

Voice Recognition based Home Automation System for Paralyzed People – A Review

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Abstract— This paper presents the review on different voice recognition based home automation technologies for the paralyzed and elderly people. Elderly people and people suffering from paralysis require third person assistance most of the time. The home automation systems are gaining popularity now a day due to their wide operation capability. Some use these home automation system seeking luxury while for the disabled people it provides a great assistance. With voice as interacting medium to control devices it becomes more user friendly and easy to operate the system rather than using some remote controller which requires physical movement which the disabled person may find uncomfortable. The voice recognition based home automation system for paralyzed and elderly people are mainly focus on controlling the electrical appliances in the home like switching the fan on or off, turning a.c on or off etc. The other voice recognition based automation system which aids the disabled people is voice automated wheel chair. There has not been any voice automated control for the bed elevation positioning by which disabled people can adjust the elevation angle of bed according to their need and comfort. From above perspective, this paper attempts to present review of existing home automation system for the paralyzed people, deliberations on pros and cons, and a proposal for voice recognition based home automation system which can control the home appliances and can actuates the bed elevation according to the disabled person need and comfort.

Keywords— Home automation system, Paralyzed people, Voice recognition, Electrical Appliances.

INTRODUCTION

People with severe speech and motor impairment due to cerebral palsy are great difficult to move independently and also cannot control home electric devices and need third person's assistance. Table 1 shows the statistical data of the number of people suffering from paralysis in different countries. This data shows that every 1 in 100 people is living with paralysis. The home automation system has much to offer these people. Interfaces based on gestures or voices have been widely used for home automation. However, gesture recognition is difficult or impossible for people suffering from severe motor impairments, such as paraplegia and tremors. The speech integrated home automation systems provides an alternative to the above problem.

Table 1 Populations of People Suffering from Paralysis in Different Countries

Country	Extrapolated Prevalence	Population
United states of America	2,642,898	293,655,405
Canada	292,570	32,507,874
United Kingdom	542,436	60,270,708
India	9,585,635	1,065,070,607
Germany	741,821	82,424,609
Italy	522,517	58,057,477
China	11,689,628	1,298,847,624

The wireless home automation system [1] built to control lights and other electrical appliances at home or office using voice commands and touch screen responses. The system is mainly developed for the disabled people. The voice recognition application is implemented using the Microsoft speech API running on windows operating system. Since the control action is taking place wirelessly the system eliminates the complexity arises due to the wires. The speech recognition accuracy of the system is very high about 90-95%.

The system allows the disable and elderly people to control the home appliances [2] using the voice commands wirelessly. The speech recognition application is implemented using the LabVIEW software. The speech recognition accuracy of the system is more than 90%. The Zigbee module is used to control appliances wirelessly [1] [2]. The use of PC makes system more expensive [1] [2]. An Intelligent Home Navigation System (IHNS) which comprises of a wheelchair, voice module and navigation module [3]. The wheel chair automatically navigates to the different locations according to the voice commands received with the help of predefined routes of house. The wheel chair is also comprises of a obstacle avoidance feature. The voice recognition is done through the SR-07 speech recognition module which eliminates the need of PC.

The system has been developed to provide support and assistance to the disabled or elderly people at home [4]. The user can control the home appliances by voice or through the graphical user interface developed on the android platform. The android operating phone captures the voice and process the voice. The processed data is sent to the Arduino using Bluetooth and accordingly the devices are controlled. The use of Bluetooth limits the range of operation up to 20 meters.

The DSP processor is used for the voice recognition process [5]. The digital signal processor processes the voice and control the appliance accordingly. The voice recognition algorithm is written in the c language. The Zigbee module is used to control devices wirelessly. The various home appliances are controlled with the help of microcontroller and relay driver circuit.

The voice recognition based industrial automation system is developed [6] so that the disabled people can use the system for automation of industrial loads using their voice commands and thereby find jobs in industries. The voice recognition is performed using the HM2007 voice recognition module. The system has 95% of voice recognition accuracy for the person uses his own profile and the accuracy is 80% when person uses other person profile.

The voice recognition module V3 is used to recognize the voice commands [7]. It can store 80 commands in its library of 1500ms each. Only seven commands are effective at a time. The voice recognition module V3 replaces other commercially available modules due to its economical price. The home automation system is developed using this module to control the various home appliances like cooler, Air conditioner etc. The voice recognition module has an accuracy of 99% under ideal conditions.

PROPOSED SYSTEM

Fig 1 shows the block diagram of the proposed system. The voice command is by the user through the microphone. The microphone is connected to the voice recognition module where the voice commands are compared with the previously stored samples. If the voice command is recognized the Ardunio controller will actuate the corresponding load with the help of the relay driver circuit. The bed elevation control circuit comprises of a motor and motorized jack to lift the bed up or lower the bed down as shown in Fig 2.

