SIMPLE CHILD SAFETY MONITORING SYSTEM USING SENSORS WITH GSM MODULE

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Abstract: *The child safety specifies the protection of children from accidents, emotional things, abuse, and online safety. In recent days, child theft has increased. According to the study, child theft increased day by day compared to past years. Kidnappers are individual groups; they are aimed at kidnapping the children and taking their internal parts and selling them for money in order to avoid the thefts. Sensor-based monitoring has been introduced. By using this advanced system, child safety will be monitored continuously, and monitored data will be continuously sent to their parents through the GSM module. The parents can see their child's status via mobile phone. By using this technology, parents do not get panicked about their children.*

Keywords: **Microcontroller, sensors, GSM technology.**

1. INTRODUCTION:

Nowadays, child thefts are increasing day by day, and kidnappers also increased day by day. Many number of children going to school by means of vehicles or by walk, due to this the parents get panic about their children's safety and security. The kidnappers main aim is to kidnap the school child because they are walking alone to school or by public transport. In earlier days child security consist of Bluetooth or Wi-Fi in it, by using this technology the system can be operated in only the short range. In order to avoid these problems, advanced child safety techniques will be introduced. Monitoring system plays an important role in child safety and child security by means of electronic system. It consists of a microcontroller, GSM, GPS, and sensors; it is also known as simple gadget. By using this system, child location is monitored by means of GPS, and children's heartbeat will be monitored by means of heartbeat sensor and a vibration sensor is used to track the child whether he or she is in emergency situation. All data can send to parents through GSM network. By using this advanced technology, parents are not worried about their child when they leave their child alone. All data can be shared with their parents by SMS format.

2. LITERATURE REVIEW:

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+ In the above journal they used Wi-Fi module and AT-mega microcontroller for process.

3. PROBLEM STATEMENT:

In the above journal they used Wi-Fi module and AT-mega microcontroller for process. By using Wi-Fi module, it can only operate in short range(50 meters), so it does not access long range, so GSM technology is used for process. AT-mega microcontroller consumes high power. In order to overcome this issues PIC microcontroller is used for process.

4. OBJECTIVES OF THIS SYSTEM:

- ✓ To monitor the child's heartbeat by heart beat sensor.
- ✓ To notice the location of a child by using GPS technology.
- ✓ To send every movement of a child by using GSM technology.
- ✓ To notice the emergency condition of child by vibration sensor.
- ✓ By using this parent are not worried about their children.

5. PROPOSED SYSTEM:

In order to monitor the child with safety, the advanced smart tracking device will be introduced. In this system, a PIC microcontroller is used for processing; it is the brain of this system. By using a microcontroller, we can control the sensors by means of a program. To monitor the heartbeat of a child, a heartbeat sensor is used. A vibration sensor is used to track the emergency situation of the child. The sensors are the transducer that are used to convert the physical status into electrical signal. Here, in this project , GPS system is enabled, so every move of the child will be monitored by means of their parents by mobile phone via GSM network. GSM network is used for sending the data from sensors and GPS sensor is used to send a location of child to their parents. By using this project low cost, child security is increased by advanced electronic devices.

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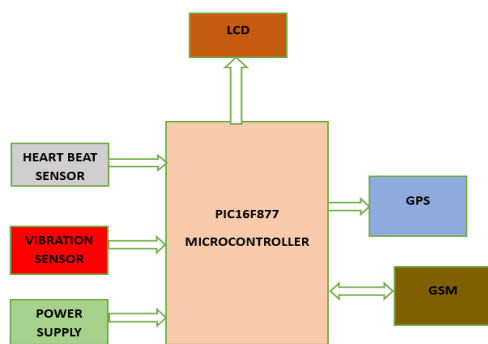
7. BLOCK DIAGRAM:

Figure-1: Block diagram

8. HARDWARE REQUIREMENT:

The hardware description specifies the various types of components used in the design. Here PIC microcontroller, heart beat sensor, vibration sensor. GPS, GSM, and LCD are used.

8.1. PIC 16F877 Microcontroller:

Figure-2: PIC Microcontroller

This microcontroller consists of a 20 MHZ crystal oscillator; it is used for providing clock pulse to microcontroller. It consists of 368 bytes of data memory, 256 bytes of EEPROM, 33 input and output pins. It can support an 8-channel 10-bit A-D converter. It is used for interfacing with many sensors.

8.2. GPS:

Figure-3: GPS module

GPS means Global Positioning System; it is used to track the location of the user from anywhere in this world. Its works in any type of weather condition. It is used to find exact location of the user.

8.3. Heart beat sensor:

Figure-4: Heart beat sensor

Heartbeat sensor is one of transducers. A transducer is used to convert the physical medium into desired electrical signal. Heart beat sensor is used to covert the heart rate into a proper electrical signal; when the heart beat is raised, then the voltage will also increase.

8.4. Vibration sensor:

Figure-5: Vibration sensor

Vibration sensor is also one type of transducer; it provides an electrical signal based on a physical medium. A vibration sensor is used to convert the vibration into a proper electrical signal, when vibration gets increased, then the output will also be increased.

