

Implementation of Hybrid Prevention System for Disabled Person Using Android Based Application

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ABSTRACT

In current scenario many of the people are suffering from seizure, fit and cramps. People suffering from the above mentioned causes can be easily slipped down without control in the current place itself. In our project we present the human activity monitoring system for fall accident and health parameters detection. The system consists of wearable blood pressure, temperature and two Accelerometer sensors. If an abnormal event is detected the information will be conveyed to the emergency contact number of the patient and that information is passed to the nearest ambulance station through wireless transceiver. This system also can be monitored through mobile application and provides the current status, location of the patient.

Key words: Fall accident, seizure, wearable blood pressure sensor, accelerometer sensor.

1. INTRODUCTION

The medical monitoring system is developed for the purpose of medical practitioners to monitor the patient in the long range transmission and it also can be useful for health care providers to improve disease management. In the proposed system, patient unit and ambulance unit are there. This proposed hybrid system includes fall detection, locating and rescue system

The patient is monitored from anywhere and the data transferred to the android phone, patient's need to wear a sensor in three parts of their body to measure the parameters such as Temperature, and Blood Pressure Movement. Real time activity of the person is monitored by accelerometer sensor (ADXL335), UA631 is used to sense the blood Pressure. LM35 is used to detect body temperature.

Normally this monitored information's are send to the user information to the user with location through GSM and GPS. Wireless transceiver is used to communicate the information between patient unit and ambulance unit.

Android application will be developed for monitoring the status like fall accident, health parameter. Now a days, old aged people and physically challenged people are greatly affected by sudden fall and also with an abnormal health conditions.

But we can overcome these issues by taking care of them with the help of developed technologies. In the field of embedded system, there is lot of research's are conducted on the area of microcontroller and the sensors.

To monitor the human's external and internal [4] activity in order to overcome these problems. Also we can easily understand the concept of embedded system, is the main advantage.

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2. RELATED WORK

Mitja Lustrek et al [1]. In this paper they discussed about the problems of aged people and the issues involved in the process of taking care of them. They tried to detect the solution to support the independent living for elderly people. And also the author handled the sensor placement concept to sense the information of the aged people. And the authors created a classifier namely Random Forest Classifier to classify the basic eight activities of the human.

Simon Kozina et al [2]. In this paper the author described about the detection process called TriLAR – three layer architecture. And also they used meta-classification to differentiate the different kinds of activities. The three layers namely bottom, middle and the top layer approach where gave a excellent result. Along with AR-activity recognition they also gave an idea to build a HMM-health monitoring system with the help of different types of sensors.

Nasir Vyas et al [3]. The authors of this paper stated the significance of heart rate monitoring. Due to the modern life style the people's area greatly affected by heart disease so the authors tried to detect heart functioning with the help of micro controllers. The main advantage of the microcontroller is it is very compatible to use with any kind of embedded system. The controller used by the author is very cost effective is the main highlight of this paper.

Nisha singh et al [4]. In this paper the author handled the pic microcontroller based temperature and heart beat monitoring system. For temperature sensing they used positive temperature coefficient thermistor hence the result will be more accurate. And for heart rate they used fingertip monitor which is very simple to use and no need of high level medical knowledge. The author developed the system which we can use at home is the major advantage. And they used pic microcontroller to interface with the sensor, is the major advantage of the paper.

3. PROPOSED WORK

The proposed system consists of two parts such as patient unit and ambulatory unit. Patient unit allows us to monitor patient's real time activity along with the health parameters (blood pressure, temperature and accelerometer). Also we can know the location of the person with the help of GPS. Emergency condition incise any of the data is in abnormal condition means it will automatically sends the information to the family members immediately through GSM. Mobile application will be developed for monitoring the status like fall accident, health parameter. Ambulatory unit will receive the emergency information and take remedial action for the patients.

4. DESIGN AND IMPLEMENTATION

4.1. Patient unit

The patient unit consists of three sensors such as temperature sensor, two accelerometer sensor, GPS, GSM. Temperature and pressure sensors will access the vital signals from the patient's body to ARM. Accelerometer sensor will monitor the movement of the patient. GSM technology will transfer the information to the emergency contact number of the patient.

4.2. Ambulatory Unit

It consists of PIC controller, LCD and wireless transceiver for receiving the information. After receiving we can find the exact place using the latitude and longitude representation then we can take immediate action.