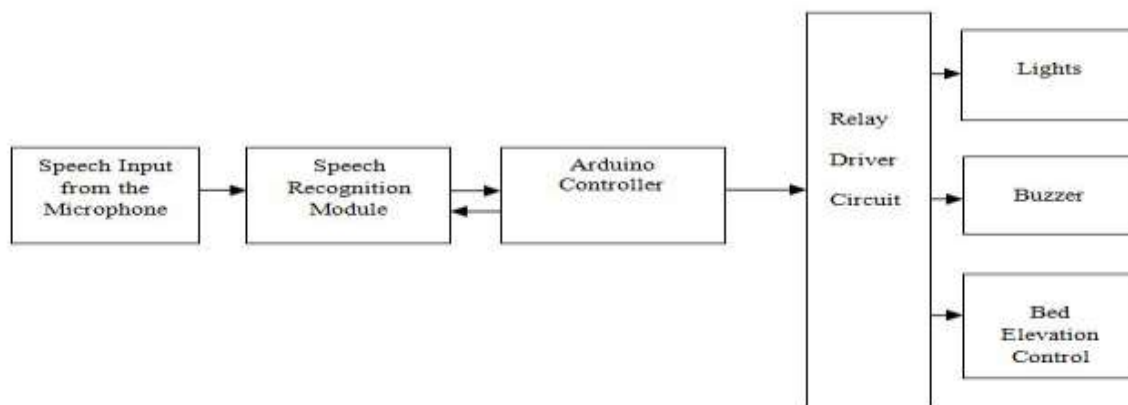


Fig.1 Block Diagram of Proposed System

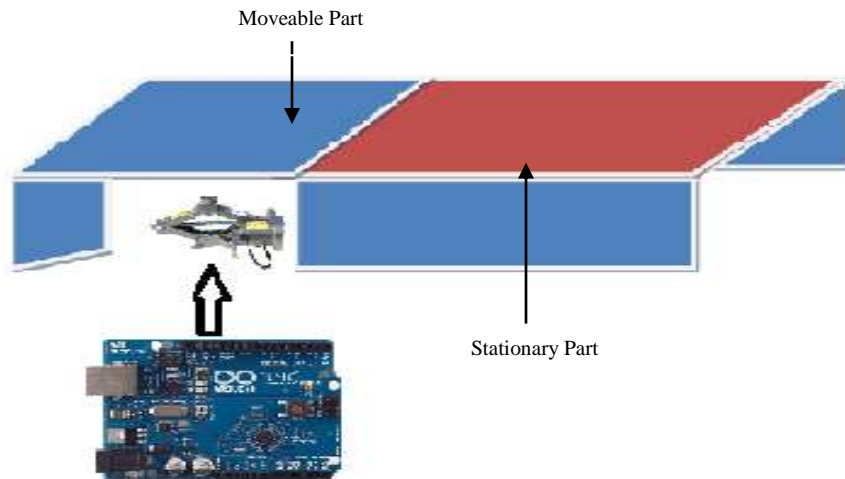


Fig.2 Motorized Jack Positioning to Lift the Bed Up or Lower it Down

The motorized jack is fitted beneath the moveable part of the bed. The Arduino controller actuates the relays which further make the motor to move in clockwise and anti clock wise direction due to which jack opens up or closes in vertical direction which in turn lifts the bed up or down. The programming of the voice recognition module and controlling section will be done in Arduino IDE.

CONCLUSION

This paper reviews the home automation system based on the voice recognition for the paralyzed people or elderly people, and since there has not been any voice recognition based home automation system which actuates the bed elevation according to the user voice commands, a new system is proposed. Hence this paper proposes the implementation of an efficient and robust voice recognition based home automation system for the paralyzed people which can change the state of home appliances on or off and adjust the bed elevation to different angles according to the person voice commands.

REFERENCES:

- [1] T.Kirankumar and B. Bhavani "A Sustainable Automated System for Elderly People Using Voice Recognition and Touch Screen Technology", International Journal of Science and Research (IJSR), Vol. 2, pp. 265-267, August 2013.
- [2] Arthi.J.E and M.Jagadeeswari "Control of Electrical Appliances through Voice Commands", IOSR Journal of Electrical and Electronics Engineering, Vol. 9, pp. 13-18, February 2014.
- [3] Rajesh Khanna Megalingam, Ramesh Nammily Nair, and Sai Manoj Prakhya "Automated Voice based Home Navigation System for the Elderly and the Physically Challenged", International Conference on Advanced Communication Technology, Seoul, pp. 603-608, February 2011.
- [4] Norhafizah bt Aripin and M. B. Othman "Voice Control of Home Appliances using Android" , International Conference on Electric Power, Electronic, Communication, Control, And Informatic Systems, Malang ,pp. 142-146, August 2014.
- [5] Parameshachari B D, Sawan Kumar Gopy, Gooneshwaree Hurry and Tulsirai T. Gopaul."A Study on Smart Home Control System through Speech", International Journal of Computer Applications, Vol. 69,pp. 30-39, May 2013.
- [6] A.K.Gnanasekar, and P.Jayavelu "Voice Based Wireless Industrial Automation with Enhanced Feedback System", Proceedings of the International. Conference on Advances in Computer, Electronics and Electrical Engineering, pp. 51-55, 2012.
- [7] Gayatri R.Shinde, Jyoti N.Borole and Kantilal P. Rane "Voice and Non Voice Control Based Wireless Home Automation System", International Journal of Innovative Research in Science, Engineering and Technology, Vol. 4, pp. 5064-5067, July 2015.
- [8] Manisha Bansode, Shivani Jadhav and Anjali Kashyap "Voice Recognition and Voice Navigation for Blind using GPS", International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering, Vol. 3, pp. 91-94, April 2015