HOME BASED ELDER CARE USING WIRELESS ZIGBEE TECHNOLOGY

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ABSTRACT

The zigbee network based elder care monitoring system is for monitoring the activity of the elder people. In this paper we monitor the activity of the elder people live alone in home by using the sensors. There are different types of sensors involved to monitor the elder people condition. We defined two new wellness functions to determine the status of the elderly while performing essential daily activities. The proposed system is installed in home which is used to inform the ambulance when the elder people is in emergency condition. This method is advantageous for elder people live alone at home.

Keywords: Zigbee Network, Home Monitoring, Elder Care, Monitoring Abnormal Behaviour, Wireless Sensor.

I.INTRODUCTION

A normal person performs daily activities at regular interval of time and may have good health condition. They can do their work alone. But elder people may have many health issues. In the recent years most of the elder people live alone at home. The system is monitor their activities and store the time of work can done by the elders. we use the different types of sensors to sense the activity and the signal received by zigbee network.

In the present work, an intelligent home monitoring system based on ZigBee wireless sensors network has been designed and developed to monitor and evaluate the well-being of the elderly living alone in a home environment.

The developed system is intelligent, cost effective, robust and there is no need of camera for monitoring the elder, the system continuously reads their activities and if the data mismatched in predefined data, then the system will automatically induce the alerts. Based on a survey among elderly we find that it has a huge acceptability to be used at home due to non use of the camera or vision based sensors. The intelligent software, along with the electronic system, can monitor the usage of different household appliances.

In this system, a required number of sensors for monitoring the daily activities of the elderly have been used. Increase of a number of sensors increases the cost of the system and may also complicate the installation issues. A variety of systems for monitoring and functional assessment for elderly care have been proposed and

developed in recent times. Monitoring activities of the person based on camera based sensors are reported in where the images of the person are taken and analyzed. In real practice applications such as surveillance and security make full use of camera based system but for home monitoring activities it lacks a huge acceptability among the elderly. Other than camera, infrared based Small Motion Detectors(SMDs), passing sensors, operation detectors and IR motion sensors have been incorporated in the house for monitoring the human activity behaviour and the interpretation of human activity is limited to only to a few human activities.

Activity recognition and Wellness determination are two important functions to be done in a timely manner rather than offline. Hence, real-time processing of data is a must for recognizing activity behaviour and predicting abnormal situations of the elders.

II.SYSTEM DESCRIPTION

The wireless sensor network integrated with zigbee network is collected data due to usage of house hold appliances and store the data in the computer for further data processing. The collected data only represents the device status like it is in active or inactive mode. To sense the activity behaviour of elderly in real time, the next level software module will analyze the collected data by following an intelligent mechanism at various level of data abstraction based on time and sequence behaviour of sensor usage.

The low level module consists of a number of sensors inter- connected to detect usage of electrical devices, bed usage and chairs along with a panic button. The fabricated sensing unit as shown in Fig.1 communicates at 2.4GHz (Industrial Scientific and Medical band) through radio frequency protocols and provides sensor information that can be used to monitor the daily activities of an elderly person.

A smart sensor coordinator collects data from the sensing units and forward to the computer system for data processing. The major task of our work is to recognize the essential activities of daily living behaviour of the elderly through sensor fusion by using minimal sensors at elderly home. For this, WSN consisting of different types of sensors like electrical, force, contact sensors with zigbee module sensing units are installed at elderly home.
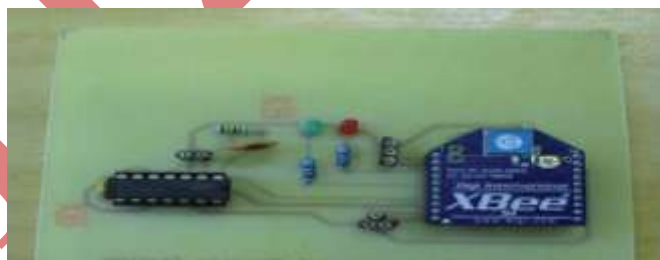

Fig.1. Fabricated sensing unit with ZigBee module.

The system uses force sensors attached to bed, couch, toilet and dining chair to monitor their daily usage. Based on the analog values of the force sensor received by the coordinator, the system can recognize the usage of these devices as active or inactive. Whenever the elderly person used these devices, developed system has monitored and recorded the event effectively for further data processing. The developed system, if any emergency occurs our system is send the information to ambulance. It is most helpful to elder people. The different types of

sensors is connected to the single zigbee wireless network device. The wireless range of zigbee is contrast to Bluetooth. Zigbee is advance wireless device.

