SMART SAFETY JACKET FOR SMALL BABY

PROJECT REFERENCE NO.: 40S_BE_1847

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Keywords: PIR – Passive Infrared, Wi-Fi – Wireless Fidelity, ADXL335– 3-Axis Accelerometer

Introduction:
In this modern world we have many cases related to child safety and these problems are due to the lack of child care. The numbers of nuclear families are increasing today; mainly these child related problems are in nuclear families. The rates of kidnaps are increasing in smart city areas. Apart from security some of the safety related problems like injuries due to fall down, presence of toxic gases and fire. Already in market we have tracking device in form of wrist watch for children which can only locate location but not ensure safety and the wrist watch can be used by the children with age above 7. Hence, for small baby wrist watch is not suitable due to its weight. “Implementation of children tracking system using mobile terminals”, an international journal paper is focused on solution of overcoming child missing and kidnapping and the tracking devices can be worn as wrist watches, anklets or i-cards. The child module includes Global positioning system (GPS), Global system for mobile communication (GSM) and receiver include parents mobile phone. A paper on “Child Safety and Tracking Management System by using GPS, Geo-Fencing and Android Application: An Analysis” and the proffered system in the paper describes an application is designed for locating missing children. It has added Geo-fencing and Emergency messaging services to enhance the system. Hence, bydesigning a smart safety jacket to assure parents that their baby is safe from suspicious action and happy in home environment.

Objectives:
Aim of the project is to develop a system especially for ensuring safety for small baby within the home environment when mother/guardian is busy with their stuff. This project has wide range of features and functionality such as security, different kinds of detection's like position, fire and gas leakage, temperature of concern baby and its movement. This will help mother/guardian to assure that baby is safe and secure by avoiding minor fall and kidnapping act.

Methodology:
The block diagram of the conceptual system is shown in Figure A. The microcontroller act as an embedded computing system and controls activities of all the sub systems which includes PIR sensor, ADXL 335(3 axis accelerometer), cry detector, flame sensor, gas sensor and temperature sensor. It includes two modules Wi-Fi module and audio play back module. The system allows tracking exact position, movement of the small baby, detection of gas leakage and fire, even it can detect any interference of object through PIR Sensor hence the information is send to mother or guardian through Wi-Fi module.
Figure A: Block diagram of smart safety jacket for small baby

Figure B: (a) General flowchart of sensors (gas, PIR, temperature & flame sensor) working, (b) Flowchart of cry detector, (c) Flowchart of 3 axis accelerometer

Figure B shows the process flow of different sensors.

Results and conclusion:

The instant movement of the baby is monitored and any changes observed than the information is sent to mother/guardian phone as shown in Figure C.
Conclusion:

The project is all about providing security and safety to baby. The system is about making home environment more secure by using Wi-Fi module. It provides a device with extensive smart features within a compact embedded system. The difficulties found while designing the system was the connection of different sensors in more précised manner. It can send accurate information only through strong Wi-Fi connection.

Figure: Working Model

Scope of the project:

The project has been focused for ensuring safety only within a home environment therefore, in future it can be further updated to use as external monitoring device The system can be efficiently enhanced as real time system by using GPS and GPRS modem.