ARM controller is used it has an in built ADC so we can change the data signals from the sensor directly to digital. So for this purpose we had been using ARM microcontroller.

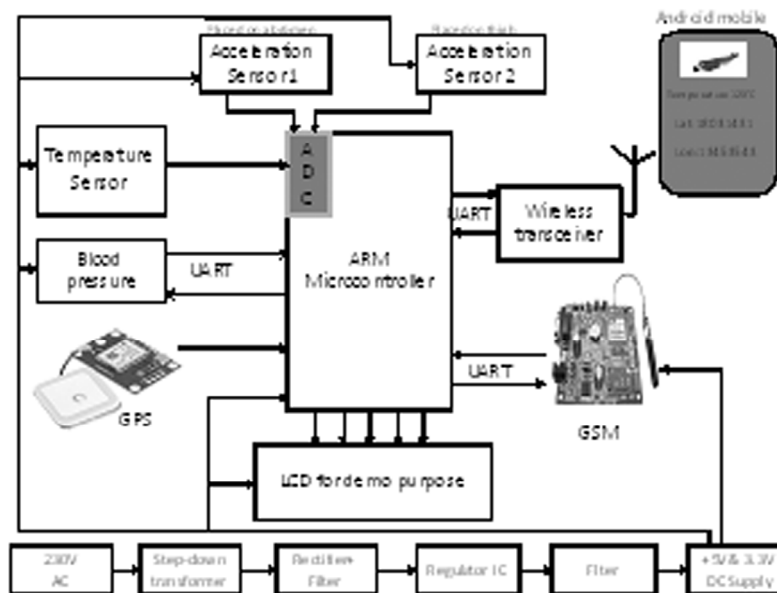


Figure 1: Patient unit Block Diagram

Ambulance unit

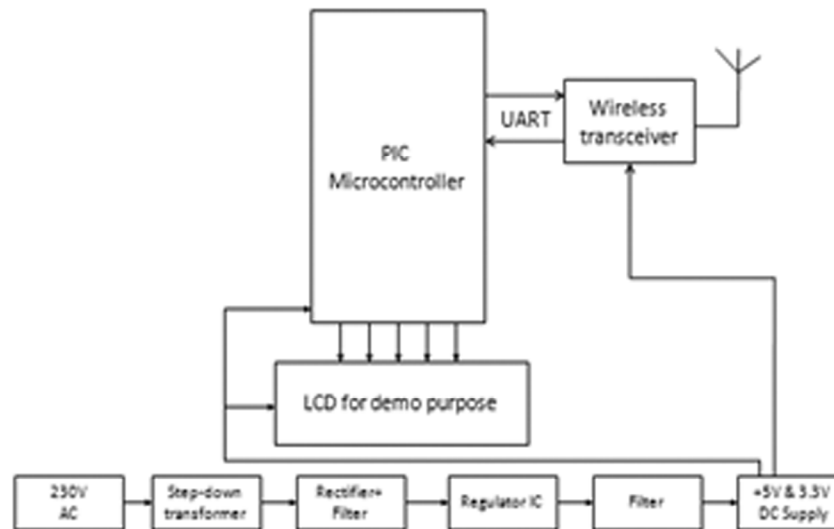


Figure 2: Block Diagram of ambulance unit

Acceleration sensor ADXL335 is used. It is used for monitoring the movement of the person. LM35 temperature sensor is used.

UA 631 blood pressure sensor is used. To monitor the systole and diastole value. Global System for mobile will transfer the information to respective emergency contact person and also to nearest ambulance centre.

Global Positioning System is used to find the appropriate latitude and longitude when the patient suddenly falls.

