



Automated Health Alerts using In-Home Sensor Data for Embedded Health Assessment

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Abstract — *There are numerous works carried out regarding embedded health assessment. For example passive infrared (PIR) motion sensors have been used to capture activity in a particular location in the home. The pattern of room to room activity has been studied as a means of investigating health changes. Motion density from PIR motion sensors can capture overall activity level that may be linked to health condition. In addition, sleep patterns have been studied using motion sensors, bed mats or load cells. Other work has focused on the detection of cognitive changes, using a combination of motion, bed and door sensing, medication tracking. Although these works look to be efficient they are not easy to realize practically. The construction and installation of these sensing equipments require sophisticated means and high care should be taken to maintain these installations. The proposed system concentrates on in home health monitoring and has developed a sensor monitoring system for embedded health assessment in the home. The focus is on detecting very early changes in health status or older adults who are managing chronic health conditions. The system integrates few health monitor sensors and eliminates PIR sensors, as PIR sensors are mainly applicable for motion detection and gives the information of the activities occurred in a particular location of the home, and health conditions may vary irrespective of any location in home.*

Keywords- Behavioral Bio-Markers, Eldercare Monitoring, Health Alerts, In-Home Sensing.

I. INTRODUCTION

Our view of embedded health assessment is the on-going assessment of health changes based on an individual's behavior and activity patterns and baseline health conditions. Sensors embedded in the environment are used to collect behavior and activity patterns for the purpose of detecting health changes. Early detection is the key to promoting health, independence, and function as people age [1], [2]. Identifying and assessing problems early, while they are still small, provides a window of opportunity for interventions to alleviate problems before they become catastrophic. Older adults will benefit from early detection and recognition of small changes in health conditions and get help early when treatment is the most effective. Most importantly, function can be restored so they can continue living independently. Recently, there has been an increased focus on technology for enabling independent living and healthy aging.

OBJECTIVE

There are numerous works carried out regarding embedded health assessment. For example passive infrared (PIR) motion sensors have been used to capture activity in a particular location in the home. The pattern of room to room activity has been studied as a means of investigating health changes. Motion density from PIR motion sensors can capture overall

activity level that may be linked to health condition. In addition, sleep patterns have been studied using motion sensors, bed mats or load cells. Other work has focused on the detection of cognitive changes, using a combination of motion, bed and door sensing, medication tracking. Although these works look to be efficient they are not easy to realize practically. The construction and installation of these sensing equipment require sophisticated means and high care should be taken to maintain these installations. The proposed system concentrates on in home health monitoring and has developed a sensor monitoring system for embedded health assessment in the home.

II.LITERATURE SURVEY

1.Automated Health Alerts using In-Home Sensor Data for Embedded Health Assessment

Abstract:- This paper proposes a model for early detection of health decline in seniors using personalized normals and continuous in-home monitoring with embedded sensors. Sensors embedded in senior housing apartments unobtrusively capture behavior and activity patterns. Changes in patterns are detected and analyzed as potential signs of changing health. Results in 21 seniors over nine months show similar performance for two techniques, where one approach uses only domain knowledge and the second uses supervised learning for training. We propose a health change detection model based on these results and clinical expertise that recognizes very early signs of health decline passively, without requiring the user to wear anything, charge batteries, or even notice the sensors.

2.Health at Home System Design for Remote Patient Monitoring

Abstract:- This paper focuses on the design and development of the Health at Home (H@H) system for remote patient monitoring. The system is integrated with the windows PC for data acquisition. The implemented design contains Disease Detection Algorithm (DDA) for disease detection and metabolic parameter monitoring on health at home platform. Regular real-time monitoring in human beings is needed for early detection of abnormalities in metabolic parameters and prevention of disease occurrence.

