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Automatic Generation of Speech (AGS) For Mute and Hearing Impaired People

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Abstract-The Automatic Speech generation System provides a suitable user friendly device to the mute and hearing impaired people in the world who are deprived of controlling things around them. This System can also be utilised for partially paralysed people. Hence, A new form of handheld device is implemented to make people easy to use. This device utilises the MEMS technology which produces signals corresponding to the movements made by the user. The microcontroller is pre-programmed with the signals corresponding to certain finger movements. When the finger movement made by the user matches with the saved movements, the microcontroller generates a certain code uniquely identifying the finger movement and hence generates the audio output which has been pre-programmed to that particular finger movement. For the partially paralysed people they can control the things such as fans, television, light etc on their own using relay to on or off the lights, fan etc by some particular hand movements so that they need not depend on the others for some basic needs and make them self-confident. Thus, this integrated system can surely provide a great substitute for physically challenged people. In the existing system there is no navigation system for physically challenged people. Our proposed system overcomes the technology which is not available in the existing system. In our proposed system the physically challenged and paralysed people can control things around them without the help of others and make them do things lie normal human beings.
Keywords: PIC Microcontroller; Microelectromechanical Systems (MEMS); Voice Board; Relay; Menu Switch; Speakers.

I. INTRODUCTION

The Automatic Generation of Speech (AGS) system finds a very useful application for physically challenged people. Many physically challenged people in this world are deprived of controlling things around them and they are not able to lead a normal life like normal human beings. This system overcomes the difficulties faced by them day to day and using this system they can get their basic needs satisfied like (drinking water, feeling hungry etc) and they can also control things around them like switching lights (ON/OFF), fans etc without the help of others. This system is thus designed for this purpose. This system uses a microcontroller (PIC 16f877A) which plays a major role in this system and accelerometer is used here where movements made by the user produces a specific output from the MEMS accelerometer. The microcontroller is programmed with specific movements and based on movements made by the user it produces an audio output. The audio output is produced using voice processor where the recorded voice is played for corresponding movement through speaker. Sign language is a language which is used for communication between the normal people and disabled people. Sign language relies on sign patterns, i.e., body language, orientation and movements of the arm to facilitate understanding between people. In all around the world about 9.1 billion peoples are deaf and dumb. In their day to day life they faced lot more problems on their communication. This proposed system is used to reduce the communication gap between the normal people and disabled people. Humans know each other by conveying their ideas, thoughts, and experiences to the people around them. There are numerous ways to achieve this and the best one among all is the gift of "Speech". Through speech everyone can very convincingly transfer their thoughts and understand each other. It will be injustice if we ignore those who are deprived of this invaluable gift. The only means of communication available to the vocally disabled is the use of "Sign Language**"**.

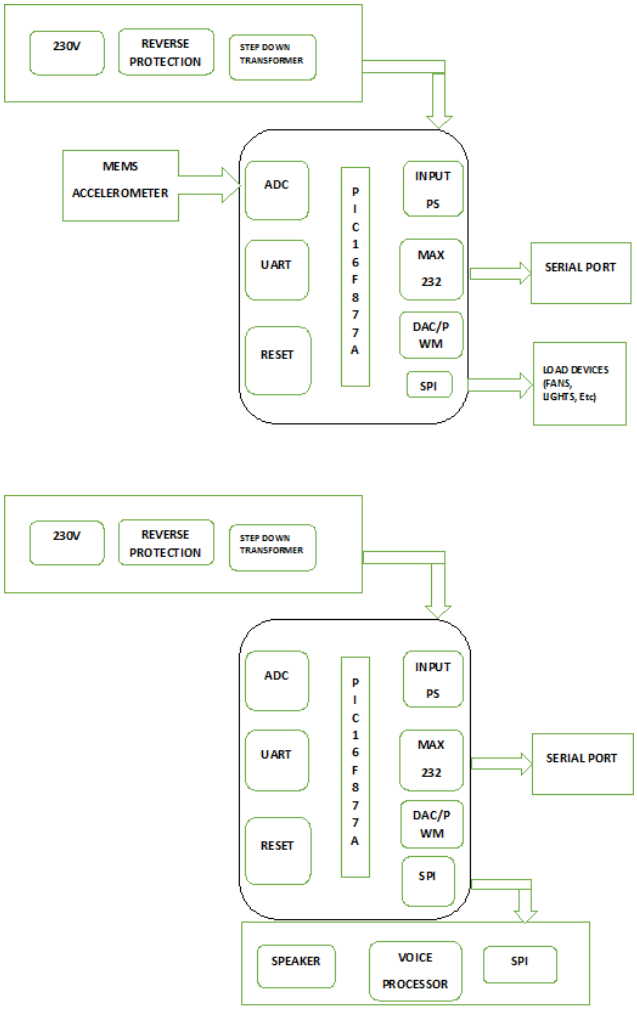
Using sign language they are limited to their own world. Deaf-Dumb people need to communicate with normal people for their daily routine. There are some difficulties when they come across in certain areas like banking, hospital etc. To overcome their problem a proper sign language is needed other than their existing communication method like lip reading, writing down word and finger spelling. Sign language is the main technique for deaf dumb communication. This language cannot be recognized by most of the normal people and blind people. They face difficulties in their way of communication. Even they have some good ideas which can also be conveyed to others without facing difficulties and they can also easily communicate with the other physically challenged people in this world, so that they can also feel free to share their ideas. This proposed system also provides a facility to control load devices or electrically operated devices especially for partially paralysed people without the help of others. Many paralysed people are not feeling free to control load devices because they have to depend on others. To

