Smart Wrist Band for Women Security using Logistic Regression Technique

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Abstract: Women is an inside society part and her security is the essential and to a great degree critical concern for the society, in present years many cases has been reported against women harassment. The only question arises is will they be able to move free on the road without having any worry about their safety. In this situation the main purpose is to design a system which will provide security to women from issues of women harassment. This paper serves a purpose which will provide security to women, it consists of IOT based smart band which is implemented using machine learning techniques. The device consists of sensors and GPS module which is integrated with Arduino UNO board. In this the GPS module will send notification to the family member about the current location of the victim which will provide more security to the women.

Index Terms: Sensors, GPS, GSM, Mobile Application, machine learning.

I. INTRODUCTION

In the current scenario we can observe that the women safety has become a common issue, women are more worried about their security and safety, different application are designed and implemented to provide security. smart applications are designed which consists of all the latest technologies to provide safety measures to the women. Smart bands are designed to provide security to women which are connected to smart devices which helps family members to get the current location of the women. The strategy is to switch to an independent hardware is main focus of this project. Here we have implemented a system which ensures the safety of women. This system is designed using IOT devices which consists of sensors i.e. pulse, temperature, motion, vibration, ultrasonic which are integrated with Arduino UNO board which results according to the situation of the women. GPS is integrated with this sensor which sends the current location of the women so that the family member can tack them. This helps to identify the location and call all the available resources to help the women. The sensor gets activated and sends values to the training dataset. If the analysis shows the abnormal results it will popup message on an application.

Main aim of this device is to provide security and safety to women dealing with different issues. Leaving in an independent world still women safety is the biggest concern, women are not safe even today. There should be some

effective solutions which can provide security and safety to women. Many devices are designed which provides the essential feature for the safety of women but they come up with a drawback that the application requires initial interaction of women and that condition is not possible.

II. LITERATURE SURVEY

"Smart Security System for Women Based on Internet of Things (IOT)" [1]. The objective of this paper is to provide security to women. They designed a band which consists of different sensors i.e. pulse, temperature, motion which is integrated on Arduino UNO, which continuously communicate with smart devices.

"Autonomous Body area network Implementation using IOT enables Healthcare Application" [2]. This paper deals about the wearable sensor node with solar energy harvesting. It deals with the monitoring of health condition of different person with the help of various sensors. A smart application has been designed which is used to display sensor data.

"Survey on Wearable device used for health monitoring" [3]. In these papers they have developed a device which is used for monitoring the health condition of patient. This device works with the smart application which tells the range of sensor and Bluetooth device.

"Smart Girl child security system using IOT" [4]. This paper tells about the device which is designed for the security of girl child. It gives description about GSM shield, Arduino Board, GPS tracking system, Screaming alarm and sensors.

"Smart Android Application for Women Security" [5]. In this paper they have developed a smart android application which is used for providing security to women. Generally, it works by clicking start button to ACTIVATE SERVICE and by pressing VOLUME KEY emergency message cab be sent to registered contacts.

III. GAPS IDENTIFIED IN EXISTING SYSTEM

We can see many of the devices has been designed to provide the security to the women. But they come with a drawback as in existing system there is no monitoring system and creates problem for women and it does not contain any safety solutions to protect them from critical situation. Addition to this in existing system, there is no alert mechanism available for providing notification for women safety it is done manually only.

- Existing system consists of GPRS service which works fine when connected to internet and cannot be used when internet connectivity is not available.

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- No functionality of hidden camera which is portable.

- Cost is high.

- All the analysis is done manually.

IV. SMART WRIST BAND SYSTEM

We have designed a smart band and android based application. It depends on the sensor values and prediction using multiple logistic regression technique which predicts the condition of women. It consists of GPS which helps in tracking the current location and notifies it to the family member and nearby police station. Also, this notification is sent on application so it provides social platform.
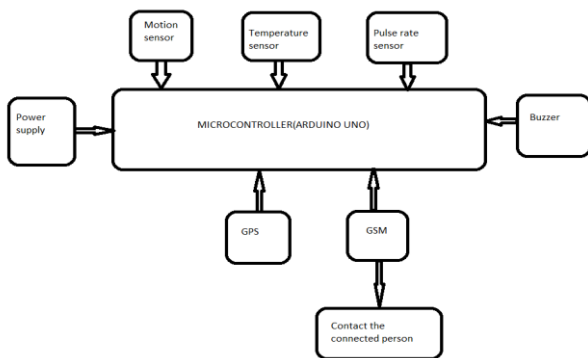

Fig 4.1: Architecture of Smart Wristband

A. Temperature sensor:

It is used to monitor the temperature of the body in any condition. Different temperature sensors can be used to monitor the temperature of the body according to different condition.