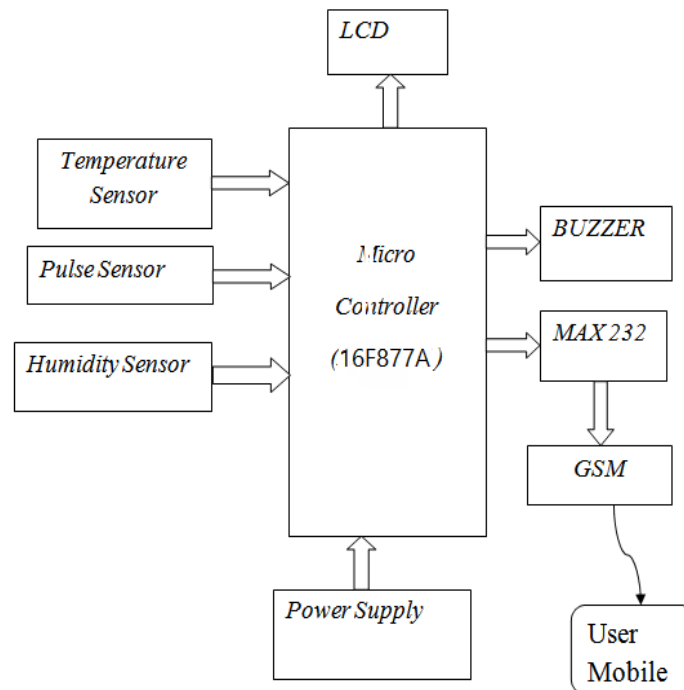
III.PROPOSED SYSTEM

The proposed system concentrates on in home health monitoring and has developed a sensor monitoring system for embedded health assessment in the home. The focus is on detecting very early changes in health status or older adults who are managing chronic health conditions. The system integrates few health monitor sensors and eliminates PIR sensors, as PIR sensors are mainly applicable for motion detection and gives the information of the activities occurred in a particular location of the home, and health conditions may vary irrespective of any location in home.

IV.SYSTEM ARCHITECTURE

Design of system

The project is designed to monitor the health activity of any person. The design include temperature sensor to sense the ambient temperature of the person, pulse monitoring sensor to read the pulse rate. These sensors collect the parameters and send to a microcontroller, the microcontroller collects the parameters and arranges in specific format and checks for the values if present within the specified limit and simultaneously forwards the information to the ZigBee module. The sensor values are collected by a P C which manages the database of the collected parameters which would be helpful to the health representative.



V.COMPONENTS AND SYSTEM DESIGN

1. PIC 16F877A CONTROLLER

PIC is a family of Harvard architecture microcontrollers made by Microchip technology, derived from the PIC1640, originally developed by the Microelectronics division of General Instrument. The name PIC initially is referred to Peripheral Interface Controller. PICs are popular with developers due to their low cost, wide availability, large user base, extensive collection of application notes, availability of low-cost, free development tools and serial programming (and reprogramming with flash memory) capability. The microcontroller is from PIC series. PIC microcontroller is the first reduced instruction set computing based microcontroller fabricated in complementary metal oxide semiconductor, that uses separate bus for instruction and data allowing simultaneous access of program and data memory. The main advantage of CMOS and RISC



Fig. Micro controller

2. LCD display (Liquid Crystal Display)

A **liquid crystal display** (commonly abbreviated **LCD**) is a thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector. It is often utilized in battery-powered electronic devices because it uses very small amounts of electric power.

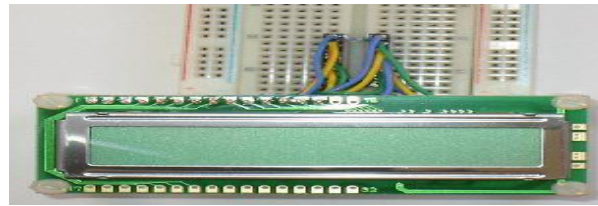


Fig. Lcd

3. Temperature Sensor (LM35)

LM35 could be a exactness IC temperature detector with its output proportional to the temperature (in °C). The detector electronic equipment is sealed and so it's not subjected to chemical reaction and alternative processes. With LM35, temperature may be measured additionally accurately than with a semiconductor device. It additionally possess low self heating and doesn't cause over 0.1 °C temperature rise in still air.

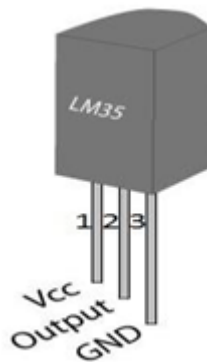


Fig. Pin Diagram of LM35

4. Humidity Sensor

Humidity is the presence of water in air. The amount of water vapor in air can affect human comfort as well as many manufacturing processes in industries. The presence of water vapor also influences various physical, chemical, and biological processes. Humidity measurement in industries is critical because it may affect the business cost of the product and the health and safety of the personnel. Hence, humidity sensing is very important, especially in the control systems for industrial processes and human comfort.



Fig. Humidity Sensor

5. HEARTBEAT SENSOR

Heart beat device is intended to relinquish digital output of warmth beat once a finger is placed thereon. Once the center beat detector is functioning, the beat crystal rectifier flashes in unison with every heart-beat. This digital output are often connected to microcontroller on to live the Beats per Minute (BPM) rate. It works on the principle of sunshine modulation by blood flow through finger at every pulse. A straightforward heart -beat electrical device are often made up of associate infrared crystal rectifier associated an infrared phototransistor. It works as a result of skin acts as a reflective surface for actinic ray. The IR reflectivity of skin depends on the density of blood in it. Blood density rises and falls with the pumping action of the center. That the intensity of infrared mirrored by the skin (and therefore transmitted to the phototransistor) rises and falls with every heartbeat.