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facilitate their communication, system that translates sign language as voice could be helpful. The proposed system is the first step towards the final goal of providing assistance to these kind of people.

II. BLOCKDIAGRAM
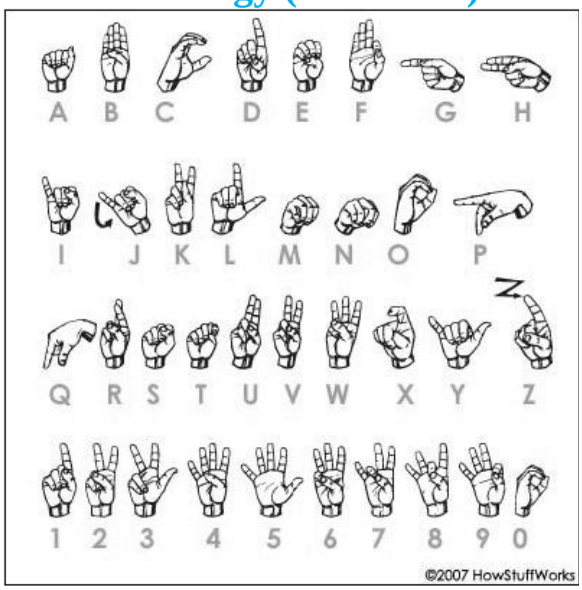


III.ACCELEROMETER

Accelerometers are used for tilt sensing. They measure both static and dynamic acceleration. The sensor has a g-select input which switches the accelerometer between ± 1.5g and
±6g measurement ranges. It has a signal conditioning unit with a 1-pole low pass filter, temperature compensation, self-test, and 0g-detect which detects linear free fall. This System is useful for the deaf and dumb, it can also be used for the (speechless) patients with half of their bodies paralysed.

A. The aims and objectives of the proposed research work include

1) Basic objective of this system is to design a portable embedded system.
2) Developing an economical and simple solution for the detection of finger movements.
3) Cost effective, reliable data acquiring method and signal conditioning.

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Example

Based on these types of movements as shown above in this example the already recorded voices are played. The output from the MEMS accelerometer is based on three axes(X, Y, Z) the values of three axes are noted for each movement and when the movement is made if it matches with values of three axes the corresponding audio output is played through speaker which is programmed in the microcontroller.

IV.LITERATURE SURVEY

Anbarasi Rajamohan et. al [1], proposed a work to communicate between a deaf-mute people to normal person using a glove and flex sensors and a speech to text conversion also done here by change in motion of hand which will cause a change in resistance in the flex sensors and accelerometer will measure the orientation of hand and based on hand movement the angle of the axis varies, if it matches with program done in microcontroller a speech output is automatically generated corresponding to the hand movement.

