SMART INSOLE-BASED LOCALIZATION SYSTEM FOR WOMEN SAFETY USING IOT APPLICATION

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ABSTRACT

A light weight, soft, robust and low cost sensor system integrated into the inner soles of footwear is being developed to channel information to a mobile device in order to assess the location details. In addition to these Heart beat sensor and MEMS sensor are included which provide pulse rate and movement of the body and also it will alert the nearby control system via IOT Application. To protect the women from difficult situation like harassment, faint, etc. Designing a smart insole to calculate force for controller for monitoring the controller system is designed to send notification via IOT. The GPS module is used to track the location of the women for easy finding.It includes a central microcontroller which provides a real-time service by controlling the various other peripherals interfaced to it. The Parameters measured are pressure, heart beat, pulse rate, body temperature and along with positioning of the women. The wireless technology used here is GSM extends the coverage area to a vast extent and also the GPS will track the exact location and send the information near the control room and as well as there relatives via IOT application.

Key words: Heart beat sensor, MEMS sensor, GPS, GSM, IOT application.

1. INTRODUCTION

In today's world, it is not safe for a person to travel one at night especially for women; it will be high time to travel alone because a woman is not highly strong as men to protect herself from them. The good way to reduce chances in becoming a victim of violent crime (robbery, sexual assault, domestic violence) is to identify and call on resources to help you out of unsafe situations.

In this paper, we present Women safety location tracker application for smart phones working over android platform. It is an innovative safety application for women, senior citizens and anyone who needs assistance in an urgent situation. This application is designed to get you help with minimal or unnoticeable efforts. This paper presents an alternative approach to the traditional methods. This application will notify friends or family if you are in some trouble and need a help from them. It sends Android phone's location and time by using GPS through SMS only to the nearby contacts and default to the parents. Through this the user can get the help as soon as possible. This system can help the user to get immediate help from the friends or family. This reduces risk and brings assistance when needed. This feature of the application not only helps in finding the exact location of the person in problem but also will help the police to trace the location of incident easily.A light weight, soft, robust and low cost sensor system integrated into the inner soles of footwear is being developed to channel information to a mobile device in order to assess the location details. In addition to these Heart beat sensor and MEMS sensor are included which provide pulse rate and movement of the body and also it will alert the nearby control system via IOT Application. To protect the women from difficult situation like harassment, faint, etc. Designing a smart insole to calculate force for controller for monitoring The controller system is designed to send notification via IOT.

2. BRIEF SURVEY OVERVIEW

It is important to have a deep understanding on the existing type of smart

insole system to implement a new smart insole system. This chapter discuss various types of smart insole system and various development in past, Smart device for women safety this is a smart foot device which is developed to safeguard the women whenever she feels unsafe. This device makes use of Internet of Things coupled with Bluetooth wireless connection. The LBM313 BLE module can support a moderate range of data rates that is 250kbs to 1mbs and it also operates at a voltage in the range between2 to 3.6v.As it is a device with small range so we use Bluetooth device as it consumes less energy, less power consumption for it to work. This device will alert that device is in sleep or asleep mode. In addition to these features Bluetooth supports within 100 meters as it is a low energy consumer. A digital triaxial acceleration sensor technolised device accelerometer which is used in BMA250.This triaxial sensor is used to measure the acceleration in 3 perpendicular axes and also it use to sense the motions like tap, tilt etc.. This sensor depends on the actions or the motions of the footwear how it is turned by the user. When the women taps her foot with her footwear device by other or from back ,the sensor in that footwear will senses the action and it will alerts the women that she is in danger.

2.1 MOBILE BASED SAFETY APPLICATION

This a is an application which is designed for the safety of women. This will help from the unwanted or fake meetings, fake calls in the work. To escape from all these, as there is no application to detect fake or real things. Hence this application is designed so that any person is in any danger or unsafe situation then he has to inform his family or friends by calling which takes much time so the designed application uses a panic button that by press that a message is sent to the people mentioned in the application with the alert. The drawbacks of this application are when the person is in problem, he cannot call someone and explain the situation and cannot give the details of the location as person may be alone. By using this application, when person is in danger situation the he press panic button from his mobile which is connecting to this application which will send alert message to the predefined contacts in the application along with the location where the person situated. In this application, the person need gives details like name and contact number where at emergency situation a message is

