Hand Guesture Recognition to Text and Voice Converstion System and Control Home Appliances

K. Suganthi, S. Manoj, M.Subash, R. Udhayarasu
Department of Biomedical Engineering
Muthayammal Engineering College
Namakkal, Tamil Nadu, India

Abstract:In our country around 2.8% of peopledumb (who are not able to speak). They can communicate only through their hand gestures and expressions. Here we proposed a new technique which has a speaker(artificial mouth) for dumb people which acts as a mediator to convey the messages to others. Some peoples can easily understand their motions or gestures but most of us cannot able to understand their way of conveying the message. In order to overcome this situation the artificial mouth is introduced for the dumb peoples. This system is based on Mems technique. According to dumb people, for every motion they have a meaning. So that each action is related or assigned to a hand gesture and sense by microcontroller. In the real time the database is fed into a microcontroller and the camera is fixed in front of them.For every action the motion sensors get accelerated and give the signal to the microcontroller. Once the motion senses the motion microcontroller matches the gesture with the database and produces the speech signal. The output of the system is using the speaker. The system also includes the concept of home appliances control so that they can communicate with remote appliances and control with the use of Hand gesture they can control the home appliances (like light, fan, … etc)

I. INTRODUCTION

This section reviews the research on the important elements in developing the signal language recognition device.The first research study focuses on gesture recognition method for detecting the movements of the hand. These condresearch study discusses the hardware that will be used in this project.

SignLanguage

There are 22 languages in India and 415 other living languages. Such diversity in languages has its challenges when it comes to communicating villages, communities and states. Indian Sign Language (ISL) is one of the living languages in India used by the Deaf and Mute communities. The number of persons with hearing impairments in India amounts to1.3million(5.8 percent of the total 21.9 million persons with disabilities in India according to the census).Educational system in India earlier focused on oral-aural method. Situation is improving with more usage of Indian Sign Language.
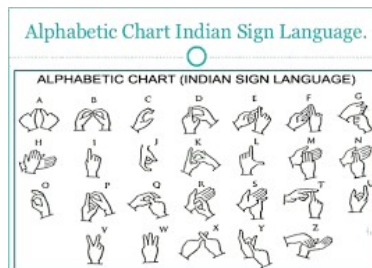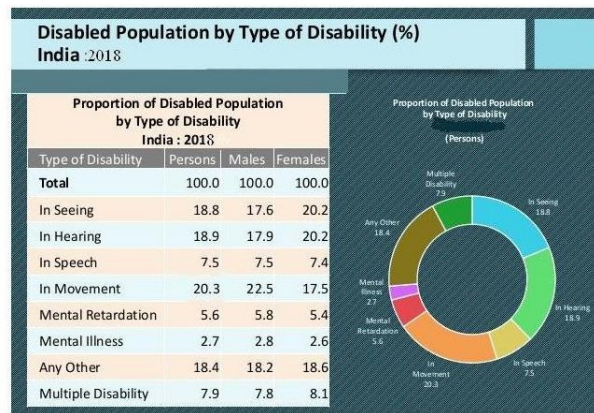

Figure 1.1: Indian Sign Language

II. LITERATURE SURVAY

Attempts to recognize sign language automatically began to appear in the 90s. Many researchers are trying to develop automatic sign language recognition system in various sign languages. Various works have been carried out previously on various sign language recognition techniques. The research on Gesture recognition system can be classified into two [1] types, first is the use of electromechanical devices. This type of system affects the signer's natural signing ability.Eng-Jon Ong and Bowden [2] presented a novel, unsupervised approach to train an efficient and robust detector which is capable of not only detecting the presence of human hands within the image but classifying the different hand shapes. Their approach detects the location of the hands using a boosted cascade of classifiers to detect shape alone in grey scale image. Foong, Low&Wibowo [3] developed a prototype sign to voice

system (S2V) using a feed forward neural network to detect a two-sequence sign. The two-sequence sign language or hand gestures were tested with an average recognition rate of 78.6%.Hemayed and Hassanien[4] developed the Arabic sign language alphabet recognition and converts it into voice. In this edge detection based technique is used extract the image parameters from captured images. Maebatake, Suzuki, Nishida, Horiuchi, Kuroiwa[5] developed a hidden markov model based sign language recognition system. A classification accuracy of 75.6% was reported. Ghouzali, Hemami, Rziza, Aboutajdine, Mouaddib[6] proposed algorithm which involves generating a discrete Cosine transform (DCT) at each pixel location, using the surrounding points. The experimental results show that our model avoids excessive false detection. Yu Huang, Monekosso, Hui Wang and Augusto[7] proposed the glove based system for the hand gesture recognition. Bluetooth based home automation system using cell phones: In Bluetooth based home automation system the home appliances are connected to the Arduino BT board at input output ports using relay. The program of Arduino BT board is based on high level interactive C language of microcontrollers; the connection is made via Bluetooth. The password protection is provided so only authorized user is allowed to access the appliances. The Bluetooth connection is established between Arduino BT board and phone for wireless communication. In this system the python script is used and it can install on any of the Symbian OS environment, it is portable. One circuit is designed and implemented for receiving the feedback from the phone, which indicate the status of the device. Zigbee based home automation system using cell phones: To monitor and control the home appliances the system is designed and implemented using Zigbee. The device performance is record and store by network coordinators.For this the Wi-Fi network is used, which uses the four switch port standard wireless ADSL modern router. The network SSID and security Wi-Fi parameter are preconfigured. The message for security purpose first process by the virtual home algorithm and when it is declared safe it is re-encrypted and forward to the real network device of the home. Over Zigbee network, Zigbee controller sent messages to the end. The safety and security of all messages that are received by the virtual home algorithm. To reduce the expense of the system and the intrusiveness of respective installation of the system Zigbee communication is helpful.