5. RESULT AND DISCUSSION

5.1. Design

Thus the proposed system can detect the temperature range of the human up to 150°C. Accelerometer sensor will capable of sense the acceleration of the mass up to 180g from 0g with respect to gravitational

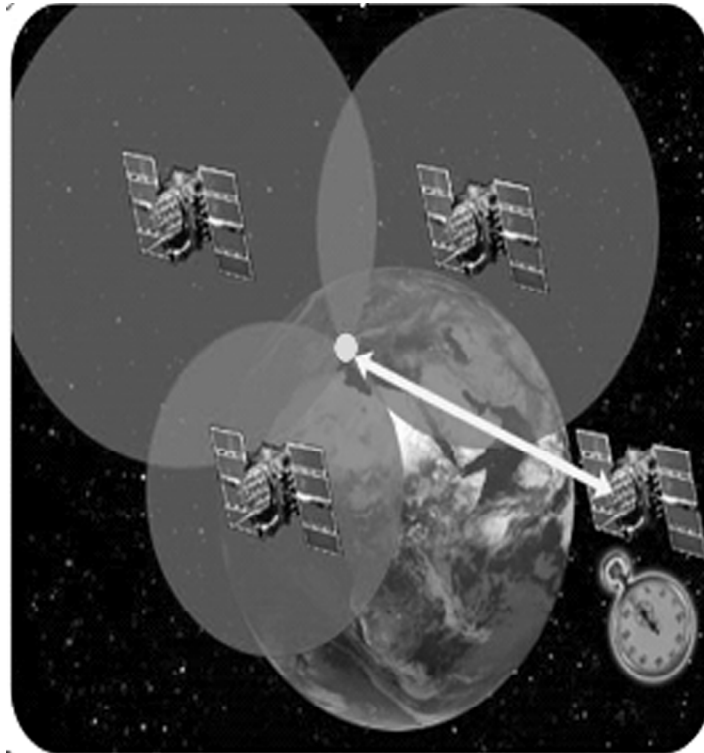


Figure 3: Trilateration Concept of GPS

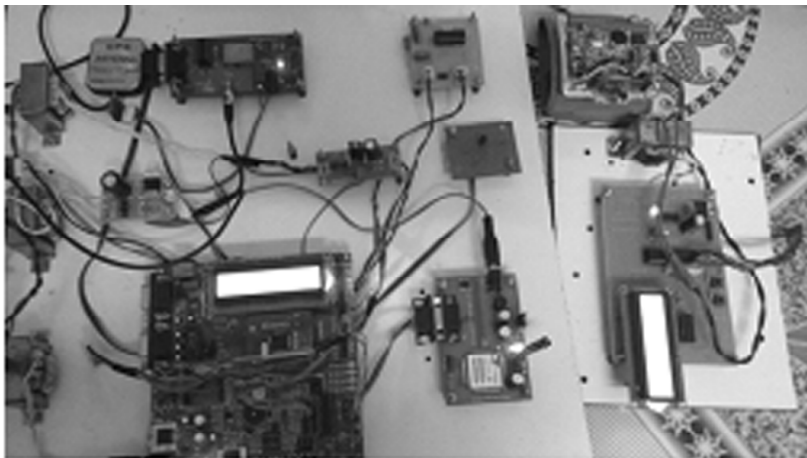


Figure 4: Prototype of the system



Figure 5: Fall Detected

axis of the earth, so we can also detect a very small amount of the change which occurs on the object. Here the blood pressure sensor and temperature sensor are basically having high sensitivity, will measure most accurate result compare with the sensors which works on the basis of auscultatory method.

5.2. In Fall Condition

In Sudden fall was occurred means we will receive immediate message automatically from GSM to Controller and Android Phone as follows,

5.2.1. In Standing/Walking Condition

Person activities were found by using accelerator sensor that is fixed to thigh. This information was conveying through the GSM to android mobile.



Figure 6: Standing Condition



Figure 7: Walking Condition

Generally accelerometer sensor are used to find the fall detection which is fixed on abdomen, and person activity like standing and walking can be find by fixed accelerometer sensor in thigh. If we want to know the particular detail of the person at present time means we can send a message with a distinct code [38] to the GSM module

6. FUTURE ENHANCEMENT

In future the project can be developed into the android platform in order to get the more graphical data. And the placement of the sensor also can be reduce in further enhancement. Instead of normal sensor we can use nano sensors and the sensors which is configured with base station will be more compatible. Due to wireless platform the patient can easily carry over the nano sensors with them.

7. CONCLUSION

Thus the developed android application system will ensure the safety of the old aged people and reduce risk of physically challenged people by alerting the user fall detection and the abnormal health condition. The system supports independent living and confidence of the old aged people effectively. And also the system is greatly user interface. The sensors used in this project also wearable and light weight and the transmission range of the system is very high because of the GSM, is the major highlight of the project.

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