SPEECH RECOGNITION FOR USER AUTHENTICATION USING WSVD ALGORITHM

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ABSTRACT: *The Home Automation systems have seen speedy changes due to introduction of a range of wireless technologies. The detonation in the wireless technology has seen the appearance of a lot of standards, particularly in the scientific, industrial, and medical (ISM) radio band. The wireless home Automation systems is assumed to be implemented in existing home environments, without any modification in the infrastructure. The automation centers on recognition of voice commands and utilize low-power ZigBee wireless communication modules along with microcontroller. This system is the majorly suitable for the elderly and the disabled persons particularly those who be alive alone and since recognize voice so it is protected. The home automation system is proposed to control all lights and electrical appliances in a home or office using voice commands. So in this Proposed work our goal is to designed a voice recognition wireless ZigBee based home automation system. The main objective of this system is to facilitate the life of people extra comfortable, particularly for the elderly and disabled as they will not have to be in fact present near an appliance to turn it on or off. The system gives attention on utilizing a Digital Signal Processor to process the voice commands*
and consequentially control the compulsory appliance. XBee transceivers are utilized to eliminate the need for huge amount of wiring among the processor and the appliances. Experimental results demonstrate that the system has a high-quality response and is cost efficient. We conclude that this system make available solutions for the difficulty faced by home owners in everyday life and create their life easier and extra comfortable by proposing a cost efficient and consistent solution.

KEY WORDS: *Dereverberation, spectral subtraction, speech recognition, Viterbi decoding.*

I. INTRODUCTION

Controlling the Home appliances by utilizing the wireless communication system is an incorporated system which is the majorly appropriate for the people who belong to senior citizen group and physically handicapped. It is extremely simple to function for the managing of home appliances on the source of voice commands. The system is convenient and configured in a technique that is installation, configuration and maintenance is very much trouble-free. A attributes of wireless home automation system approve to user to handle home control unit which is wireless. These appliances frequently have to be particularly designed to be well-suited with every other and with the control unit for the majorly commercially accessible home automation systems. The project demonstrates a system that can be incorporated as a single portable unit and agree to one to wirelessly manage loads like fans, lights, air coolers, security video cameras, refrigerators, desktop systems, automatic doors, audio/visual equipment's etc. and turn on or off any appliance that is plugged into a wall outlet, get the status of dissimilar sensors and obtain decision consequently. The overall system is manage from a microphone which is associated with speech recognition chip. This chip propels the voice commands in binary sequence to the controller . The base station unit obtains decision and sends the commands to remote station by ZigBee trans-ceiver . The remote system recognizes the commands through ZigBee transceiver and performs the additional function as per the received signals. The sensors unit is capable of identifying when the user enters or leaves the room by measuring the modification in signals strength between the access Point and can consequently turn on or off appliances such as lights and fans and in the mean time send its status back to base station.

II. OBEJECTIVES AND GOALS

The main purpose of this research is to develop an Speaker recognition based computerization system capable of managing numerous devices inside a home and office using speech commands with protection of voice command of individual user only with speech commands broadcasted and received wirelessly. In organize to accomplish this objective, the following goals are defined and accomplished:

- *To produce speech database of users in regulate to differentiate the speech signals to activate appliances. use*
- *To intend Wireless transmission media using ZIGBEE transceivers.*
- *To appraise and choose the nearly all appropriate speech processing technique for converting audio signal to machine code instructions utilizing speech processor and security matter by MATLAB programming using WSVD algorithm.*

III. PROPOSED METHOD

The proposed method is aspired at designing a voice controlled smart home management system for the following reasons. One of the most important problems in our present day society is consumption of energy, whereby energy utilization is incessantly increasing year by year. Nowadays, some people may be too lazy or too busy to get up and turn off a particular appliance.

A) Software Design

Software design for this proposed system involves training for speech processor and assembly programming for microcontroller to work on received signals from speech processor. It obtains control commands from processor and switches ON/OFF relay attached to the particular appliance. Our project concurrently works with MATLAB code, where speech recognition will be bring out using WSVD algorithm. If voice command is competition with the corpus stored in system then and then only code will produce matched waveform and appliance will be turn on.