B. Motion Sensor:

A Motion Sensor is a device that is used to detects objects moving around the person. It detects is anybody or any object is passing the way of the women. It automatically generates the alert message if any object is moving around it.

C. Ultra-Sonic Sensor:

Ultrasonic sensor has been broadly divided into three categories consists of transmitters, receivers and transceivers. In this transmitter is used to convert the electrical signals into ultrasound, receivers are used to convert ultrasound into electrical signals and the transceivers can be used for both transmitting and receiving ultrasound.

D. GPS Module:

Global positioning system (GPS) is able to locate the current location and the latitude and longitude of a receiver and also calculate the time distance of the user.

As seen in figure, the device is connected to the smart phone using WIFI module. The device works as an interface between the phone and the system which generates signals and communicated with mobile phone. The sensors continuously produced the data and device monitors the activity of the system and maintain the data and perform the operation. It monitors the sensor data with the help of preinstalled application in mobile phone.
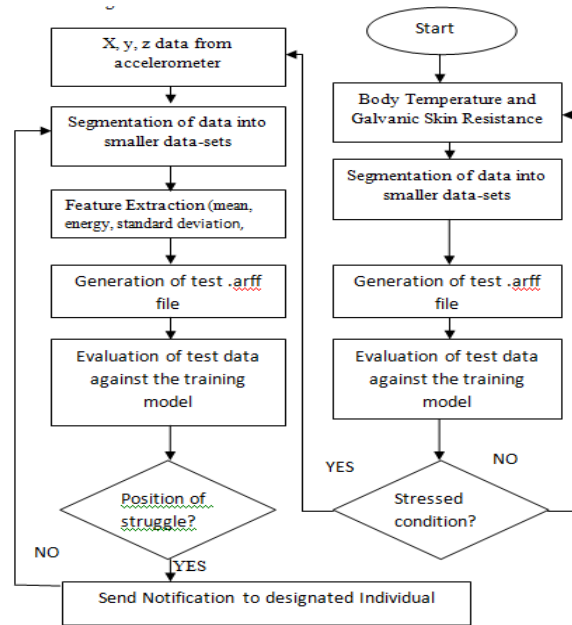

Fig 4.2: Methodology of Smart Wristband

In critical condition the application performs various function and alerts the networking device to phone to perform various operations:

• Sends notification and alert the family member by sending message and nearby police station.

The system is designed with GPS monitoring location tracker which sends the exact location of the victim.

System is all in one device. We don't have to carry multiple devices. When the power condition is less, it autogenerate the signal and sends the location to the pre-stored contacts. We don't need internet connection for tracking. GPS track the exact location of the person wearing it.

V. SMART WRIST BAND WITH LOGISTIC REGRESSION TECHNIQUE

The following steps are carried when once the unusual behavior of the user is detected. The analysis and prediction is done on the basis of the inputs given by the different sensors like pulse rate sensor, temperature sensor and unusual motion detected by the motion sensor. The situations are pre-programmed into the system based upon which the device makes the decision and is handled by the smart phone app.

- Get the data using the GPS module.

- Get the Data from the different sensors and perform prediction.

- Send the message to the contact which are available in the device.

Machine learning approach for prediction and classification:
As designed, the sensor data is continuously observed from the device and with the help of chip which is programmed in a system which will continuously receive the data from the sensor and send sensor data to
Thing Speak.

