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Automated Wearable Technology for Women Safety

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Abstract: In the current scenario, the rate of the women harassment and the crime against women is on the hike and when it comes to India, a crime against women is committed in every three minutes and so there prevails an unprotected environment for the women and the girl children around us. The technology on the other side has reached an global outreach in our country and the ease to accessibility to technologies has also driven our environment a better place to live in the main goal of the paper is to develop a wearable device that certainly ensures women and girl children, safety and protection against harassments. In the paper we propose to develop a device which is integrated with hardware and software components and create a "wearable device" named "smart band" which has specific features that helps women to stay safe and fearless from crimes. The main features of the band includes the "GPS tracking" system which helps to track the location of the victim on the go. The pulse monitoring sensors to keep track of their heart beat and the motion sensors to track their body motions and the device would be programmed. In such a way that whenever an problem is encountered it can send help request along the location and the pulse rating to the relatives and friends by the smart phone that is being connected to the "smart band" by the use of the continuous internet connection. The feature helps the friends and the relatives to reach and save the victim in an much short span of time.

INTRODUCTION

The "Internet of Things" is becoming an extreme growing topic in the recent times. The high internet availability and the cost of reduction in the connection of devices, sensors and the sky-rocketing smart phone penetration, all these factors on the whole has created a high platform for the internet of things. Basically the internet of things is connecting one or more devices with an on or off switch with the internet .The devices that is used be like smart phones, lights, electronic goods, wearables and almost everything that is feasible to connect. The new future rule of technology will be like "Anything can be connected and will be connected".

The wearable technology is a very great application of the Internet of Things. The wearable technology is a

category of technology device that is normally worn by the user to track their locations, health condition or other information related to their health or security. It may also have several sensors like motion tracking or temperature sensing and many others which can be connected to the smart phones.

The study focuses on designing an automated smart wearable solution for women that helps them to feel protected and provides them courage to face the social challenges fearless. The is done by developing an advanced system that monitors and tracks the location and health condition of a person by the use of sensors and gadgets like pulse rate monitoring, temperature sensing ,Global Positioning System (GPS) and Global System for Mobile (GSM) and motion sensors to track the motion of the person and so the device is easy for use and also comfortable when compared with the existing systems.

The smart band that is being developed is integrated with the smart phone and so the size and the cost is reduced. The GPS and the GSM can be used of a smart phone[1]. The device can be installed with Bluetooth 4.0 BLE (Bluetooth Low Energy) which comes in handy for several days on a single shot of charge[2].

RELATED WORKS

The current technologies that have been designed for women safety in the existing market are of different varieties and they satisfy various needs of the society and on a detailed survey of those existing systems we summarize some of the existing smart security solutions for women and their usage to the environment. The type of security solutions may vary as applications, gadgets or even as a combination of both and a few among them is listed below.

EXISTING SECURITY APPS FOR WOMEN

TellTail: The app is a creation of DIMTS (Delhi Integrated Multi Modal System Ltd.). The application allows the user to be tracked through the GPS on their phone or on their vehicle and also it allows the user to send an instant alert to a group of contacts as well during the time of emergency.

Bsafe: The Bsafe app will let user to send SOS messages to guardians .It includes the user's location information by means of GPS and make sure that the guardians receive the location information at any time.

VithU app: The app is also an emergency app. When the power button of the smart phone is pressed twice consecutively it begins sending alert messages with a link of the location of the user every two minutes to the contacts[2].

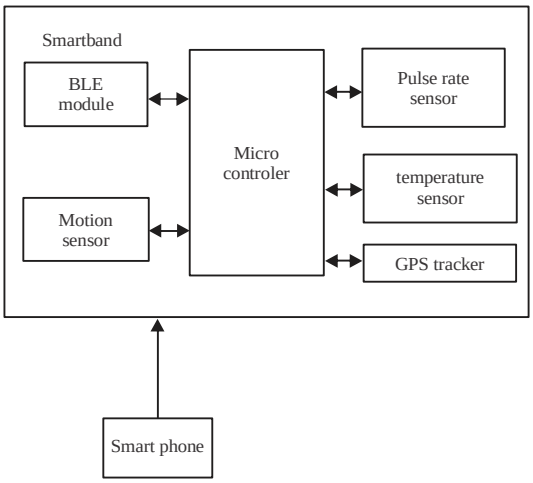

Fig. 1: Smart band module

EXISTING SECURITY GADGETS FOR WOMEN

Safelet: The safelet is a speed and convenient wearable device that focus on the safety of women. The device has two side buttons used to press and send messages within a guardian network. It allows the friends and family members to automatically contact the emergency number from within the app. The device can also record audio by synchronization with the users mobile phone.

