

Home for Older Adults using Gerontechnology

¹Dr.S.Elango, ²S.Gopinath, ³N.Hariharan, ⁴R.Gurunadhan

¹Assistant Professor, Department of Electronics and Communication Engineering, Paavai Engineering College (Autonomous), Namakkal, Tamilnadu, India

^{2,3,4}UG Scholar, Department of Electronics and Communication Engineering, Paavai Engineering College (Autonomous), Namakkal, Tamilnadu, India

Abstract - In the last few decades, the life expectancy in most of the countries has increased. Dementia, chronic diseases and conditions such as heart disease, stroke, cancer, and diabetes are the most common health problems. Therefore, there is no wonder that the demand for healthcare services has been increased. The Elderly people may require frequent, immediate medical intervention, which may otherwise result into fatal consequences. Such emergency situations can be avoided by monitoring the patient continuously in their friendly environment with the help of Smart Homes. Smart homes are homes with technologically advanced systems to assist automation of domestic task, easy to communicate, and provide high security. To meet the health issues due to aging for the adults it should be bring up into well-being life enhancement, smart homes have been geared to accommodate with special needs.

Keywords: Information and communication technology, obtrusiveness, quality of life, smart homes, Gerontechnology, Older, Adults.

I. INTRODUCTION

In an aging world, it is important to maintain health and independence for as long as possible. Instead of being hospitalized or taken to a facility, older people with chronic illnesses, especially those with cognitive disorders, can get help in their own environment with numerous "smart" devices that support them in their activities. A "smart home" is a residence that is equipped with technology that makes it easier for residents to be monitored in order to improve the quality of life, promote physical independence and reduce the burden on the caregiver. Several projects have been carried out worldwide, but there are still ethical and legal issues to be resolved, and there is currently no evidence of the impact of smart homes on health outcomes. Randomized controlled trials are required to understand the advantages and disadvantages of these projects. However, this will only be possible with the widespread spread and penetration of smart homes in the social network.

II. OBJECTIVES

- To take care of older adult in their Home environment
- Maximizing their Independency
- Enriching their lives
- Automation, Easy Adaptability

III. RELATED WORK

In the United States, the prevalence of multiple chronic diseases among the elderly exceeds 60%. According to the American Geriatrics Society, complex needs are chronic illnesses that often require the service of different healthcare professionals in different situations, including frequent hospitalizations [5]. Elderly people with complex needs can only carry out basic daily activities to a limited extent due to physical, psychological and psychosocial difficulties that require complex continuous care [5]. Thanks to technological instruments, seniors with chronic illnesses and complex needs can stay at home and maintain an acceptable quality of life [6,7]. Technological innovations for the elderly are taking place at an unprecedented rate [8]. "Geron technology" is a term that combines gerontology and technology and describes an interdisciplinary scientific field in order to "design technology and environment for an independent life and the social participation of older people in health, comfort and safety" [9]. The term "intelligent house" refers to a specific type of house or residence that is equipped with sensors and actuators that are integrated into the residence's infrastructure and are intended to monitor the context of the resident in order to improve his or her experience at home. [10,6]. Smart homes can allow seniors to live longer independently at home and reduce their dependence on informal or formal caregivers, or allow caregivers to take better care of older people. These technologies have the potential to offer a cost-effective approach to improving the quality of life and to help seniors live safely in their homes [11]. A smart home can potentially provide a variety of services, from simply automating tasks (e.g., monitoring ambient temperature), analyzing or predicting a resident's location, and detecting the behavior or health of an occupant living at home Subsequent transmission of the data collected for remote monitoring. In the health

sector, there are two key applications for smart homes: "(a) home automation: remote control or automatic control of household appliances, devices or systems to improve the quality of life of an occupant or administrator of energy consumption; and b) monitor wellbeing: monitor an occupant's health in order to maintain his well-being".

IV. EXISTING SYSTEM

Epidemiological and clinical studies have focused on an increasingly important concept in both clinical care for the elderly and research into aging, namely frailty, a reduced biological reserve syndrome and resistance to stressors as a result of the cumulative decrease in multiple physiological systems and susceptibility to undesirable results. Since frailty is currently probably a more difficult and unidentified concept, the best way to operate this living syndrome is still controversial.

V. PROPOSED SYSTEM

These smart homes allow older adults and people with disabilities to stay in their homes where they feel comfortable, instead of spending high cost for health care. Smart home gives the opportunity for independence, which will help to get confidence, determination and the ability for the disabled person and older adults.

Smart homes can provide elderly and disabled people with many types of emergency assistance systems, safety devices, fall prevention, automatic timers and warning messages. These systems provide secure feeling for the individual in their homes knowing that they are rescued within few minutes. Smart home systems will make it possible for family members to monitor their loved ones from anywhere through an internet connection.