III.DATA ACQUISITION

Captured data are dynamically changing and demanding fast, real-time response time for forecasting the irregular behaviour of the elderly. To analyze the data properly, an efficient process of storage mechanism of sensor data onto the computer system is executed. Issues like storage requirements for continuous flow of data streams and processing of data to generate patterns/abnormal events in real time were effectively dealt in the current system.

Since there is a continuous in flow of sensor streams we have stored the sensor data in the processing system only when there is a change in the sensor events - Event based storage (i.e) when status (active or inactive) of the sensor is changed then the sensor fusion data is recorded. This is most efficient technique, as it reduces the size of storage to a large extent and more flexible for processing of data in real time. Event monitoring collection of data has enormous benefit over continuous flow collection of data in terms of the amount of data storage and processing of data in real-time applications like home monitoring.
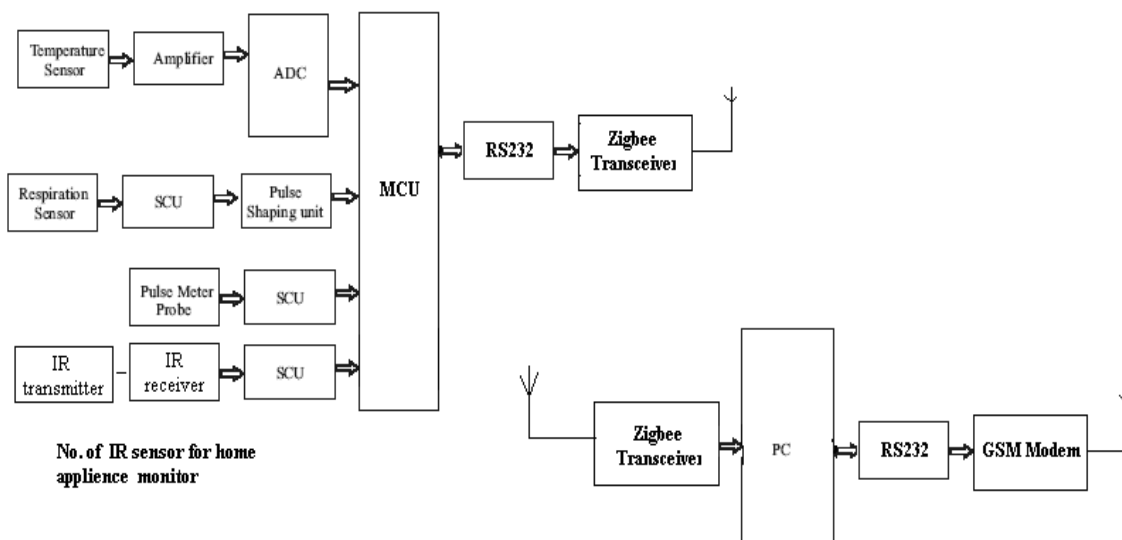

Fig.2.Block Diagram Representation of Zigbee Network

IV. ACTIVITY MONITORING

Pulse Sensors are monitor the elder people pulse range. It sends the low range signal to the zigbee network and this network convert it into data value and stored in the computer, like that all the sensors sensing their activity and send to zigbee network. It converted into data value and stored in the computer. Activity annotation process will help the monitoring system to recognize the various behaviours of the elderly at different instant of time. This process is done based on the collection of sensor identity from the sensor fusion of various sensing units

connected to different house-hold appliances. Appropriate time slot size is to consider for labelling the activity based on the sensor id and time of the day. It provides sufficient information for doing data analysis.

If the elderly person needs assistance with some of their Activities of Daily Living (ADLs) - An index or scale which measures a patient's degree of independence in bathing, dressing, using the toilet, eating and transferring (moving from a bed to a chair, for example) [19] as these are used to determine the need for long-term care or Instrumental Activities of Daily Living (IADLs), professional caregivers accessing the elderly activity reports will have an objective assessment of their actual needs and appropriate care services based on the daily functional assessments of the person.