SHE (Society Harnessing Equipment): The SHE is an electronic device with a embedded garment which can generate 3800 kV by electronic circuit that helps the victim to escape. In case of multiple attacks it can send around 80 electric shocks[3].

Smart belt: The device is designed in a way that is similar to the common belt. It works with arduino, alarm and sensors. The device will send alarm automatically if the threshold limit of the sensors is exceeded. The screaming alarm unit will be activated and sends sirens asking help[4].

The applications or the devices that have been listed has a major drawback , they need an external triggering of the victim which is not that very easy for the victims at danger situations. So, a solution that works autonomous is encountered in the project (Fig. 1).

PROPOSED WORK

As in Fig. 1, the smart phone is connected with the smart band by the means of Bluetooth low energy module .The interface or the communication between the two devices is made by means of a application that is specially designed and installed in phone. The data's that is continuously formulated by the band including the pulse

rate, temperature rate , the location of the user and the change in motion are monitored by the use of the application that is pre installed in the phone. The description of the various individual units that is used in the project are explained as follows.

MICRO CONTROLLER

The micro controller is one of the most important component of the band. The is a self contained system with a processor, memory and peripherals used as embedded system to other machineries like automobile, telephones and watches, electronics and many others.

PULSE RATE SENSORS

The pulse rate sensor gives out a digital output by monitoring the heart beat of the user and the calculations of the Beats Per Minute is made by the means of the micro controller that is directly connected to the phone. The working of the pulse rate sensor is achieved by the light modulation of satellites networking principle and they are kept monitored to uplink the data's for synchronization.

TEMPERATURE SENSOR

The body temperature of humans is always not in a similar range it will tend to vary depending on various changes in and around the body, so it is very important to track the body temperature to safeguard the user from unlike situations. There are various kinds of temperature sensors and one among them is LM 35 which is an precision integrated circuit sensor that has a linear proportionality with the output voltage and temperature in Celsius. In case of any emergencies then the sensor senses an abnormal body temperature and so it automatically triggers the module for immediate rescue.

MOTION SENSORS

A motion sensor normally senses an moving object, particularly people. The motion sensors form a vital component of security system. The motion sensor is integrated with components that automatically do a work or sends alert to a user in a given area. It normally works by the use of combining various technologies. While combining multiple sensing technologies in to one detector reduces false triggering, it does at the expense of reduced detection probabilities and increased vulnerability factor[5].

GPS TRACKER

The GPS tracking unit will use the global positioning system to determine and track the precise location of the person. It also calculates the latitude and longitude of the person on the globe by the calculation of the time difference of the signals from the various satellites present. The types of the GPS trackers is categorized in to data loggers, data pushers and data pullers. Thus, the GPS is of a great use in providing continuous monitoring of the location of the user and sends alert to the family and friends if there is an unspecified location tracking.

BLE MODULE

The Bluetooth low energy module is of low cost and small size. The power requirements for the BLE is also less when compared to the other common Bluetooth modules. It is also compatible with a large installed base ofcomputers, phones and tablets. The is mainly used in many places such as health care, sports and fitness, generic and proximity sensing and many others.

CONCLUSION

The main theme or the idea behind the project is to give women of our society an easily accessible and comfortable safety wearable device that is also easy to afford. The device is designed focusing on some of the very frequent critical issues in the current environment and so a feasible security solution is framed to solve them through our device.

By further research on the current scenario and by understanding more problems some more additional features can be added to the project and the accuracy of the project can also be increased by the desired changes.

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