JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

AN ASSISTANCE TO KEEP TRACK OF SENIOR INDIVIDUAL

G. Saraswathi Harshitha[1],K. Udaya Lakshmi[2], K. Harshitha Reddy[3], A. Sravya[4], Md. Jubair Basha[5]

[1]*Dept. of CSE, KallamHaranahareddy Institute of Technology, Andhra Pradesh, India.*

[2]*Dept. of CSE, KallamHaranahareddy Institute of Technology, Andhra Pradesh, India.*

[3]*Dept. of CSE, KallamHaranahareddy Institute of Technology, Andhra Pradesh, India.*

[4]*Dept. of CSE, KallamHaranahareddy Institute of Technology, Andhra Pradesh, India.*

[5]*Dept. of CSE, KallamHaranahareddy Institute of Technology, Andhra Pradesh, India.*

Abstract:

In current day world, monitoring your cherished elderly person is becoming a tough job. Monitoring the health condition of the elderly person at home is a tough job. In particular, elderly patients should be regularly checked and their loved ones should be updated from time to time about their health condition at work. Thus, this is an innovative method that easily automates this process. This technology provides support to monitor the protection of the elderly who utilise sensors to watch their senior health and use the Internet, in case of any problems, to notify their loved one.

Key words:

Elderly people, health surveillance, temperature sensor, ARDUINO, panic buttons, the web of things, etc.

1. INTRODUCTION

As indicated by a report of the United Nations, the proportion of old people matured over 65 is developing throughout the long term. Living with maturing guardians and dealing with their prosperity are normal practices in India. In any case, the significant expense of living has constrained the greater part of the Indian families to be double worker families. Because of the significant expense of living, both wedded couples need to work to make a decent living, leaving their maturing guardians at home. Leaving the old guardians without care may make wellbeing and medical problems which stress their functioning youngsters. Hence, helped living innovation which empowers the old's opportunity of movement and whereabouts has gotten one of the dynamic examination fields.

Safety and health are always significant issues with any increase in technology the elderly race advances. Like the recent corona virus assault, which has to some degree destroyed the Indian economy, it is an illustration of how medical care has become very important. It is usually preferable to monitor these elderly people using remote monitoring equipment in these regions where the pandemic is widespread.

Increased old life expectancy and technology developments resulted in creative and efficient methods for monitoring senior citizens. This uses the movement and location sensing system with the Internet of Things (IoT). Arduino Nano is presenting a solution for sustainable and adaptive elderly-oriented infrastructure construction. This aims to find an inexpensive and economically stable solution.

The sensors esteem are gathered and the information data is given to ARDUINO NANO and afterward, it is moved to the worker. The information put away in a data set and can be shown on a site that can be gotten to exclusively by approval to see the situation with the senior person. Meaning to boost the employability of IoT in medical care frameworks, numerous nations have embraced new innovations and approaches. This changed the ebb and flow of research in the medical services area into a more useful field to investigate. The inspiration of this paper is, to sum up, the progression of cutting-edge concentrates in IoT-based medical care frameworks and to give a precise audit of its empowering advances, administrations, and applications.

This offers the system architecture built utilising the aforementioned devices. IoT's primary uses may be health and safety, enhancing availability, quality of care and reducing costs. This technology will assist to monitor elderly citizens in real time. Advances in information technology and communication have led to Internet of Things emerging. In a secure and healthy environment today, the use of IoT technologies offers doctors

and patients the ease of applying them to different sectors. By utilising Arduino to build inexpensive health and safety systems utilising IoT. By measuring senior individual factors such as movement and temperature in our system. The sensor readings are gathered and Arduino receives the data information and transmitted to the server. The data recorded in a database may only be seen on a website by authorising the visitors to examine the status of the elderly.This can fundamentally further develop a person's personal satisfaction. It permits senior people to keep up with autonomy, forestall difficulties, and limit crisis circumstances. This framework works with these objectives by conveying care directly at the home just as outside moreover. Likewise, senior individual and their relatives feel solace realizing that they are being checked and will be upheld if an issue emerges.

2. RELATED WORKS

The IoT framework used for medical applications helps to combine the benefits of IoT and cloud computing with the medical sector. It also establishes procedures for transmitting patient data from many sensors and medical equipment to a specific health-care network.Several studies have discussed various activity tracking. Among the methods used for the activity tracking include wearable device or smartphone.