5.1 Proposed Block Diagram

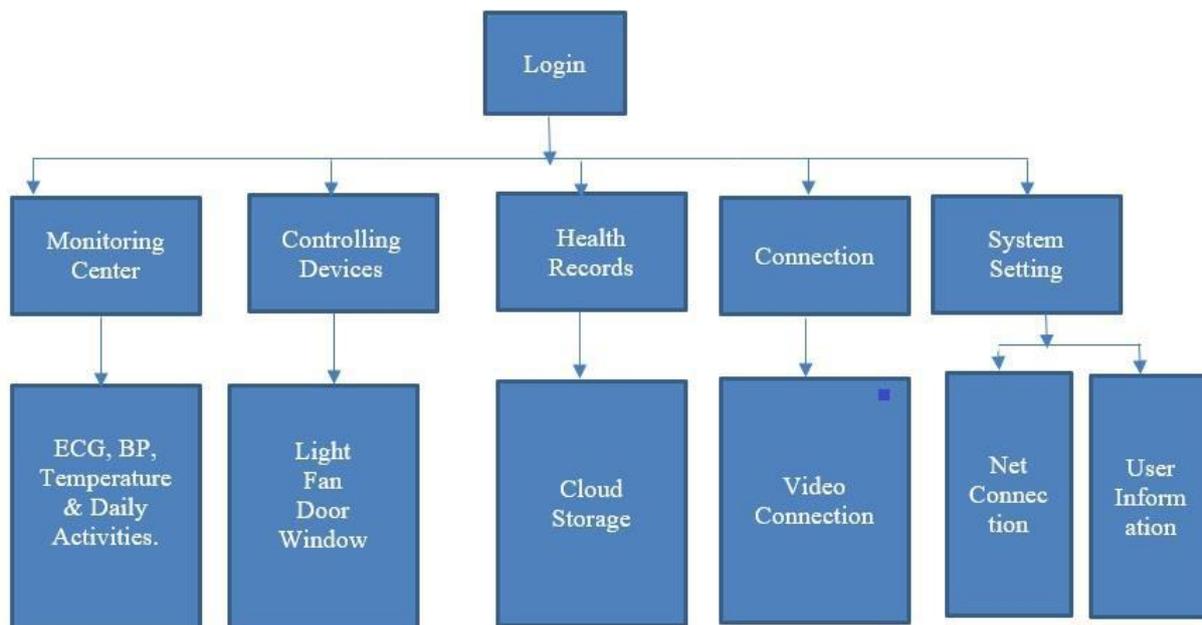


Figure 1: Block diagram of proposed system

5.2 System Implementation

Smart home are equipped with advanced automation systems for various pre-programmed functions and tasks. The smart home for the elderly has the following features:

- Take the rescue device that can be connected to the emergency call center.
- Video access control system-Residents can see the visitor's image in the room and remotely open the door.
- Install sensors on the seat and bed, providing early warning if the user does not available in time.
- When the user leaves the bed, a light turns on automatically.
- Users can test and assess their Blood pressure, Pulse, and Stool at home. The medical information is selectively sent to the relevant person.

- Creating awareness about this project in health care center and organizations.

VI. RESULT AND DISCUSSION

6.1 Simulation Result

The data received from the resident adult unit is displayed in the COM port terminal as shown in figure 3. Graph for heart rate is displayed continuously and plotted in software as shown in figure 2.