Ruize Xu and his co authors [2],explained how to provide communication between dumb people and normal person based on recognition of hand gestures. The output signals from mems accelerometer are fed to microcontroller. An automatic hand gesture algorithm is developed to identify the individual gestures in sequence. The directions are also transmitted to PC via Bluetooth protocol and finally the gesture is recognized by comparing the gesture code with the stored templates and corresponding hand gestures are obtained.

Abjhijt Auti, explained how to to develop Electronic Speaking Glove, designed to facilitate an easy communication through synthesized speech for the benefit of speechless patients. Generally, a speechless person communicates through sign language which is not understood by the majority of people. Gestures of fingers of a user of this glove will be converted into synthesized speech to convey an audible message to others. The glove is internally equipped with multiple flex sensors that are made up of "bend-sensitive resistance elements". For each specific gesture, internal flex sensors produce a proportional change in resistance of various elements. The main advantage is that the glove can be worked as normal human being hand. Finally the gesture movements are converted into speech output.

V. PROCESS FLOW

The automatic generation of speech system uses a PIC Microcontroller(16F877A) which has 40 pins in which PORT A(5 Pins) is especially used for analog inputs and outputs and remaining ports are used digital I/O. The user module is MEMS accelerometer(ADXL335) which is held by hands of the user and movements made will produce a analog signal based on three axes(X,Y,Z). It is given to 3 analog pins of the PIC Controller. The MEMS accelerometer has 5 pins(+5v,GND,X,Y,Z) and in that X,Y,Z pins are connected to analog pins and remaining two pins are connected to GND,Vcc. Then the three axes are monitored using serial monitor in PIC C Compiler using RS232 serial communication. Based on that movements the three axes values are monitored and it is programmed accordingly. The Audio Board has 8 pins(Rec,Play,Del,A0,A1,A2,A3,A4) where Rec is used to record user defined voice and del is used to delete the recorded voice and play is used to play the recorded voice.

During recording voice Rec pin is enabled and any one of the analog pins from 5 pins is enabled(For Ex.A0 pin). The user is

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made to speak and that analog pin is disabled so that the spoken voice is stored in that pin, likewise 5 pins are stored with different voices. During playing Rec is disabled and Play is enabled with any one of the analog pin so that stored voice in that corresponding pin is played. When it is to be done automatically by controller the condition is fixed while programming (For Ex. If X=323,Y=267,Z=367) the pin A0 pin is enabled so if the mems o/p matches with conditions the voice is played. The audio board is interfaced with only digital pins to the microcontroller because it has only HIGH or LOW state and it is programmed accordingly. The load devices can also be operated using relay which is connected to digital pins in PIC. When A0 pin is enabled it can also be programmed to simultaneously switch ON the load, likewise the load devices can also be controlled by user. Especially for physically challenged people they can switch ON/OFF the fans, lights without the help of others. This is the advancement in this system.

This proposed system is an attempt in this direction to design modalities that can assist people who are limited by either handicaps or diseases to have better quality of life. In this proposed system a low cost device will be designed that used MEMS accelerometers to recognize different gestures made by people. Once recognized these gestures can be used to do various functions.

VI. SOFTWARE TOOLS

A. MPLAB IDE
B. Proteus 8.0 Professional
C. PIC C Compiler

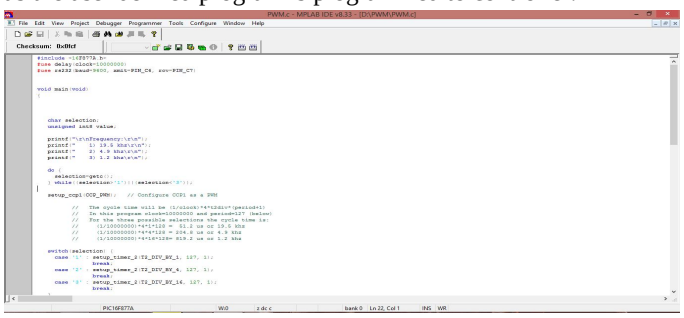
VII. HARDWARE REQUIRED

A. PIC16F877A
B. MEMS Accelerometers
C. Relay Drive, Relays
D. Voice Processor
E. Speaker
F. Pickit 3 programmer

VIII. SOFTWARE

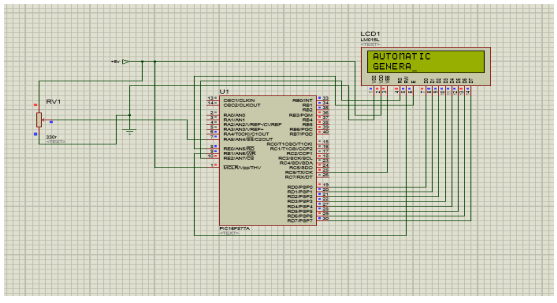
A. MPLAB IDE 8.0

Microchip Integrated Development is a software used to compile the program and is used to program to the PIC microcontroller using pickit 3 programmer. Thus the user defined program is programmed to controller.



