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AN IMPROVEMENT FALL DETECTION SYSTEM FOR ELDERLY PEOPLE

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ABSTRACT

In this paper, an enhanced fall detection system is projected for old person observance that's supported good sensors worn on the body and operational through client home networks. With treble thresholds, accidental falls are often detected within the home care setting. By utilizing data gathered from all the sensors measuring instrument, accelerometer and good sensors, the impacts of falls are often logged and distinguished from traditional daily activities. The projected system has been deployed in an exceedingly model system as careful during this paper. In the proposed system continuously monitoring the pulse rate, temperature of the particular person if the any sensor exceeds the limit then immediately the location of the person will be messaged to the authorized person through the GSM, the location will be tracked by using the GPS receiver.

Keywords: GSM module, Mobile, SMS, GPS, Temperature Sensor, Accelerometer and Micro Controller

I. INTRODUCTION

In recent years, many varieties of client electronic devices are developed for home network applications. A client home network sometimes contains numerous styles of electronic devices like sensors and actuators, in order that home users will management them in AN intelligent and automatic thanks to improve their quality of life. Some representative technologies to implement a home network area unit radical Wide Band, Bluetooth and accelerometer. Measuring system is appropriate for client home networks as a result of numerous sensors are often deployed to collect home information data in an exceedingly distributed, self-organizing manner with comparatively low power. The structure of projected fall detection system core structure depends on a small programmed Controller Unit (MCU). The cardio tacho and measuring system area unit integrated on one single board, recording real time acceleration and heartbeat. Every acceleration and heart beat data is initial captured by analog-digital converter (ADC). Then, the digital signal is transmitted to the

MCU for any method. The system is complemented with a customer interface designed to look at data in amount.

As far as we can see elderly people are having the common problems like fever, rise or fall of blood pressure, or they may accidently fall down. In such cases unlike the young people they need an immediate medication or the help. Our project can capable the measure or monitor the problems like pulse measurement, temperature measurement and even the fall detection using accelerometer.We are using the Global Positioning System for the detection of the location of the person. By using the GPS we can find out exact location of the person. We are able to detect any problem or illness even though we are not in sight by using GSM module. We can find the person by the received message. This system is intended such it will facilitate the elder persons World Health Organization square measure residing within the house.

II. LITERATURE REVIEW

To implement the GSM and GPS for fall detection system the study has done on different researches.

The many of fall detection systems available in previous depends up on the application of the users implemented using different sensors techniques. Many of the previous systems are monitoring the elderly living space could analyse potential risks of fall occurring, and some of the systems like buzzing the when the fall occurred. So all the previous technologies will be not fully monitoring the person health details abnormally.

In this paper, an enhanced fall detection system is proposed for elder persons monitoring that is based on smart sensors like temperature, heart beat and accelerometer worn on the body interfaced to the controller on the system by utilizing these sensors, the impact of falls can be logged and distinguished from an accelerometer and smart sensors. Here the proposed system has been deployed as prototype system described in this paper. The structure of the proposed fall detection system will be based on microcontroller programmed unit. Whenever the sensors get detected then automatically the gps will capture the location of the person and immediately the information will sent to the authorized person by using gsm mount on the system.

III. HARDWARE DESIGN

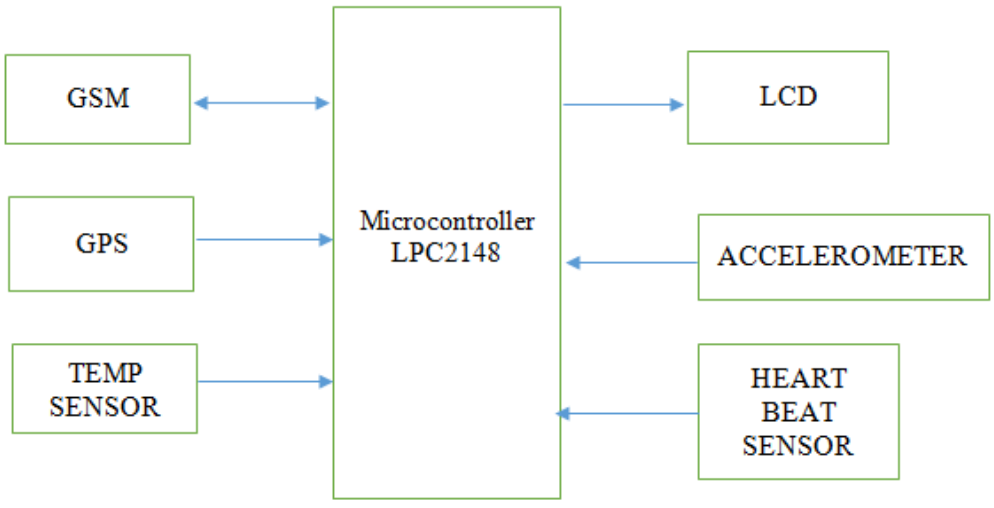

Fig 1: Block Diagram

The fall detection system using GPS and GSM technology consists of different hardware and software modules. The following block diagram shows the overview of hardware components included in the system.

3.1 LPC2148 Microcontroller

The LPC2148 microcontroller board based on a 16-bit/32-bit ARM7TDMI-S CPU with real-time emulation, 16-bit/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package, 8 kB to 40 kB of on-chip static RAM and 32 kB to 512 kB of on-chip flash memory; 128-bit wide interface/accelerator enables high-speed 60 MHz operation, In-System Programming/In-Application(ISP), Single 10-bit DAC provides variable analog output, Two 32-bit timers/external event counters (with four capture and four compare channels each), PWM unit (six outputs) and watchdog, Low power Real-Time Clock (RTC), Multiple serial interfaces including two UARTs (16C550), two Fast I2C-bus (400 kbit/s), SPI and SSP with buffering and variable data length capabilities.