Anguita et al. used accelerometer and gyroscope in a smartphone to detect six activities, namely walking, going upstairs, going downstairs, standing, sitting and laying. Themobile phone was placed atthe waist ofthe volunteers. The data collected from the experiment was used as the datasetfor machine learning and the classifier used to determine the activities was SVM. The highest accuracy was achieved when the user placed the smartphone in the pant sidepocket. Therefore it can be observed that the holding position of the smartphone has a great impact on the accuracy of activity recognition. Since the user might not keep the smartphone in the same position, the usage of smartphone to track the activities might not be feasible.

Pham et al. used distributed motion sensors; Passive Infrared (PIR) was employed to detect ambient motion which in turn helped to detect the location. Both MIMU and PIR are not accurate enough to reliably detect location.Based on the activities, sensors were placed on the arm or leg of the patient. The raw data from sensors were collected. However, the types of sensor being used and the algorithms adopted are different and very much depending on the type of activities being detected.Due to the differences inthe sensor setup between the activities, the dataset used for the machine learning was not consistent for different activities. The complexity of placing the sensors in the right place would be a huge obstacle for practical usage.

Vepakomma et al. proposeda method to integrate both activities recognitionandindoor positioning to study the actions in context of the elderly location using wrist-wornwearable's with theaidofother sensors including Global Positioning System (GPS), Bluetooth beacon, temperature, air pressure and humidity sensors. The experiment starts with data collectionusing sliding window-based data, pre-processing andfeatures extraction. The pre-processed data was evaluated with various Deep Learning Neural Network models and parameters with accuracy of over 90%.

From these literature reviews, it can be seen thatthe wearable's such as belts may be more useful because Wrist-wornwearable also has the issue of pickingupfalse readings due to the user moving his or her hand. For instance, moving a hand back and forth may be interpreted as falling. The actions have been studied in real time in a way that does not intrude on the user's privacy and emergency notification can be sent to the relevant parties. Emergency cases include those that require immediate attention such as falling and the location

3. OBJECTIVE

Plan and implement the system for the protection of senior individuals using the Internet of Things to examine and perceive exercises and promote the global positioning framework of seniors who use sensors to follow senior individual well-being and web uses to enlighten their friends and family if any problem arises.

So, the Internet of Things (IoT) based wellbeing and exercises checking framework is the current answer for it. Senior Individual Monitoring game plan engages perception of Elder People outside of standard settings, which extends admittance to human administrations workplaces at cutting down costs.

The well-being and checking framework based on the Internet of Things (IoT) is thus the current solution. The main objective of this job is to design and implement a strong system that employs sensors to track senior personal well-being, exercises and the web to enlighten its closest relatives in case of any problem.

4. METHODOLOGY

In order to reduce the false reading, a wearable device on a waist belt is developed in this paper. The device consists of vibration sensor, ARDUINO NANO, temperature sensor, panic button and GPS receiver.

Thewearable device reads the raw data from the sensor and push the raw data to the server. Similarly, the latitude and longitude values are read from GPS receiver and pushed to the server. Next, the results of the location and motion are analysed to derive the action of theelderly.

The solution suggested is Arduino-based protection system for senior citizens. Our system offers an intelligent patient health monitoring system using sensors to monitor patient health and utilises the internet to notify your loved ones in the event of any problems. Our technology utilises both temperature and activity sensors to monitor patient health. In order to monitor the state of the panic button and Wi-Fi connection, the sensors are linked to a microcontroller. If the system detects sudden changes in the body temperature of elderly individuals, the system updates security through IOT and displays body temperature data of the patient on the Internet live and a GPS module is used to locate patients or elderly.

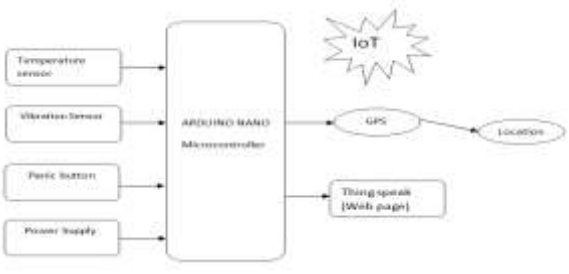

Figure 1: Architecture of the proposed system

The architecture of the system is governed primarily by ATmega328P. Arduino Nano's power source is 5V and the sensors, such as the Vibration Sensor and the temperature sensor, are utilised for sensing the movements and temperature of the elderly. Arduino Nano receives and analyses sensor data and updates the Thingspeak website.

