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IoT based Efficient Smart Monitoring Techniques for Disabled & Elderly People

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Abstract: The wireless technologies are set to revolutionize people lives in homes and office environment in an efficient way. Smart home appliances are maintained through voice recognition and DTMF method, which are used by elderly and disabled people. One or more cameras are setup in home to monitor elderly and disable people. The home appliances status image sent to guardian mail ID through internet. In case of unnecessary usages of home appliances are recognized the owner controls the home appliances through internet and avoids the wastage of power.

Keywords: *Smart home, DTMF, Voice recognition, Bluetooth and IoT.*

I. INTRODUCTION

According to the World Health Organization (WHO) statistics as shown in Figure 1, out of the total population in the world approximately 7 billion, about 18.9% people are disabled and about 11% people are above 60 years of age. About 30% people of world total population depend on the others for daily living activities. The dependency on other people is overcome by implementing this project. It not only reduces their dependency on others but also simplifies and revolutionizes their life.

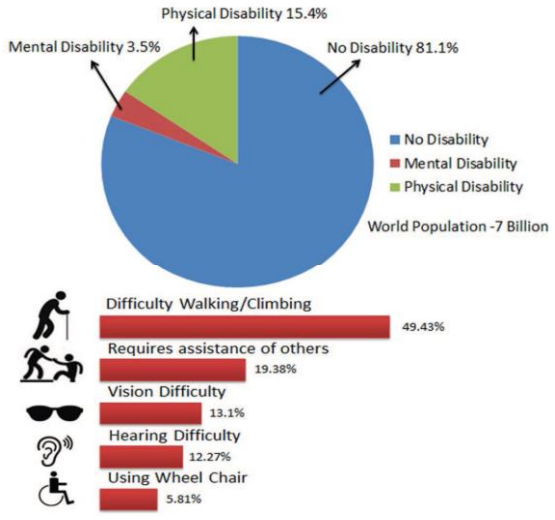

Figure 1: Disabled people statistics

Smart Homes monitoring also known as home automation can be achieved via wired and wireless systems. At the time of construction of a house wired installations are done to provide home automation facilities through a wired mode and thus making the installation easier. Internet of Things is connection of several devices, which uses internet. Internet of things is used almost everywhere such as in hospitals, agriculture, homes, business etc. The data obtained from the IoT devices are stored on cloud. IoT is a growing technology; it allows connection of two or more devices into a single architecture.

II. RELATED WORK

Home appliances controlled by using different technology like Wi-Fi, DTMF, Voice command and hand gesture method etc. This paper describes the implementation of controlling various home appliances like light, fan, tv, washing machine and refrigerator through an android bluetooth mobile app [1]. The Bluetooth android app is developed and installed in the user android mobile. The user sends the commands to the microcontroller using android app. The microcontroller processes commands based on the working of command relay circuit. Relay circuit will turn on or off the power of home appliances based on the input from the controller.

In this paper microcontroller is used as a control unit, which gets inputs from a mobile connected through DTMF decoder [2]. To switch on or off any appliance the keypad buttons in the cellular phones are pressed. This cellular mobile connected to the DTMF decoder. The entered tone is decoded via the DTMF decoder. The entered tone is further converted into binary values. Depending on the binary value microcontroller control home appliances either is switched ON or is switched OFF.

This proposed system consists of server and sensors [3]. The Server controls and monitors various sensors like temperature, motion and light level sensors. The Intel Galileo connects to the internet through Wi-Fi. When the connection is established between sensors and Galileo board, sensors start to read the parameters of sensors like p1, p2, p3 etc. The required sensors threshold levels are set as t1, t2, t3 and so on. The sensor data are sent to the web server and stored in the cloud using internet.

The data can be received from the cloud can be analyzed anywhere any time. If the sensor parameters are greater than the threshold level then the respective alarm a1, a2, a3 etc. will be activated. In the proposed system the gas leakage, temperature and motion in the house is monitored.

The advantages and disadvantages of various technologies [4] that have been predominantly used to implement a HAS.

Table 1: Comparison between various technologies

Technology Type	Advantages	Disadvantages
Java Based	User interface, secured, Reliable	Complex, costly, expensive wired installation
Bluetooth based	Secured, Support multimedia	Medium power consumption, Supports up to 7 nodes only

Phone line based	Easy access, simple, remote access	User has to remember access codes, wired architecture.
Zigbee based	User interface, interoperable, easy	Link breakage problems, low data rate
Home gateway web server based	Remote access, accurate, fast	Costly, dependent on internet
Wi-Fi based	Accurate, Fast, Support multimedia	High power consumption, Complex

III. PROPOSED SYSTEM DESIGN

The home appliances like fan, light etc. are controlled using 3 technologies they are

- DTMF method
- Voice recognition method and
- IoT technique

The figure 2 represented below shows proposed system architecture

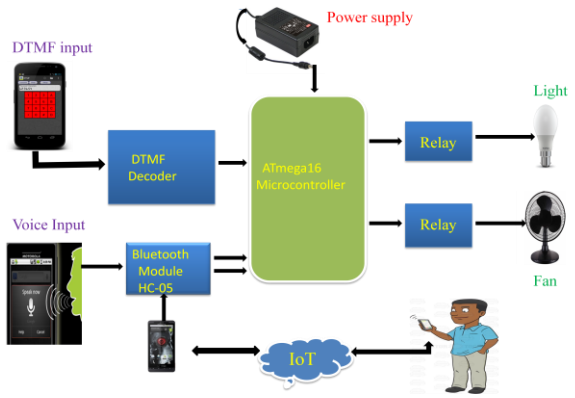

Figure 2: System architecture

Hardware Requirements

- IC 9170 DTMF decoder
- HC-05 Bluetooth module
- ATmega16 Microcontroller
- Relay
- Home appliances fan, light etc…
- Power supply
- Smart phones