6.GSM

A GSM electronic equipment could be a wireless electronic equipment that works with a GSM wireless network. A wireless electronic equipment behaves sort of a dial-up electronic equipment. The most distinction between them is that a dial-up electronic equipment sends and receives knowledge through a hard and fast phone -phone line whereas a wireless electronic equipment sends and receives knowledge through radio waves. A GSM electronic equipment will be AN external device or a computer Card / PCMCIA Card. Typically, AN external GSM electronic equipment is connected to a pc through a serial cable or a USB cable. A GSM electronic equipment within the style of a computer Card / PCMCIA Card is intended to be used with a laptop personal computer. It ought to be inserted into one in every of the computer Card / PCMCIA Card slots of a laptop personal computer. Sort of a GSM itinerant, a GSM electronic equipment needs a SIM card from a wireless carrier so as to work.

VI.ADVANTAGES AND APPLICATIONS

ADVANTAGES:

Identifying and assessing problems early, while they are still small, provides a window of opportunity for interventions to alleviate problems before they become catastrophic. Older adults will beneath from early detection and recognition of small changes in health conditions and get help early when treatment is the most effective

APPLICATIONS:

- 1.Activities of daily living (ADLs)
2. Independent living
3. Healthy aging

VII. CONCLUSION AND FUTURE SCOPE

In this paper, we tend to gift studies designed to analyze embedded health assessment. A forward search was 1st accustomed retrospectively investigate the feature area of embedded in-home sensors. We tend to additionally delineated a prospective study exploitation 1-D health alerts. Clinical ratings on the health alerts were provided by clinicians and accustomed train and check multi-D classifiers. The most effective 6-D performance was achieved by a FPT supported domain information solely, though the SVM (trained on labeled coaching data) had an analogous performance. To improve this performance, we'll investigate on-line learning exploitation the alert ratings as feedback. The work bestowed here shows that domain information might be used for initial classification to create up enough information to support on-line learning strategies. Finally, supported the study results and our expertise exploitation health alerts prospectively, we tend to planned a model for detection health decline with in-home sensors. A randomized management study exploitation this model with the hydraulic bed device, motion sensors, and in-home gait is current to more check the potential of embedded health assessment. Systems that acknowledges terribly early signs of health decline passively, while not requiring the user to wear something, charge batteries, or do something special, has monumental implications for seniors' health trajectories. Distinctive health decline early provides a window of chance for early treatment and intervention that may address health issues before they become harmful. This offers the potential for improved health outcomes, reduced aid prices, continued independence, and higher quality of life.

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REFERENCES

- [1] K. S. Boockvar and M. S. Lachs, ``Predictive value of nonspeci_csymptoms for acute illness in nursing home residents," *J. Amer. GeriatricsSoc.*, vol. 51, no. 8, pp. 1111_1115, 2003.
- [2] S. Ridley, ``The recognition and early management of critical illness," *Ann.Roy. College Surgeons England*, vol. 87, no. 5, pp. 315_322, 2005.
- [3] G. Singla, D. J. Cook, and M. Schmitter-Edgecombe, ``Recognizing independent and joint activities among multiple residents in smart environments," *J. Ambient Intell. Humanized Comput.*, vol. 1, no. 1, pp. 57_63, 2010.
- [4] D. J. Cook and M. Schmitter-Edgecombe, ``Assessing the quality ofactivities in a smart environment," *Methods Inf. Med.*, vol. 48, no. 5, pp. 480_485, 2009.
- [5] G. Virone *et al.*, ``Behavioral patterns of older adults in assisted living," *IEEE Trans. Inf. Technol.Biomed.*, vol. 12, no. 3, pp. 387_398, May 2008.
- [6] T. S. Barger, D. E. Brown, and M. Alwan, ``Health-status monitoringthrough analysis of behavioral patterns," *IEEE Trans. Syst.,Man, Cybern. A, Syst., Humans*, vol. 35, no. 1, pp. 22_27, Jan. 2005.
- [7] S. Brown, B. Majeed, N. Clarke, and B.-S. Lee, ``Developing a wellbeingmonitoring system_Modeling and data analysis techniques," in *Promoting Independence for Older Persons With Disabilities*, W. C. Mannand A. Helal, Eds. Washington, DC, USA: IOS Press, 2006.

- [8] J. A. Kaye *et al.*, ``Intelligent systems for assessing aging changes: Homebased,unobtrusive, and continuous assessment of aging," *J. Gerontol.,Psychol. Sci.*, vol. 66B, no. 1, pp. i180_i190, 2011.
- [9] M. Skubic, G. Alexander, M. Popescu, M. Rantz, and J. Keller, ``A smarthome application to eldercare: Current status and lessons learned,"*Technol. Health Care*, vol. 17, no. 3, pp. 183_201, 2009.