The architecture contains the following list of components as stated above:

Vibration Sensor: The Vibration sensor is a sensor that works dependent on various optical in any case mechanical standards for identifying noticed framework vibrations. The affectability of these sensors ordinarily goes from 10mv/g to 100mV/g, and there are lower and higher sensitivities are likewise open. The affectability of the sensor can be chosen dependent on the application. So it is crucial to know the degrees of vibration adequacy reach to which the sensor will be uncovered all through estimations.

Temperature Sensor(LM35 Sensor): LM35 sensor is utilized for estimating the internal heat level. LM35 is a simple temperature sensor that yields a simple sign. Microcontrollers don't acknowledge simple signs as their info straightforwardly. Consequently, need to change the simple yield flags over to computerized prior to taking care of to the microcontroller's information.

GPS Module: GPS module goes about as the satellite and gets the information much of the time and sends likewise to the RS32. It is created by the US division of safeguard (DOD). The radio wire contribution of the module gets the GPS signals, and a total consecutive information message with the region, speed increase, and time data is squeezed at the sequential line. The module gives the current date, time, longitude, scope, elevation, speed, and travel bearing among other information, and can be utilized in numerous applications including route, armada the executives, global positioning framework, planning, and mechanical technology.

Arduino Nano: ARDUINO NANO is a board put together microcontroller with respect to ATmega328P. It's anything but a 16 MHz quartz precious stone, 14 computerized input/yield sticks, a USB association, a force jack. It's anything but an emergency signal. Just interface it's anything but a PC with a USB link, to begin with, AC to DC association. A regular ARDUINO UNO board can be utilized for some, applications dependent on the coded program. "NANO" was picked to record the arrival of ARDUINO programming. The version1.0 of the ARDUINO is the reference and now refreshed to later forms. The first in a progression of USB ARDUINO sheets was the NANO board and the reference model for the ARDUINO stage.

Power Supply: The ARDUINO can be fuel either by the outer source or by the USB. Also, the manner in which it ought to get fuel is chosen consequently. Fringe force can come one and the other from a battery. The contribution to the circuit is applied from the controlled force supply. The ac input i.e., 230V from the mains supply is venture somewhere around the transformer to 12V and is taken care of to a rectifier. The yield got from the rectifier is a throbbing dc voltage. So, to get an unadulterated dc voltage, the yield voltage from the rectifier is taken care of to a channel to eliminate any ac segments present even after correction.

5. IMPLEMENTATION

The system uses two sensors (Vibration and Temperature), the Arduino Nano processor module and two Arduino and IoT transmission modules. The two sensors perceive the data from the individual senior body as analogue impulses. These signals are converted into digital format by the ADC. The data sensed to the Microcontroller Arduino. The Arduino Nano gets the sensor data and updates it on the website of Thingspeak.

The Senior Individual Status was constantly monitored with sensors and the sensor readings are updated on request on a web server (ThingSpeak). The LM35 Temperature Sensor is used to detect body temperature and the Panic button is used to warn the system and a GPS module is used to locate patients or the elderly (Longitude and Latitude).

When the elderly person wears the device, his/her location, body temperature, tilt sensorvalueandpanic button values can be monitored in serial monitoring. These values are displayed in time difference of1sec.This paper presents that there are 4 different emergency cases, they are:

1) Movement detection of elderly person.
2) Elder is lost or if they are far from their home.
3) When elderly person presses panic button.

During the above emergency cases, a notification is sent to the caretaker and family members. In case of an emergency, this gadget has a panic button. Whenever the elderly person pushes the panic button, the person's location is located. The family members and the caregiver who watch the elderly person are warned when the person is in an emergency and may offer them with assistance.To notify the emergency cases, we are using Thinkspeak webpage which gives notification. Notification contains the location and cause of emergency. And the notification that is send to caretaker also contains the family contact number. The emergency cases can also be viewed on webpage.

5.1 BENEFITS

1) The IoT module is expanding by enabling gadgets to be integrated that link to the Internet, give information on the health and safety of senior citizens and provide caretakers and family members information in real time.
2) The sensors are employed in the system rather than RFID technology so that the person is not healthy.
3) In the system, the sensors are utilised in the wearable device to ensure correct data.
4) This leads to lower costs than the current system.

6. EXPERIMENTAL RESULTS

Anticipation and communication using GPS and IoT is the key guideline for the security framework. It includes ARDUINO, Vibration Sensor, Sensor of Temperature, GPS and IoT module. ARDUINO NANO is used for general cycle control. The ARDUINO is changed with embedded dialects and then organised and placed into the memory of the glimmer.