III. EXISTINGSYSTEM

The previous methods of communication for dumb people used a system where buttons are used These buttons are connected to a controller system and based on each button press, different lights of various colours are switched of These different coloured lights have a different meanings that would be understood by the family or friends of the dumb people Despite the fact that the deaf and dumb people can impart without issues amongst them- selves, there is serious challenge for the hearing or impaired person trying to communicate with normal people. This is because note very single typical people can comprehend their gesture based communication. The greater part of ordinary individuals has not been taught about the sign language. As communication is imperative, this issuesinevitably makes a limitation for the impaired individuals to correspond with thenormal.

Disabled Population by Type of Disability (%) India :2018

Proportion of Disabled Population by Type of Disability India : 2018

Type of Disability	Persons	Males	Females
Total	100.0	100.0	100.0
In Seeing	18.8	17.6	20.2
In Hearing	18.9	17.9	20.2
In Speech	7.5	7.5	7.4
In Movement	20.3	22.5	17.5
Mental Retardation	5.6	5.8	5.4
Mental Illness	2.7	2.8	2.6
Any Other	18.4	18.2	18.6
Multiple Disability	7.9	7.8	8.1

IV. SIMULATION

Power supply: a group of circuits that convert the standard ac voltage (120 V, 60 Hz) provided by the wall outlet to constan voltage Transformer a device that step up or step down the ac voltage provided by the wall outlet to a desired amplitude through the action of a magnetic field Rectifier: a diode circuits that converts the ac input voltage to a pulsating dc voltage The pulsating voltage is only suitable to be used as a battery charger, but not good enough to be used as a dc power supply in a radio, stereo system, computer and so on. Filter: a circuit used to reduce fluctuation in the rectified output voltage or ripple. provides a steadier dc voltage. Regulator: a circuit used to produces a constant dc output voltage reducing the ripple to negligible amount. One part of power supply.
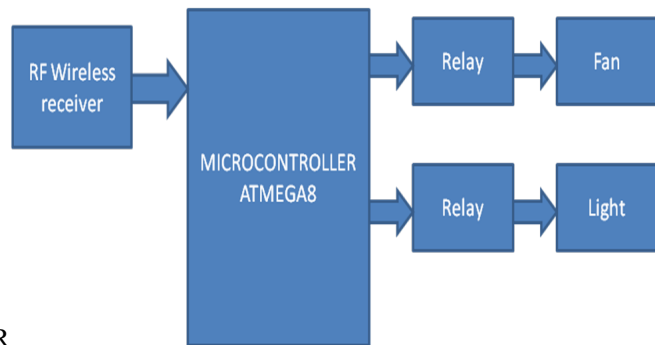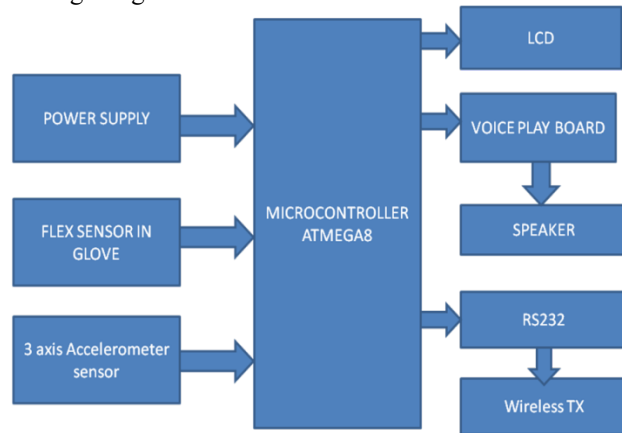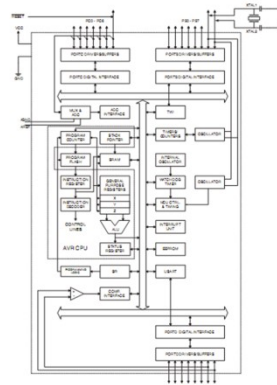
Voltage Regulation