send to them with the location. A person can add multiple contacts in the application. To send the alerts message user has to press the button with the name SOS as pressed it will send the, message to the predefined contacts. In the message sending can have anything like "help" or "I'm in danger" etc. User can send an audio message or can make video call and explain the situation. This application also gives the information about the first aid which helps in the emergency situation.
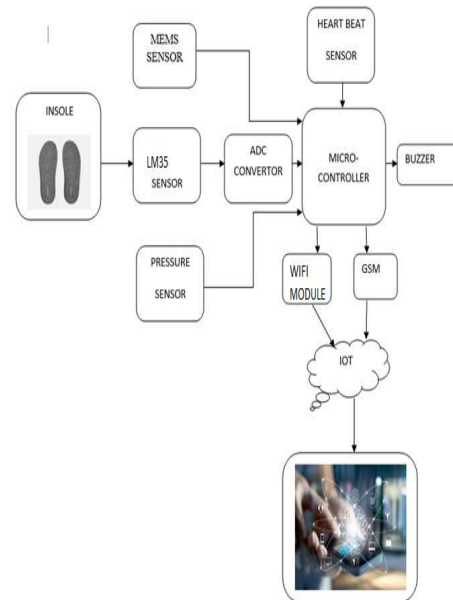
3. BLOCK DIAGRAM

Fig: Block diagram of smart insole safety system using IOT application

In all the existing systems, the user must register the emergency numbers. This is an android app which provides all facilities but it has a disadvantage that if the mobile phone of the women is thrown away by the opposing person, this model cannot be used efficiently. To overcome this disadvantage we propose a model like in shoe. Smart Insole is also equipped with low-cost inertial measurement unit including a3-axis accelerometer and 3-axis gyroscope gait characteristics in motion. Smart Insole can offer precise acquisition of gait information. Meanwhile, it is lightweight, thin, and comfortable to wear, providing an unobtrusive way to perform the gait monitoring.

4. SOFTWARE TOOLS

The internet of things (IoT) is the network of physical devices, and other items embedded with electronics, software, sensors,

actuators, and network connectivity that enable these objects to collect and exchange data. In 2013 the Global Standards Initiative on Internet of Things (IoT-GSI) defined the IoT as "the infrastructure of the information society. The IoT allows objects to be sensed and controlled remotely across existing network infrastructure. Internet of Things (IoT) is an environment in which objects, animals or people are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

4.1 ARDUINO IDE

The Arduino/Genuino Uno can be programmed with the (Arduino Software (IDE)). Select "Arduino/Genuino Uno from the Tools > Board menu (according to the microcontroller on your board). For details, see the reference and tutorials. The ATmega328 on the Arduino/Genuino Uno comes pre-programmed with a boot loader that allows you to upload new code to it without the use of an external hardware programmer. It communicates using the original STK500 protocol (reference, C header files). You can also bypass the boot loader and program the microcontroller through the ICSP (In-Circuit Serial Programming) header using Arduino ISP or similar; see these instructions for details.

4.2 EMBEDDED C

Embedded C is a set of language extensions for the C Programming language by the C Standards committee to address commonality issues that exist between C extensions for different embedded systems. Historically, embedded C programming requires nonstandard extensions to the C language in order to support exotic features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations. In 2008, the C Standards Committee extended the C language to address these issues by providing a common standard for all implementations to adhere to. It includes a number of features not available in normal C, such as, fixed-point arithmetic, named address spaces, and basic I/O hardware addressing. Embedded C uses most of the syntax and semantics of standard C, e.g., main() function, variable definition, data type

declaration, conditional statements (if, switch case), loops (while, for), functions, arrays and strings, structures and union, bit operations, macros, etc. A Technical Report was published in 2004 and a second revision in 2006.

5. CONCLUSION

The smart insole based design and implementation of an energy efficient IoT-based fall detection systems and pulse monitoring system. The device is light-weight and flexible hence suits to different IoT-based fall detection systems and can be used regularly without interfering user's daily activities. Despite the considerable achievements that have been accomplished on the field of providing multiple solutions for elderly fall monitoring, detection, and prevention in the recent years, there are still some clear challenges to overcome. Typically, drawbacks previously stated while surveying various types of research and commercial fall detection and prevention solutions, are considered as open issues that have to be considered for further research. When a fall occurs, the system can detect and pulse will be monitoring then remotely inform responsible person such as a doctor or caregiver in real-time. Finally, all the information will be updated in IOT.

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