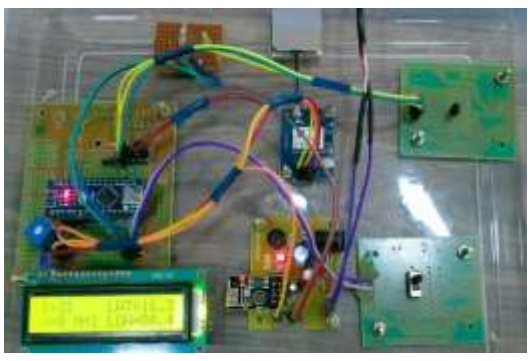

Figure2: Model prototype for the Assistance to keep track of Senior Individuals.

Figure3: Result shown on LCD display for motion sensing along with the position andtemperature.In this it shows that there is movement sensing by representing M=1.

Figure4: Result shown on LCD display when the panic button and the temperature and position are ON. In this it shows that the panic button is activated by representing V=1.

Figure5: Alert for motion detection displayed in the Thingspeak website. In this it shows that the motion sensing is on that is it detected the movements of the senior individual so that they are in emergency situation or not.

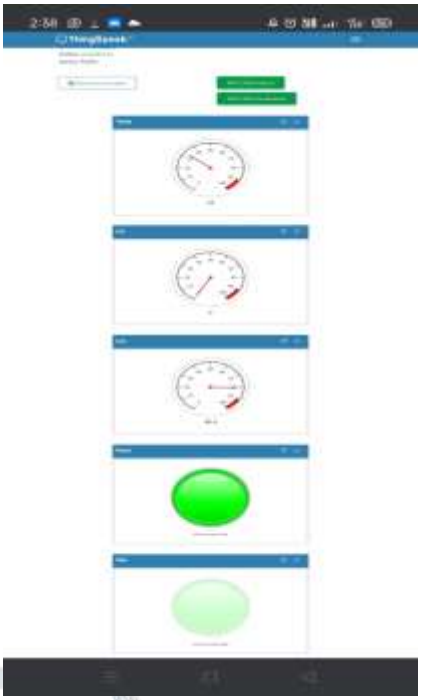

Figure6: Alert displayed in the panic button on the website of Thingspeak. In this it shows that the senior individual is in emergency or if him/her are lost when they are outside.

7. CONCLUSION

The elderly action recognition system based on outdoor location and fall detection has beensuccessfullyimplemented and tested in home environment. The combination of technologies including IoT using sensors,monitoring and notifying in webpage have been demonstrated to simulate the monitoring of activities. Thesystem showed a high accuracy.

In this paper, a wearable waist belt is developed as it is able to produce better results. Also, a desktop application is developed for live-monitoring of the elder person and an android application to notify the caretakers in case of emergency along with the cause and their current location. However, the high degree of accuracy and ease of usage ofthe systemshow great promise in securityrelated issues to elderly healthcare.

The family members and caretakers may watch elderly people at all times by utilising the technology. A website is also created to monitor the older person and inform the custodians of the reason and their present position in the event of an emergency. In many kinds of application linked to senior safety, however, the high degree of precision and the simplicity of use of the system show tremendous potential. The data on security parameters are saved and released publicly. The caregiver may thus watch the persons at any time from a distant place.

8. FUTURE WORK

The framework may be worked on from a variety of points of view and can be implanted with many different service sensors to guarantee the safety and safety of senior people.The system still warrants more research on how to use the results for healthcare purposes in order to detect early symptoms of age-related illness based on the time, motionas well as the behavioural pattern of the elderly. Incorporate a pulse quantification heartbeat sensor. Include a gyrator sensor instead of a direction sensor for more accurate results.

9. REFERENCES

[1] Internet of Things (IoT): Worldwide number of connected devices between 2012 and 2020 (in billions). [Online]. Displayed: *https://www.statista.com/statistics/471264/iotnumber of devices connected-worldwide/.*

[2] Kabir, Z., Dash, A., Das, B. Prasad, D. Abdominal obesity, Indian subcontinent independent cardiovascular risk factor: a clinical epidemiological evidence summary(2011) Cardiovascular Disease Research Division, 2(4), pp. 199-205. HR: 10.4103/09803-3583.89803.

[3] Keerthivasan S et al. "Conversion of a digital to analogue converter circuitry with full swing GDI with low complicated 10-bit current steering" Biotechnology Journal of Pakistan. Vol. 14, Special Issue II, pp. 204-208, 2017.

[4] Shubham Banka, Isha Madan and S.S. Saranya, IoT Monitoring for Intelligent Healthcare. ISSN 0973-4562 Research International Journal of Applied Engineering ISSN 13, No.15, pages. 11984-11989,2018.