Figure 3.1: BLOCKDIAGRAM TRANSMITTER

Figure 3.2: BLOCK DIAGRAM RECEIVER

V. BLOCK DIAGRAM

Basic Function:- The main function of the CPU core is to ensure correct program execution. The CPU must therefore be access memories, perform calculations, control peripherals, and interrupts. In order to maximize performance and parallelism, the AVR uses a Harvard architecture separate memories and buses Programdata. Instructions in the Program memory are executed with a single level pipelining. While one instruction is being executed, the next instruction is pre-fetched from the Program memory. This concept enables instructions to be executed in every clock cycle. The Program memory is In-System Reprogrammable Flash memory. The fast-access Register File contains 32 x 8-bit general purpose working registers with a single clock cycle access time. This allows single-cycle Arithmetic Logic Unit (ALU) operation. In a typical ALU operation, two operands are output from the Register File, the operation is executed, and the result is stored back in the Register File in one clock cycle. Six of the 32 registers can be used as three 16-bit indirect address register pointers for Data Space addressing

enabling efficient address calculations. One of the these address pointers can also be used as an address pointer for look up tables in Flash Program memory. These added function registers are the 16-bit X, Y and Z-register. The ALU supports arithmetic and logic operations between registers or between a constant and a register. Single register operations can also be

executed in the ALU. After an arithmetic operation, the Status Register is updated to reflect information about the result of the operation. The Program flow is provided by conditional and unconditional jump and call instructions, able to directly address the whole address space. Most AVR instructions have a single 16-bit word format. Every Program memory address contains a 16- or 32-bit instruction.

VI. RESULTS & DISCUSSION

We have Successfully Tested the Arduino interfacing with the flex sensor and LCD.

VII. CONCLUSIONS

As for now, we have successfully interfaced the flex sensor,LCD with ARDUINO (Atmega 328p) using the software Arduino IDE with the suitable Embedded code Language. Hence, We could further proceed for the hardware interfacing. The main goal of this project is to develop sign language translation system that can translate the sign language into text. Since not every typical people being educate with communication through signing, this system will help them to comprehend the language of deaf and dumb people so that will give points of interest to them in conducting their daily tasks ahead. This system explains the design and working of a system which is helpful for dumb deaf people to commune with themselves as well as with the normal people.

REFERENCES

[1] Ismail, M. F., Rahim, M. K. A., & Majid, H. A., "The Investigation of PIN Diode Switch on Reconfigurable Antenna", In RF and Microwave Conference (RFM),IEEE International, pp. 234-237,2011.

[2] Singh, Ashish, Mohammad Aneesh, KumariKamakshi, Anurag Mishra, and J. A. Ansari. "Analysis of F-shape micro strip line feed dual band antenna for WLAN applications." Wireless networks", pp.133-140, 2014.

[3] Jose, Shilpa K., and S. Suganthi. "Rectangular micro strip antenna for WLAN application",In 2015 International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS), pp. 15.IEEE, 2015.

[4] MilindSaurabh, KhandaAnum, Rajan Mishra, and G. S. Tripathi. "Performance Enhancement of Microstrip Patch Antenna for UWB and

[5] Tlili, Boutheina. "Design of double C-slot micro strip patch antenna for WIMAX application." IEEE Antennas and Propagation Society International Symposium, pp. 1-4. IEEE, 2010.

[6] G.Neelakrishnan, S.N.Pruthika, P.T.Shalini, S.Soniya, "Performance Investigation of T-Source Inverter fed with Solar Cell" SurajPunj Journal for Multidisciplinary Research, 2021, Volume 11, Issue 4, pp:744-749

[7] C.Nagarajan and M.Madheswaran - 'Experimental verification and stability state space analysis of CLL-T Series Parallel Resonant Converter' - Journal of ELECTRICAL ENGINEERING, Vol.63 (6), pp.365-372, Dec.2012.

[8] C.Nagarajan and M.Madheswaran - 'Performance Analysis of LCL-T Resonant Converter with Fuzzy/PID Using State Space Analysis'- Springer, Electrical Engineering, Vol.93 (3), pp.167-178, September 2011.

[9] C.Nagarajan and M.Madheswaran - 'Stability Analysis of Series Parallel Resonant Converter with Fuzzy Logic Controller Using State Nagarajan and M.Madheswaran - 'Experimental Study and steady state stability analysis of CLL-T Series Parallel Resonant Converter with Fuzzy controller using State Space Analysis'- Iranian Journal of Electrical & Electronic Engineering, Vol.8 (3), pp.259-267, September 2012.

[10] An, Boon-Khai, and Boon-Kuan Chung. "A wideband E-shaped micro strip patch antenna for 5-6 GHz wireless communications." Progress In Electromagnetics Research 75: 397-407,2007