B. Proteus 8.0 Professional

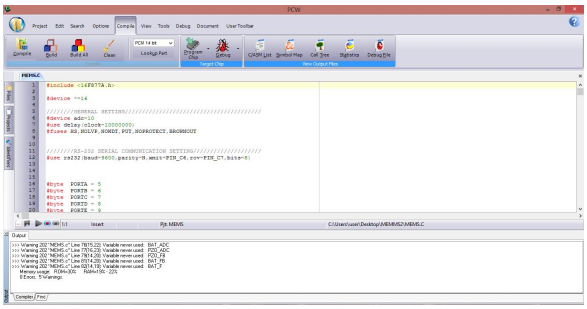
It is simulation software used to test the circuits and output is viewed visually. Highly complicated circuits are easy to test using this software.



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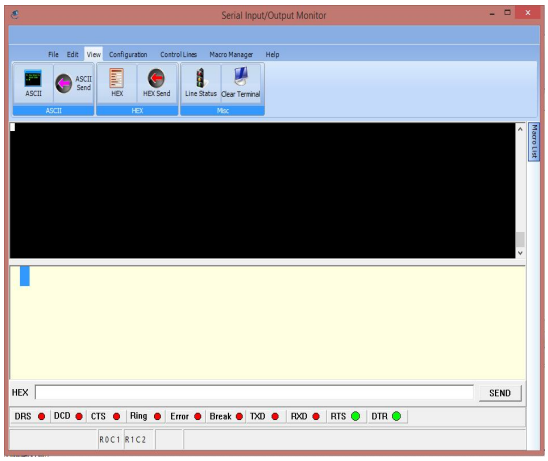
C. PIC C Compiler

It is a compiler similar to C/C++ Compiler especially designed for PIC for all Series of microcontroller. It is used to compile the program and checks for errors and creates a object file. That object file is added as source file in MPLAB IDE 8.0 to program to the microcontroller.



D. Serial Monitor

It is present in the PIC C Compiler which is used to monitor the values from microcontroller(i.e Output from the MEMS) using serial communication.

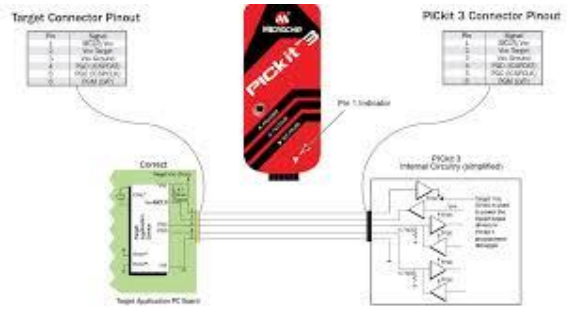


E. Voice Processor

The voice processor is used to record the user voices and it has a option to play it again and also to delete the stored voices in the memory. It can record upto 25 voices but here we are using only 5 voices connected to 5 pins from the microcontroller.

F. PICKIT 3

It acts as a driver between software and hardware. It is used to program the user defined coding to the microcontroller.



G. Microcontroller

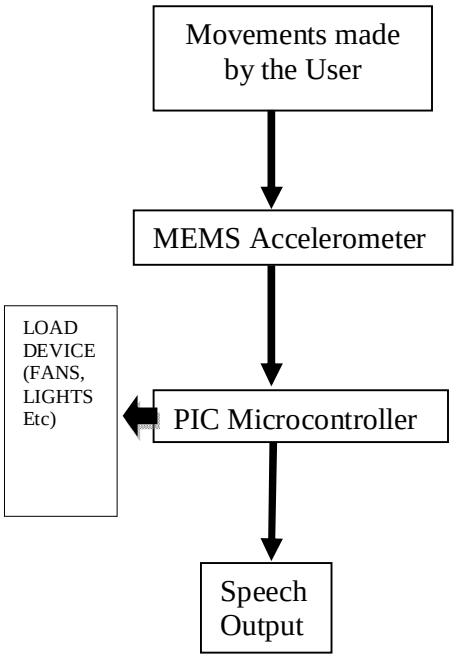
The controller has two modes of operation – training mode and operational mode. In training mode the gesture are made by user and the voltage levels are stored in EEPROM.