[5] M. Manohar, M. K. Perumal, Internet survey of subjects: case studies, applications, and future directions, Springer International Publishing, (2017) 281-297. In the Internet of Things: Novel advances and envisaged applications.

[6] United Nations (2019). World Population Ageing. [online] *https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019- Highlights.pdf*

[7] Pham, M., Yang, D., Sheng, W., &Liu, M. (2015, December). Human localization and tracking using distributed motion sensors and an inertial measurement unit. In Robotics and Biomimetics (ROBIO), 2015 IEEE International Conference on (pp. 2127-2132). IEEE.

[8] Nienhold, D., Dornberger, R., &Korkut, S. "Sensor-Based Tracking and Big Data Processing of Patient Activities in Ambient Assisted Living" Healthcare Informatics (ICHI), 2016 IEEE International Conference on (pp. 473-482), IEEE Oct 2016.

[9] Vepakomma, P., De, D., Das, S. K., & Bhansali, S. "A. Wristocracy: Deep learning on wrist-worn sensing for recognition of user complex activities" BSN (pp. 1-6), June 2015.

[10] Anguita,D., Ghio, A., Oneto, L., Parra, X.,&Reyes-Ortiz, J.L. "Human activity recognition on smartphones using a multiclass hardware-friendly support vector machine." International workshop on ambient assisted living (pp. 216- 223). Springer, Berlin, Heidelberg. Dec 2012.

[11] Song-Mi Lee, Sang Min Yoon,Heeryon Cho. "Human Activity Recognition from Accelerometer Data Using Convolutional Neural Network".

[12] Ruhani Ab. Rahman, NurShima Abdul Aziz, MurizaKassim, Mat IkramYusof, IoT-based Personal Health Care Monitoring Device for Diabetic Patients ,978-1-5090-4752-9/17/2017 IEEE.

[13] Valsalan P, Surendran P, Implementation of an Emergency Indicating Line Follower and Obstacle Avoiding Robot, 16th International Multi-Conference on Systems, Signals and Devices, SSD 2019.

[14]Rajendran T & Sridhar KP. "Epileptic SeizureClassification using Probabilistic Neural Network based on Parametric Features", International Journal of Scientific & Technological Research. Vol.9, No. 3, 2020 (Accepted for Publication).

[15] Gulraiz J. Joyia, Rao M. Liaqat, Aftab Farooq, and Saad Rehman, Internet of Medical Things (IOMT): Applications, Benefits and Future Challenges in Healthcare Domain, Journal of Communications Vol. 12, No. 4, April 2017.

[16] K. Perumal, M. Manohar, A Survey on Internet of Things: Case Studies, Applications, and Future Directions, In Internet of Things: Novel Advances and Envisioned Applications, Springer International Publishing, (2017) 281-297.

[17] P. Rizwan, K. Suresh. Design and development of low investment smart hospital using Internet of things through innovative approaches, Biomedical Research. 28(11) (2017).

[18] Hariraj V et al. "Fuzzy multi-layer SVM classification of breast cancer mammogram images", International Journal of Mechanical Engineering and Technology, Vol. 9, No.8, pp. 1281-1299, 2018.

[19] Vijayakumar P et al. "Efficient implementation of decoder using modified soft decoding algorithm in Golay (24, 12) code". Pakistan Journal of Biotechnology. Vol. 14, No. Special Issue II, pp. 200-203, 2017.

[20] Rajendran T et al. "Recent Innovations in Soft Computing Applications", Current Signal Transduction Therapy. Vol. 14, No. 2, pp. 129 – 130, 2019.

[21] K.R. Darshan and K.R. Anandakumar, "A comprehensive review on usage of internet of things (IoT) in healthcare system," in Proc. International Conference on Emerging Research in Electronics, Computer Science and Technology, 2015.

[22] P. Chavan, P. More, N. Thorat, S. Yewale, and P. Dhade, "ECG - Remote patient monitoring using cloud computing," Imperial Journal of Interdisciplinary Research, vol. 2, no. 2, 2016.

[23] S.H. Almotiri, M. A. Khan, and M. A. Alghamdi. Mobile health (m- health) system in the context of iot. In 2016 IEEE 4th International Conference on Future Internet of Things and Cloud Workshops (FiCloudW), pages 39–42, Aug 2016.

[24] S.M. Riazulislam, Daehankwak, M.H.K.M.H., Kwak, K.S.: The Internet of Things for Health Care: A Comprehensive Survey. In: IEEE Access (2015).