Software Requirements

- Embedded C
- Java

A. DTMF method

Smart home system using various technologies depends on the user requirement. Here DTMF technology is used to control home appliances like fan and light. The user mobile phone is connected to controller through IC9170 DTMF decoder. The user (dumb and deaf person) gives an input through DTMF input command. The DTMF decoder processes DTMF input and the frequency message is converted into binary value and sent to the controller. Based on the DTMF input frequency value, the controller control respective home appliances.

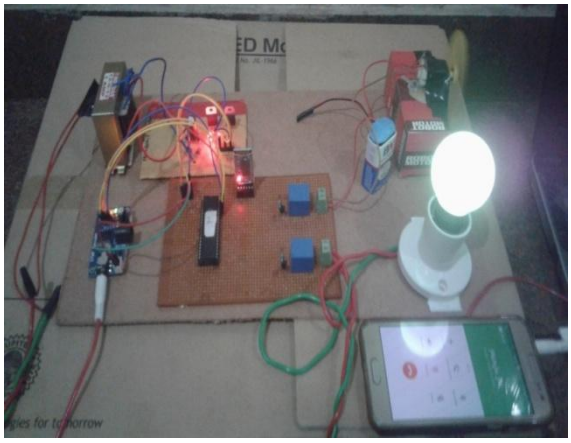

Figure 3: DTMF method control home appliances

B. Voice recognition method

The home appliances control system using voice recognition technology. Using the java code voice is recognised in the mobile android application developed and installed to user mobile. The users like elder people give voice command using mobile app. The mobile app process voice command and converts them into text message and sends these message to the controller through HC-05 Bluetooth module. The pairing of Bluetooth device is essential to transmit data from user mobile to controller. Based on the user voice input ATmega16 microcontroller controls home appliances.

Figure 4: Voice recognition method control home appliances

C. IoT method

The guardian sends the command to the protocoder application. One or more cameras are setup in home to monitor elderly and disable people. The home appliances status images clicked by the cameras are sent to guardian mail ID using internet. The owner recognizes the unnecessary usage of the home appliances controls the usage of these appliances and avoids the wastage of power.

Figure 5: Home appliances control by IoT method

IV. RESULTS AND PERFORMANCE ANALYSIS

The home appliances like fan, light etc. are controlled by elderly and disable people using DTMF and Voice recognition method. The guardian can monitor people and control the home appliances by sending the command to protocoder application installed in the mobile. The home appliances status image is sent to guardian mail id. The below table shows the performance analysis of different technologies are used to control home appliances.

Table 2: Performance analysis

PARAMETER	DTMF METHOD	VOICE RECOGNITION METHOD	IoT
1.Range	Not limited	<50m	Not limited
2.Power consumption	More	Less	Less
3.Accuracy & execution speed	Accurate & medium	Accurate & medium	Accurate & high
4.Complexity	High	Medium	Low

CONCLUSION

Elderly and disable people control home appliances like lighting, air conditioning, refrigerator, washing machine, fan and TV using different technology like DTMF and voice recognition method. The home appliances status image is sent to email id of the user when send command is issued to the home mobile phone. The advantage of IoT is the home appliances can be monitored and controlled from anywhere in the world. This system can be implemented in houses, offices, hospitals, industries and universities

References

[1] Anandhavalli D, Noorul S. Mubina, “Smart Home Automation Control Using Bluetooth and GSM”, International Journal of Informative & Futuristic Reserch, Volume 2, Issue 8, April 2015.

[2] ApurvaMisra1, Ajay K. Yadav, “An Advanced Home Automation System Using Mobile Phone”, International Journal Of Electrical And Electronics Engineers (IJEEE), Volume 07, Issue 01, June-2015.

[3] Era Johari and Vidhi Thaker;"Remote controlled home automation using android application via wifi connectivity", IJRITCC. 2015, vol. 3, Issue :3,no. 2, pp. 1489-1492.

[4] Withanage, C. ; Ashok, R. ; Chau Yuen ; Otto, K., "A comparison of the popular home automation technologies", Innovative Smart Grid Technologies - Asia (ISGT Asia), 2014.

[5] L.Yang, Yanhong. Ge,L. Wenfeng,“ A home mobile healthcare system for wheelchair users", Computer Supported Cooperative Work in Design (CSCWD), Proceedings of the 2014 IEEE 18th Int. Conference DOI: 10.1109/CSCWD.2014.6846914 , Page(s): 609 -614.

[6] Apoorva Bharambe and Divya naik "Automatic Hand Gesture Based Remote Control For Home Appliances", IJARCSSE, volume 5, Issue 2, 2015 pp. 567-571.

[7] Kumar mandula, Ramu Parupalli, “Mobile based home automation using Internet of Things(IoT)”, International Conference on Control, Instrumentation, communication and computational Technologies(ICCICCT), 2015.

[8] Kusuma S M, Vinay sagar, “Home Automation using Internet of Things”, International Research Journal of Engineering and Technology (IRJET), Volume 02, Issue 03, June-2015.