This is done using the Arduino UNO IDE. Data collected is repeatedly being send and stored in cloud, it is collected in the cloud and analyzed by the MATLAB to perform analysis. First step is to understand the condition of person. To do this, pulse sensor and temperature sensor values has been analyzed. All the operation and prediction are done using the machine learning technique. Large amount of dataset is used which is being divided into "training" and "test" dataset to perform prediction and as a result it generates the graph which tells the condition of the person. During analysis all the sensors generate the data and are continuously being monitored for the analysis. Prediction is done on the training data considering the test data.

VI. RESULTS AND DISCUSSION

The device is designed using different sensors as shown in the figure-3. It consists of Arduino and different sensors integrated with it:
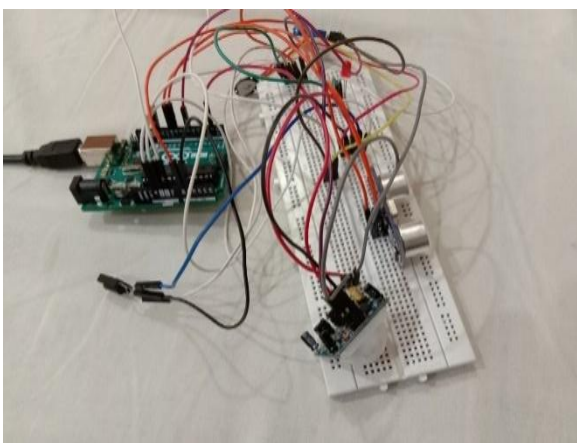

Fig 6.1: Smart Wrist band System

As a result, we are sending sensor data to cloud platform namely Thingspeak which is collecting the sensor values and analyzing it with MATLAB and generating a graph using different parameter values.
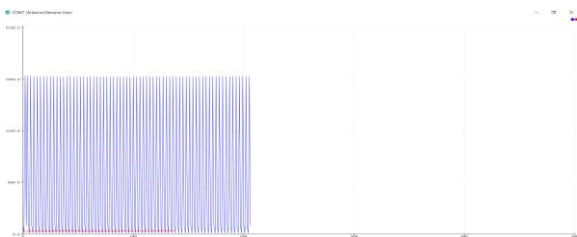

Fig 6.2: Graph generated from the device data

Along with the analysis we have performed a logistic regression technique considering the dataset which has been categorized into training and test data which is used for performing the prediction.

Table 1: Test Data

S.no	T1	M1	U1	V1	P1
F	97.2	13	35	0	75
F	97.7	13	40	0	61
F	98.1	12	31	1321	89
F	98.2	14	54	0	81

F	98.2	12	47	443	64

Table 2: Training Data

S.no	T1	M1	U1	V1	P1
F	96.7	12	0	0	69
F	96.8	14	41	0	62
F	97.2	10	45	0	66
F	97.4	12	43	0	68
F	97.6	12	45	345	57

After applying the prediction logic, we are obtaining a graph which is showing the result as a woman is in stressed or relaxed condition and how the parameter have impact on each other.
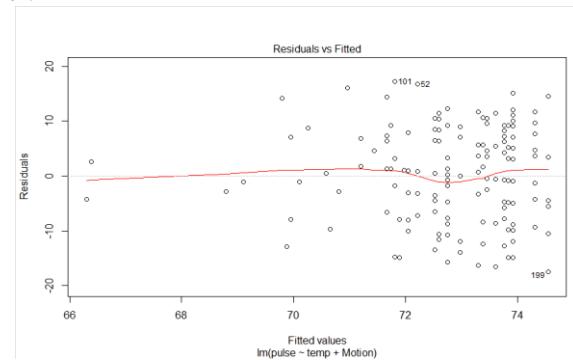

Fig 6.3: Graph generated from the Regression Technique

VII. CONCLUSION

This system has been designed considering the crucial condition of the women. To provide safety to women in a fastest way possible. The proposed designed will help women in all the critical situation and will help in solving all the issues faced faces by the women in recent past years. The system is designed considering all the latest technologies which will provide more safety features to women.

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AUTHORS PROFILE

Avantika Bhate completed B. Tech in computer science and engineering from Dr. C. V. Raman University Bilaspur. Currently perusing M. Tech in Computer science and engineering from Vellore Institute of technology, Vellore. My M. Tech research work is to design a Smart wrist band for women security using logistic regression technique.