance of the system is to monitor child's location and health in real time, of the child as well as aged people and notify to their care takers using different sensors, sending the photos if any accuse attack them.

Literature Survey
Safety of a child in a large public event is a major concern for event organizers and parents. [2020 IEEE 14th International Conference on Semantic Computing (ICSC)].This paper addresses this important concern and proposes an architecture model of the IoT enable smart child safety tracking digital system. This IoT-enabled digital system architecture integrates the Cloud, Mobile and GPS technology to precisely locate the geographical location of a child on an event map. The proposed architecture model describes the people, information, process, and technology architecture elements, and their relationships for the complex IoT-enable smart child safety tracking digital system. The proposed architecture model can be used as a reference or guide to assist in the safe architecture driven development of the various child tracking digital systems for different public events.

Methodology
A. Vibration Sensor
This sensor buffers a piezoelectric transducer. As the transducer is displaced from the mechanical neutral axis, bending creates strain within the piezoelectric element and generates voltages. Specifications: The Vibration Sensor Detector is designed for the security practice When Vibration Sensor Alarm recognizes movement or vibration, it sends a signal to either control panel Developed a new type of omni-directional high sensitivity Security Vibration Detector with omni-directional detection

B. Raspberry PI

The Raspberry Pi is designed to be connected to the Internet. Its ability to communicate on the Internet is one of its key features and opens up all sorts of possible uses, including home automation, web serving, network monitoring, and so on. The connection can be wired through an Ethernet cable, or the Pi can use a USB Wi-Fi module to provide a network connection. This is very useful in situations where the Raspberry Pi itself is in-accessible and does not have a keyboard, mouse, and monitor attached to it.

Fig 1: Raspberry PI

C. PI Camera

The 5MP Raspberry Pi 3 Model B Camera Module Rev 1.3 with Cable equips flexible cable for attaching with Raspberry Pi 3 Model B. The 5MP camera module is perfect for small RaspberryPi projects. The high-definition 5MP camera delivers outstanding photos but can also shoot video, ideal for drones or a CCTV project. The lightweight camera board allows for it is useful in more practical roles, such as a hidden camera, even a camera for a Pi-phone.This Raspberry Pi Camera Module is a custom designed add-on for Raspberry Pi. It attaches to Raspberry Pi by way of one of the two small sockets on the board upper surface. This interface uses the dedicated CSI interface, therefore it is designed especially for interfacing to cameras. The CSI bus is capable of extremely high data rates, and it exclusively carries pixel data.

D. Temperature Sensor

The MLX90614 ESF is an Infra-Red thermometer for non-contact temperature measurements. Both the IR sensitive thermopile detector chip and the signal conditioning ASIC are integrated into the same TO-39 can. The Integrated MLX90614 GY-906 is a low noise amplifier, 17-bit ADC, and powerful DSP unit thus achieving high accuracy and resolution of the thermometer.The user can configure the digital output to be PWM. As a standard, the 10-bit PWM is configured to continuously transmit the measured temperature in the range of -20 to 120 °C, with an output resolution of 0.14 °C.

E. Heart Beat sensor

Heart beat sensor is designed to give digital output of heat beat when a finger is placed on it. When the heart beat detector is working, the beat LED flashes in unison with each heartbeat. This digital output can be connected to microcontroller directly to measure the Beats Per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.

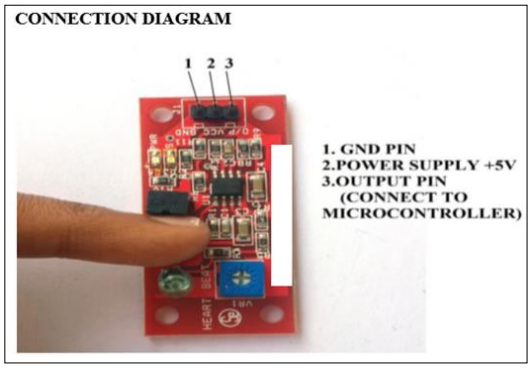

Fig 2: Heart Beat Sensor

F. Sound Sensor

- Sound Sensor Module Sound Detection Module Main Chip: Lm393, Electret Microphone
- Working Voltage: Dc 4 ~ 6v Has The Signal Output Instructions Single Signal Output.

- Effective Signal Output For Low Level. Output Low Level And Signal Light Will On When There Has Voice.
- Can Be Used For Sonic Lamp, With Photosensitive Sensors Act As Sound And Light Alarm, Also Can Be Used In The Occasion Of Voice Control And Sound Detection. Circuit Boards Output Switch Value.