V. SYSTEM OPERATION

This is the circuit diagram of the system. In this circuit shows the monitoring of the pulses. The normal pulse rate is in the range of 40 to 70.the system continuously monitor the pulse rate of elder people. whenever the pulse rate is in below of predefined range the LED will glow. It alerts the user for knowing the critical position of elder people. Likewise all the sensors are used to monitor the elder, if the data is not in the range of predefined data the system induce the alert message or signal then people can help the elders.
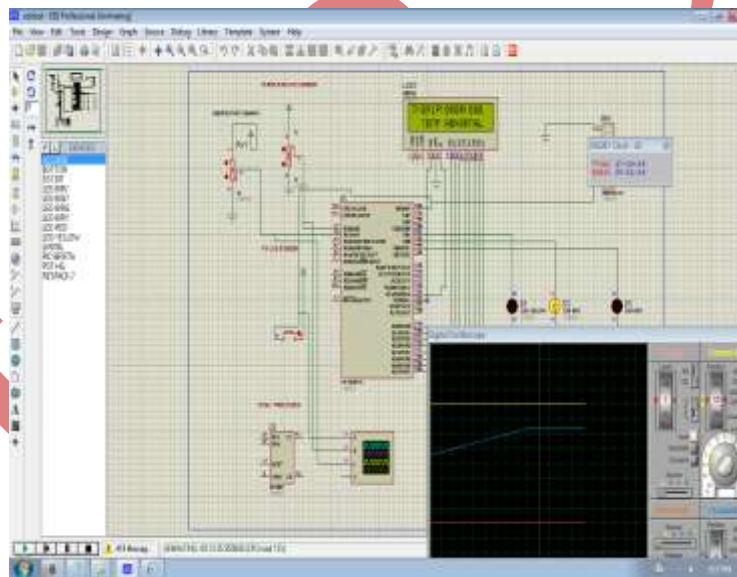

Fig.3.Simulation Output of Abnormal Temperature Condition

This output shows elder people body temperature is not in the range of defined data. It will indicate elder people health condition is in critical position. The system gives alerts message to the user and given ambulance number through GSM modem. This fig shows the temperature is in normal condition.
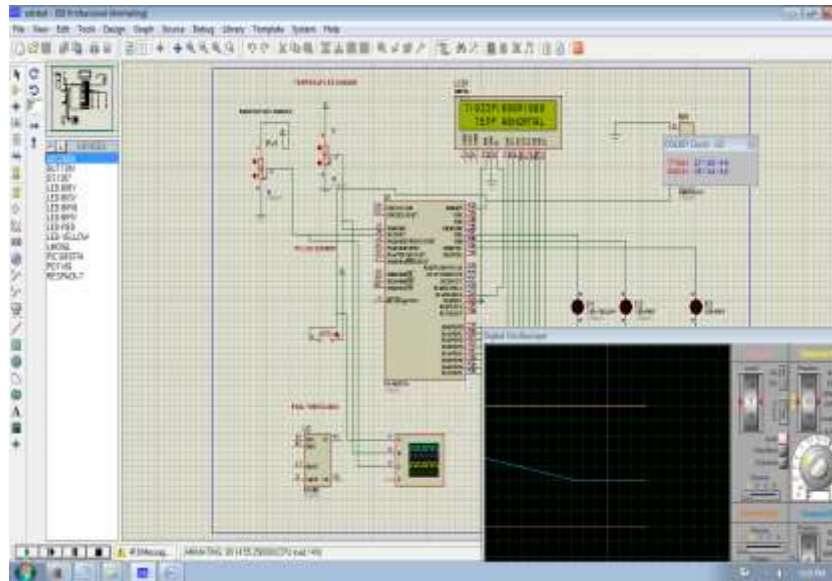
Fig.4.simulation output of normal temperature condition

This interface enables the care provider to know immediately the present activity status of the elderly (i.e) whenever a house–hold appliance connected by a sensing unit is in use then the interface will highlight the icon indicating the location of the elderly. System can also simultaneously store the sensor activity information and analyze the wellness indices. Another advantage of the interface is that remote monitoring of the elderly can be easily done. Real-time sensor activity status at the corresponding hour of the day is recorded simultaneously in the respective files of the computer for data processing. Continuous sensor activity status is recorded in respective files of the computer for effective data processing.

VI. DATA ANALYSIS

The collected data is compared to predefined data in every time. This is real time process. If the data is not in the range of predefined data value, the system will predict elder people is not in normal condition. then the system will make alerts to the user as well as ambulance. The program is stored in the kit and the system will responds depends on the program.

VII.CONCLUSION

The developed home monitoring system using WSN is low cost, reliable, flexible and efficiently monitor the elder people activity. Real-time activity behaviour recognition of elderly and determination of wellness function of the elderly using the activity of appliances was encouraging as the system was stable in executing the tasks for few weeks. If the system is executed for number of required months the optimal utilization of the appliances used by elderly will be derived. Also, the efficiency of wellness functions to predict the abnormal behaviour of the elderly in using the daily household appliances will also increase. The system is much helpful for elders live alone at home.

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