B) Hardware Design

In this hardware design section, we will present the hardware explanation of the 3 main parts that form our Smart Home Control System. It will just have to speak to turn off a device, in that way saving energy as well as one's time. In addition, old or disabled persons may experience complications in disappearing around the house to turn on/off their appliances, particularly if they live alone. It will be much effortless for them to utilize the voice control system. It will also assist blind people as they will be capable to turn on a fan or a radio without relying on others. The system was designed in such a technique that it is simple to install and utilize. The proposed method is to utilize a Digital Signal Processor (DSP) for speech processing and recognition. The output of the DSP will be sent, throughout the XBee transceivers, to the manage part, where a micro controller will chose the necessitated device according to the input voice command. The system can be separated into 3 main parts:

- *Microphone and DSP for Audio processing part.*
- *XBee transceivers for Data Transmission part.*
- *Microcontroller and relays Control part*.

The voice commands will first be captured and processed in the DSP according to the voice recognition technique was used. Following successful recognition of the commands, control characters will be wirelessly sent throughout the XBee transceivers to the microcontroller, which will in turn on the corresponding relay. As a outcome, home appliances could be turned on or off depending on the specified voice command.

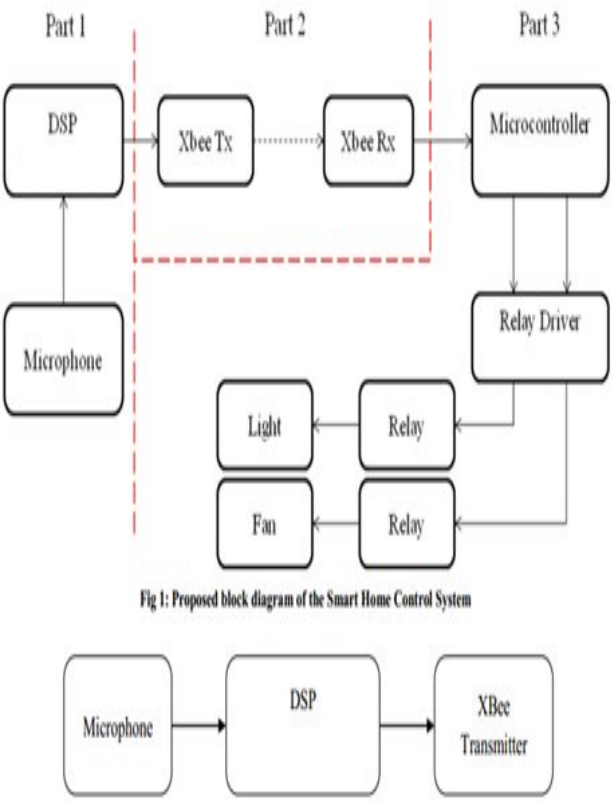

Fig 1: Proposed block diagram of the Smart Home Control System

Figure 1: Proposed Block Diagram of the smart Home Control system

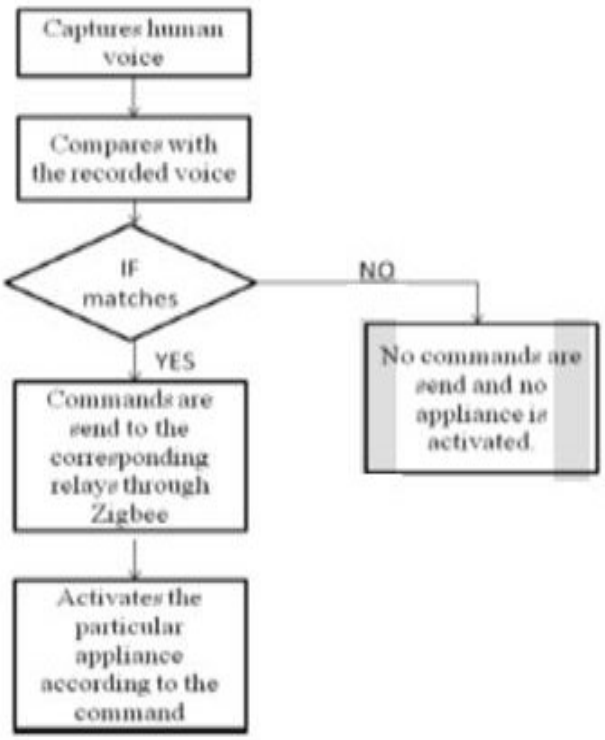

Figure 2: Appliance Control Modules with relay controlling circuits

Above figure demonstrates the sequence of activities in the WHAS. The voice is taken by using a microphone. Upon recognition of the commands, control characters are sent wirelessly to the specified appliance address. Accordingly, appliances can be turned ON or OFF or controlled approximately increasing or decreasing the speed depending on the control characters received.