8.5. LCD:

Figure-6: LCD display

LCD display consists of LED inside it. It is used to convert the electrical signal into light with respect to input. LCDs consist of a thin layer, which is made up of liquid crystal material. It is mainly used to display the output.

8.6. GSM MODULE:

Figure-7: GSM module

GSM Module is also known as electronic module, which consists of SIM slot inside it. By using the GSM module, we can communicate with each other through the GSM network. It can accept both text and call. It consists of antenna in it; it is used to sending or receiving of data.

8.6.1 GSM Architecture:

GSM architecture consist of three main systems

- ➢ Base station sub system
- ➢ Network and switching subsystem
- ➢ Operation subsystem

i) Base station subsystem:

Base station subsystem is also known as radio subsystem. It consists of BTS and BSC. BTS means Base Transceiver Station; it consists of a antenna. It is also called a cell tower; it receives a radio signal and converts it into a digital signal that is passed through a GSM network. It is controlled by Base station controller. Base Station Controller plays an important role in networking; it is used for controlling the operation of the BTS. It acts as a mediator between BTS and MSC. It plays an important role in increasing the network efficiency.

ii) Network and switching subsystem:

The network subsystem consists of MSC, Home Location Register, Visitor Location Register, and   Authentication Center.

1) HLR:

HLR is the huge database that contains information about subscriber, such as account details; it is also used to store subscriber's country code and phone numbers.

2) VLR:

VLR is also a huge data base; it contains the subscriber's current location.

3) AUC:

AUC means Authentication Center. It is a privacy place; it is also a strongly protected area that is used to find fake SIMs and stolen SIMs.

iii) Operation subsystem:

OSS is used to monitor the operation of mobile system, base transceiver stations, Base station controllers, mobile station controllers.

8.6.2 Features of GSM architecture:

- ❖ By using GSM system, voice clarity is very good.
- ❖ High frequency efficiency
- ❖ Service cost will be low.
- ❖ It can support many devices.
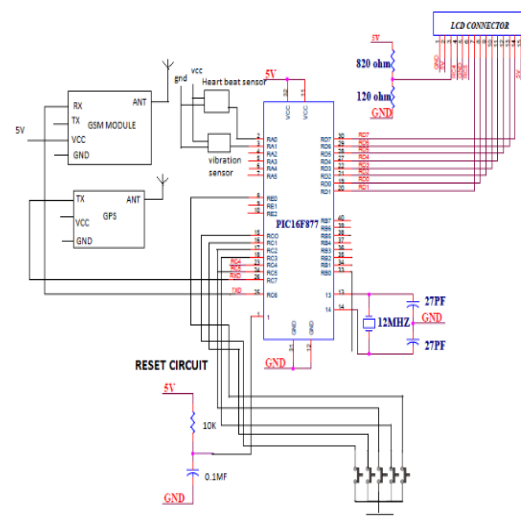- ❖ Accessing the network is easy.

9. CIRCUIT DIAGRAM:

Figure-8: Circuit diagram

9.1. Construction of the circuit:

Here, this system consists of PIC microcontroller, two sensors heart beat and vibration sensors are used. Heartbeat sensor is connected with RA0 pin, and vibration sensor is connected with RA1 pin, ground, and VCC connected, respectively. GPS module TX pin is connected with RXD pin of microcontroller. GSM module RX pin is connected with TXD pin of microcontroller. 1 pin of the microcontroller is connected to the reset circuit. 31st and 32nd pins are connected to ground. 13th and 14th pins of the microcontroller are crystal pins; crystal is connected to generate a clock pulse. The pin from RS1 to RD7 is connected to the LCD to interface with the LCD display. Proper supply and ground connection are given to the LCD terminal.

9.2. Working of the circuit:

Whenever the power supply gets ON, the sensors start working, it monitors the physical medium and converts into proper electrical signal that is viewed via LCD display and the information send to their parents. When the child is in panic situation his heart beat gets increased, whenever the heart beat gets increased the output voltage also increased and data passed to their parents via SMS through GSM network. When he or she is in accident situation then the vibration sensor sense it and produces the output to their parents by SMS. GPS system is powered by power supply, it tracks the child for every second and send the location data to their parents via SMS through GSM network.

9.3. Advantages of this system:

- Peace of mind for their parents
- High security
- High protection
- High speed of emergency response

10. CONCLUSION:

In this modern world, advancement of science and technology is non-stop. New technologies and new inventions are introduced. In future, technology grows day by day and we should imagine our future. Child safety system is must in this upcoming days because child thefts are increased day by day. In order to avoid this problem, we proposed a new child safety system. This project is very useful to all types of children and differently abled people in all of environment.

11. FUTURE SCOPE:

In future, the proposed system can develop adding advanced sensors like blood pressure monitoring sensor, respiration monitoring sensor, blood glucose level monitoring sensor, etc. These are the factors are considered in future project to develop the new innovative Child safety monitoring system.

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