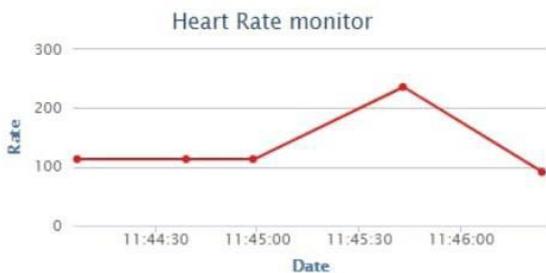


Figure 2: Heart Rate Graph Plot

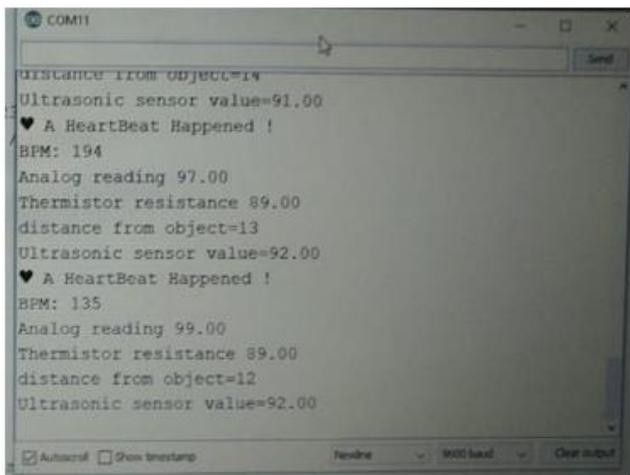


Figure 3: Terminal Monitor Window

6.2 Prototype of Hardware

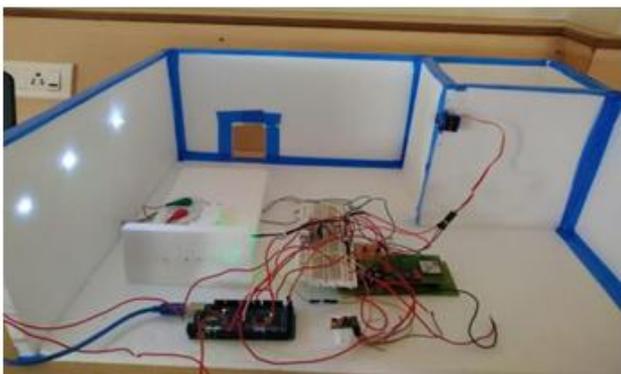


Figure 4: Prototype of Hardware - Side View

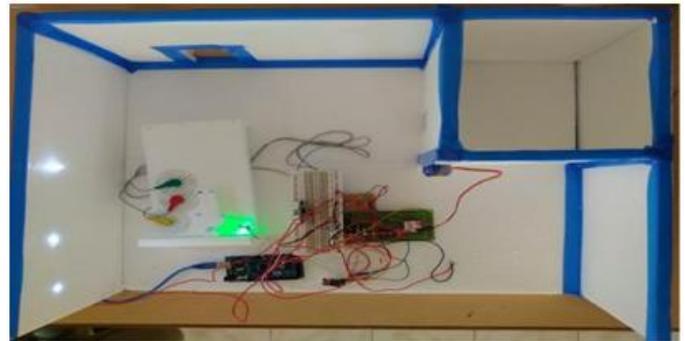


Figure 5: Prototype of Hardware - Top View

The prototype hardware of proposed system is developed which is shown in figure4. Hardware is developed using arduino board in which the heartbeat sensor, temperature sensor, ultrasonic distance sensor are interfaced. All sensor readings from the adults and resident place is collected and transmitted through the UART to a GSM modem connected to the internet. Thus the output of proposed hardware model is verified and found suitable for implementation in real time.

VII. CONCLUSION

Gerontechnology can provide support to aged people, increase aged people's health care and encourage social participation. If gerontechnology is not used by the aged people it cannot bring about the yield and benefit for aged people. Thus, it would be beneficial to study aged people's wishes and hopes towards how the technological solutions should be presented and taught for them. Thus gerontechnology fulfill its purpose to enhance, prevent, compensate and care.

REFERENCES

- [1] UNDP, Human Development Report 2013. The Rise of the South: Human Progress in a Diverse World, *Published for the United Nations Development Programme (UNDP)*, UN Plaza, New York, NY, 2013.
- [2] UN, "UN Global Issue: Ageing,20" May 2014 [Online]. Available: <http://www.un.org/en/globalissues/ageing/>
- [3] T. Mattimore, N. Wenger, N. Desbiens, J.M. Teno, M. Hamel, H. Liu, R. Califf, A.F. Connors Jr., L. Lynn, R. Oye, "Surrogate and physician understanding of patients", *preferences for living permanently in a nursing home, J. Am. Geriatr. Soc.* 45 (1997) 818-824.
- [4] D. Cook, "Health monitoring and assistance to support aging in place", *J. Ubiquitous Comput. Syst.* 12 (2006) 15-29.

- [5] D. Hickam, J. Weiss, J. Guise, D. Buckley, M. Motu'apuaka, E. Graham, N. Wasson, S. Saha, "Outpatient Case Management for Adults with Medical Illness and Complex Care Needs", *Agency for Healthcare Research and Quality (US)*, Rockville, 2013.
- [6] V. Frisardi, B. Imbimbo, "Gerontechnology for demented patients: smart homes for smart aging", *J. Alzheimer's Dis.* 23 (2011) 143–146.
- [7] N. Archer, K. Keshavjee, C. Demers, R. Lee, "Online self-management interventions for chronically ill patients: cognitive impairment and technology issues", *Int. J. Med. Inf.* 83 (2014) 264–272.
- [8] K. Chen, A. Chan, "Predictors of gerontechnology acceptance by older Hong Kong Chinese", *Technovation* 34 (2014) 126–135.
- [9] ISG, International Society for Gerontechnology, 2014 [Online]. Available: <http://www.gerontechnology.info/index.php/journal/pages/view/isghome> (accessed 22.05.14).
- [10] G. Demiris, B. Hensel, "Technologies for an aging society: a systematic review of smart home applications", *Year b. Med. Inform.* 2008 (2008) 33–40.

Citation of this Article:

Dr.S.Elango, S.Gopinath, N.Hariharan, R.Gurunadhan, "Home for Older Adults using Gerontechnology" Published in *International Research Journal of Innovations in Engineering and Technology - IRJIET*, Volume 4, Issue 5, pp 123-126, May 2020.