C) Project Design Methodology

At this point we will focus on the principle involved in the design of the Voice Recognition Wireless Home appliance control System by using ZigBee. The project was separated into partitions to construct the design process modular. In the prototype board organized and manufactured by the author s, the parts replaced with their specifications are:

- *Speech Recognition : The main technique in this methodology is speech recognition system which is voice recognition IC processor. The IC can identify maximum of up to 20 words.*
- *ZigBee: It is a cost effectual, power competent, wireless networking standard serial communication protocol. The cost efficiency agree to the technology to be expansively organized in wireless control and examining based applications , the power proficient consumption permits longer life with smaller batteries, and dissimilar networking topologies such as adhoc, mesh , ring, star make available high reliability and larger range.*
- *Microcontroller: Any 8-bit microcontroller can be used for configuring this system. Here we have used microcontroller full static controller , with 8k Flash memory and 256 bytes RAM, 4 I/O ports of 8 bit wide, 3 timers/counter s along with 8 interrupt sources etc.*
- *Power supply.*
- *Various sensors relay switches board and sound alarm.*

D) Voice Recognition Unit

The voice recognition system is completely integrated and uncomplicated to use programmable speech recognition Circuit. Programmable, in the means that we can prepare the words or commands that we would like the circuit to be recognized. This circuitry permit us to experimenting with numerous aspects of speech recognition technology . It has 8 bit data out which can be interfaced with some microcontroller for additional processing and development.

IV. EXPERIMENTAL RESULTS AND DISCUSSIONS

The prototype of the system has been assembled and experimented. We demonstrate the response of the speech recognition application to verbal commands. The tests involved 10 subjects; the trails were accomplished with people with various Indian languages. The test subjects were a grouping of male and female and 7 different voice commands were sent by every person. Consequently the test involved throwing a total of 70 commands. 80.05% of these commands were recognized accurately. When a command is not recognized accurately , the software pay no attention to the command and does not broadcast any signals to the device control modules. The accuracy of the recognition can be influenced by surrounding noise, speed of the speaker, and the clearness of the spoken inflection. These features required to be studied additional in further characteristics by conducting more tests. The system was tested in an apartment and executed well up to 40m. With a clear line-of- sight transmission the reception was accurate up to 80m.

FEATURES:

- *Self-controlled voice recognition unit*
- *User programmable as per the application*
- *Up to 20 word vocabulary of duration length two second each*
- *Supports for speech recognition for many languages (Multi-lingual)*
- *Will keep the speech recognition data in memory even after power off.*
- *Effortlessly interfaced to organize external circuits & appliance.*

APPLICATIONS:

There are numerous areas for application of voice recognition technology.

- *Through Speech recognition we can controlled appliances and toys*
- *By using Speech recognition supported computer games*
- *Speech recognition supported to virtual reality*
- *Telephone support systems*
- *Voice recognition based security systems*
- *Speech to speech transformation systems.*

V. CONCLUSION

Voice recognition Wireless Home appliances management system Based on ZigBee is a extremely functional for the Person such as senior citizens and physically handicapped persons, who are not capable to do various activities efficiently

when they are at home and require one's help to handle those tasks. With the Voice Recognition beside with ZigBee network we can reduce the complication of hardware circuitry in Voice recognition. Wireless Home appliances controlled system Based on ZigBee is a very useful project for the people like senior citizens and physically handicapped persons, who are unable to do different activities effectively when they are at home and need one's help to handle those tasks. With the Voice Recognition along with ZigBee network we can reduce the complexity of hardware circuitry in case of wired automation and also it prevent to obtaining up and down again and again to on/off appliances. ZigBee Home Automation provides enhanced operating range as evaluated to Bluetooth and any other wireless serial communication methods . With the use of ZigBee Home Automation circuit considerable amount of power minimizing is possible and it is compatible with future upcoming technologies so it can be without difficulty modify for individual requirements. On the further hand over with voice recognition system, it provides secure access t o home. So when we are living in advanced world where ever y thing is changing with in no time such security is mandatory. case of wired automation and also it pr event to get up and down again and again to o n/off appliances. ZigBee Home Automation provides better operating range as evaluated to Bluetooth and any other wireless serial communication methods . With the utilization of ZigBee Home Automation circuit substantial amount of power reducing is probable and it is well suited with future upcoming technologies so it can be effortlessly make specially for individual requirements. On the other hand with voice recognition system, it make available secure access to home. So when we are living in advanced world where the whole thing is varying with in no time such security is compulsory.

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