3.2 GSM Modem

A GSM modem is a gadget which can perform all the mobile operations like calling, and GPRS network with it. However, the main contrast is the GSM modem is the crude type of a cell telephone which is planned to use in modern and test applications. The GSM modem utilizes 900MHz data transfer capacity as a part of India according to the telecom administrative tenets. As we say prior it is a crude type of a cell telephone, the GSM modem contains a SIM card space, Antenna and a Max 232 driver in it.

3.3 GPS Receiver

A GPS receiver calculates its position by exactly temporal arrangement the signals sent by the GPS satellites high on top of the world. Every satellite regularly transmits messages containing the time the message was sent to the gps receivers on the earth, precise orbital data, and therefore the general system health and rough orbits of all GPS satellites. The location is displayed, maybe with a moving map show or latitude and longitude; elevation data could also be enclosed.

3.4 Temperature Sensor

The DS1621 measures temperature by tallying the quantity of clock cycles that an oscillator with a low temperature coefficient experiences amid a door period controlled by a high temperature coefficient oscillator.

3.5 Accelerometer

An accelerometer is a sensor that measures the physical acceleration experienced by an object due to inertial forces. As a speedometer is a meter to measures speed, an accelerometer is a meter to measure acceleration. An ability of an accelerometer to sense acceleration can be put to use to measure a variety of things like tilt, vibration, rotation, collision, gravity, etc. Accelerometers measure in terms of ‘g’ (‘g’ is acceleration measurement for gravity which is equal to 9.81m/s^2). Accelerometers are made using tilt sensors.

3.6 Heartbeat Sensor

Heartbeat device provides an easy thanks to study the perform of the guts which may be measured supported the principle of psycho-physiological signal used as a stimulant for the virtual- reality system. The number of changes in the blood within the finger changes with reference to time.The device shines a lightweight lobe

(a tiny terribly bright LED) through the ear and measures the sunshine that gets transmitted to the sunshine Dependent electrical device. The amplified signal gets inverted and filtered, within the Circuit. So as to calculate the guts rate supported the blood flow to the tip, a heart-rate device is assembled with the assistance of LM358 OP-AMP for watching the heartbeat pulses.

IV. SOFTWARE DESIGN

In this proposed system, as we used LPC2148 we need to use following software tools to program for it.

1. Keil uVision
2. Flash Magic

The Keil uVision is an IDE for Embedded C language. In this IDE, we need to import the utilities and libraries according to the controller we are using. This IDE is very simpler and in user friendly manner to use. It includes all the C/C++ compilers, assemblers, and debuggers in it. It simplifies the process of embedded simulation and testing along with Hex file generation.

The flash magic is a programming utility. The C/C++ program written in IDE will be processed into Hex file i.e. in .hex format. It is necessary to dump the hex file on to the microcontroller.

V. WORKING DESCRIPTION

The fall detection using starts from when the powered up to the microcontroller and all the sensors interfaced the it continuously checks the pulse rate of the person, the heart beat module set to the 79 pulses it means the normal pulse rate of person and maximum temperature is also set and accelerometer detection then any one of the sensors exceeds then the location of person will be captured and information sent to the authorized person through GPS and GSM technology. In this paper we implementing the arm7 based lpc2148 microcontroller and smart sensors like temperature, accelerometer and Heart beat sensor.

VI. RESULTS

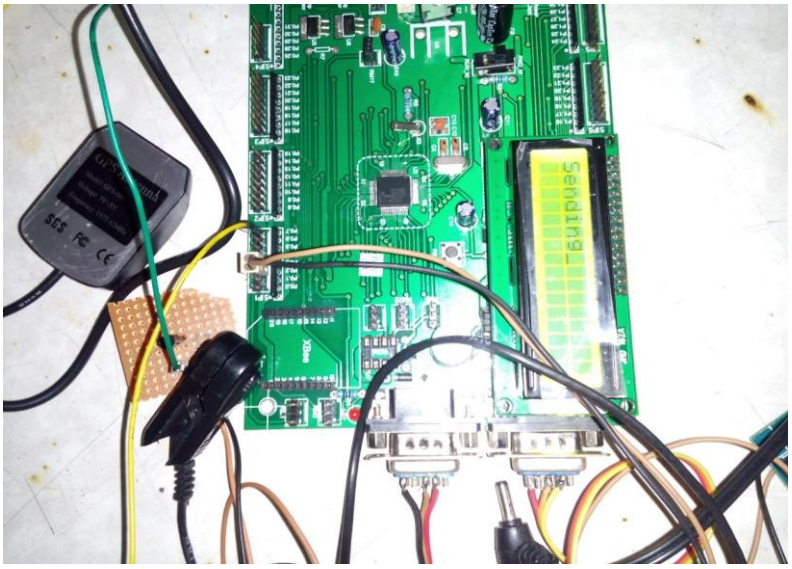

Fig 1: Overview of System Design Model

VII. CONCLUSION

In the old age of every person needed immediate help for the disorders like heart stroke, fever or even person fall down. In their old age they needed help or at least they require immediate help especially in the cases like person fall down or even heart stroke. With the help of our project we can reduce the major damages for all persons in all cases. The proposed system will be very helpful for elderly people. The smart sensors are interfaced to ARM (Advanced risc machine)and the heart beat sensors count will be set to the normal pulse rate of the person if it exceeds then the immediate action will be processed by the controller by using GSM and GPS technology.

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