This sound sensor module provides an easy way to detect sound and is generally used for detecting sound intensity. The module is based on an electret microphone and LM393 comparator IC detects whether the sound has exceeded a threshold value. The sound level set point is set through an onboard potentiometer. When sound exceeds the setpoint, an LED on the board is illustrated and the output is sent low. It detects the sound via microphone and feeds into an LM393 comparator IC. The device is very simple to use and quite convenient to interface with Raspberry Pi, which makes it perfect to use in simple projects**.**

G. RFID Reader

The RFID reader is also known as an interrogator, it provides the connection between the tagdata and the software that needs the information. The image below is showing an RFID Reader.

Fig 3: RFID Reader

By making use of an attached antenna, the reader extracts the data on the tags and then sendsthe data to a host computer for further processing.In addition tags can also be categorized basing on their frequency of communication. Theenergy, read range and in some cases the size of the tag is determined by the communicationfrequency between the tag and the reader.

Fig 4: Typical RFID card for the project

H. Moisture Sensor

The Moisture sensor is a device to measure volumetric water content on the skin. The sensor measures volumetric water content indirectly, without removing moisture, by using other parameters like electrical resistance or conductance, dielectric constant and interaction with other neutrons.

System Design

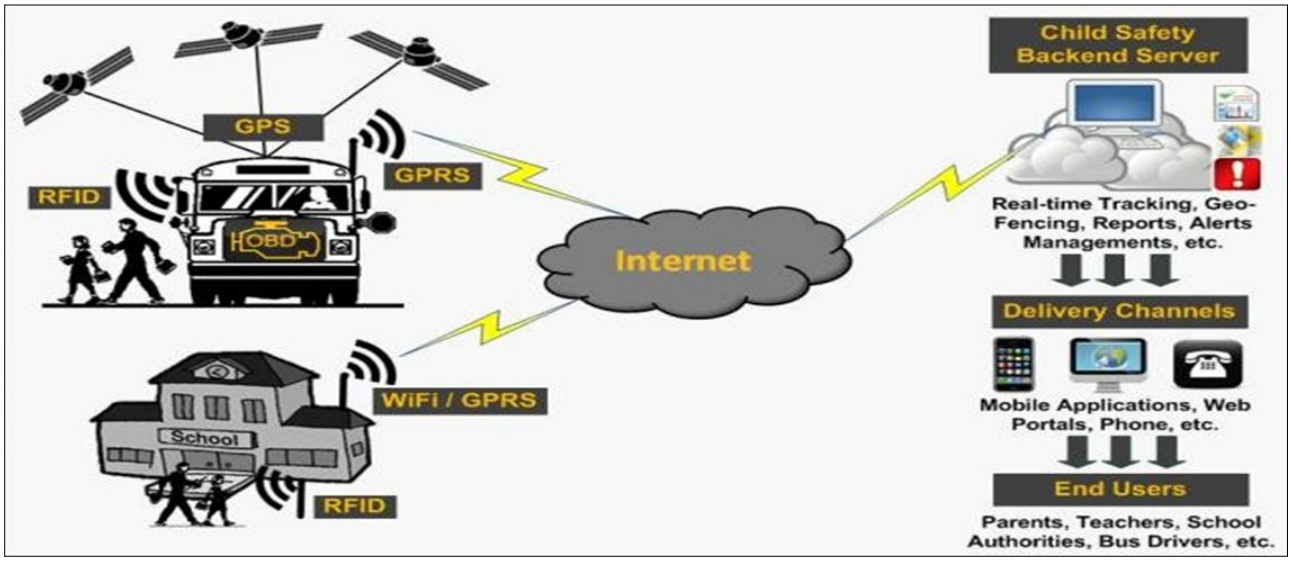

Fig 5

Conclusion

All parent wish to shield their children from real dangerous world they will inevitably undergo hard times. Normal behavior of any child depends on the child's age, personality, and at the end the physical and emotional development. A child's behavior may be a problem if it doesn't match the expectations of the family or if it is disruptive. So Parents may face many problems with their children, when they let them free without any observation. There are many tracking system available in present time, these systems use different technologies but each of them has one or more limitation such as not suitable for many children or monitor how far the child from their parent without monitoring the environment surrounded the children or can monitor only one state at a time. While the designed tracking system allows parent to monitor multiple children and they will be alarmed if any child be in danger state.

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