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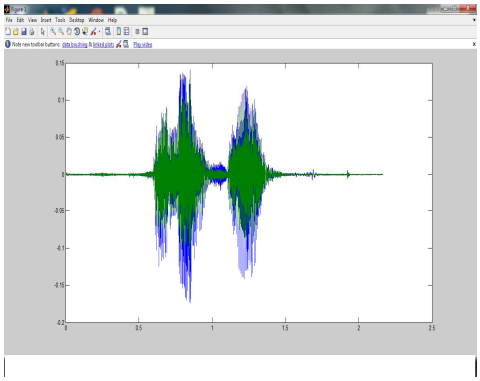
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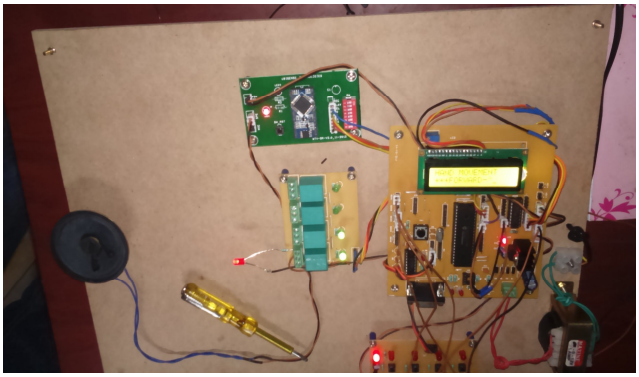
In operational mode the data is being compared with predefined values and the matched gestures are sent to text to speech conversion module. The module consists of TTS
block and Speak Jet. The output is processed and heard via a speaker.

IX.FLOW CHART



IX. RESULTS AND DISCUSSION





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X. ADVANTAGES

A. Easy to communicate with the people as others so their ideas can't be used by others for the growth of nation.
B. They can be as normal human beings.
C. Can be used for partially paralysed people so that they can control the thing by their own and not depend on others.
D. Easy to use.
E. Voice can be changed based on user's choice.

XI.LIMITATIONS

A. Cost becomes more for complex movements.
B. Program needs modification for more movements based on user's requirement.

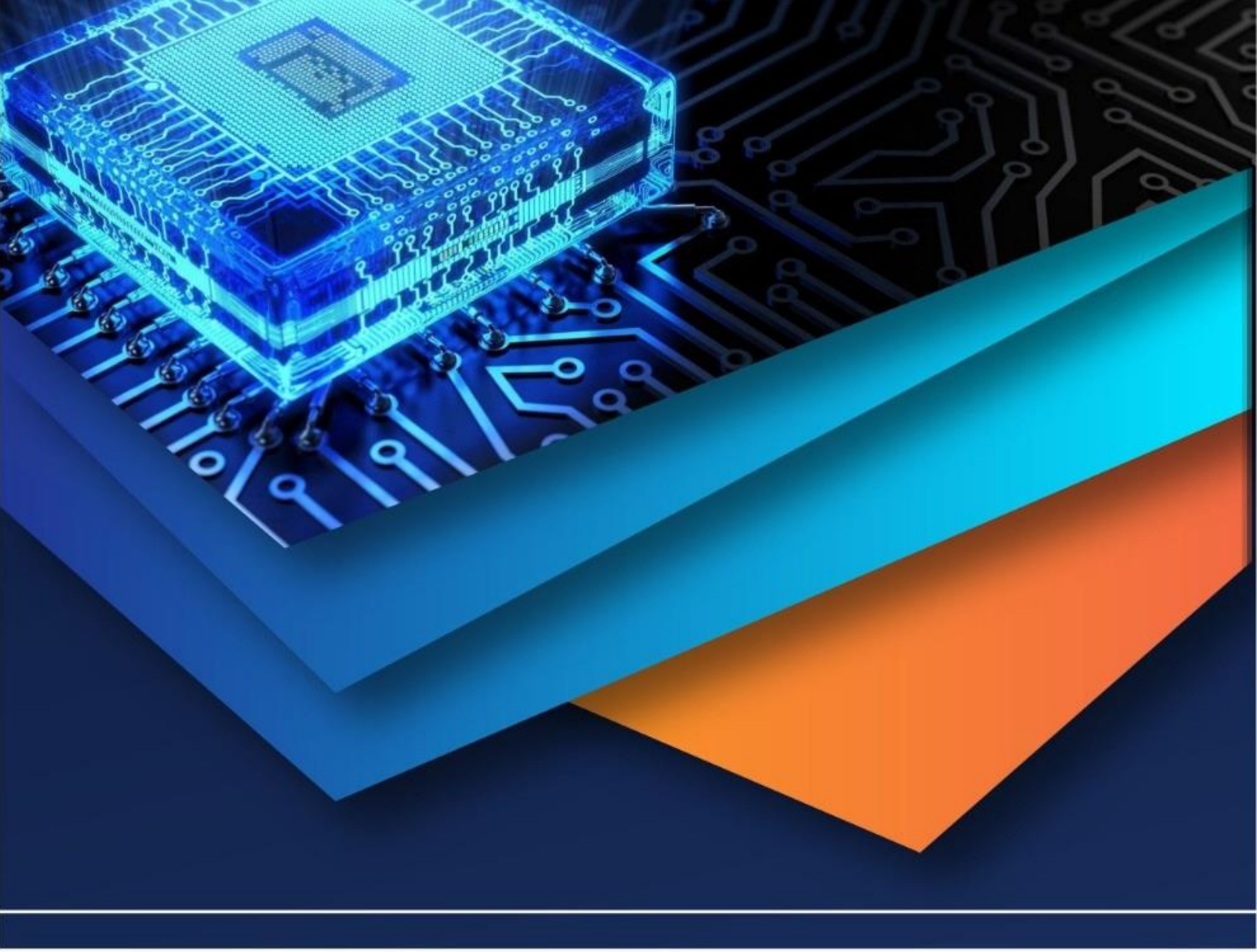
XII. FUTURE ENHANCEMENT

A. The project can be enhanced to include two or more accelerometer's to capture the orientation of hand movements once the gesture is made. This will expand the capability to translate larger gestures. Then flex sensor can be used.
B. Load devices can be operated using wireless communication so that home automation can be brought using basic hand movements.

REFERENCES

[1]Ruize Xu, Shengli Zhou, And Wen J. Li, "Mems Accelerometer Based Nonspecific-User Hand Gesture" year may 2012, VOL. 12, NO. 5.
[2] Anbarasi Rajamohan , Hemavathy R., Dhanalakshmi M. "Deaf Communication Interpreter" year 1 may 2013,Volume 2 Issue 5.
[3] Syed Faiz Ahmed, Syed Muhammad Baber Ali, Sh. Saqib Munawwar Qureshi, Syed Faiz Ahmed, Syed Muhammad Baber Ali, Sh. Saqib Munawwar Qureshi,]"Electronic speaking glove for speechless patients" april 2014, Volume 3, Special Issue 4.
[4] S. Saivenkatesh, k. Suriya Intelligent speech recognition and translating embedded device for deaf and dumb individuals", april 17/04/2014.
[5] A.Y. Satpute1 and A. D. Bhoi "Electronic speaking system for dumb", july 2013, ISSN: 22311963.
[6] by M. Rahim1, Tamnun E Mursalin2, Nasrin Sultana3 "Intelligent Sign Language Verification System –Using Image Processing, Clustering and Neural Network Concepts",may 2011.
[7] Bhavina Patel, Vandana Shah, Ravindra Kshirsagar, "Microcontrollor based gesture recognition system for handicap people" October-decemeber 2011, E-ISSN0976-7916.
[8] Chenghui Yang]"Based on Artificial Neural Networks for voice recognition word segment" by may 2010.
[9] R. San-Segundo, J.M. Montero, J. Macías-Guarasa, R. Córdoba, J. Ferreiros, J.M. Pardo, "Generating Gestures from Speech" by may 2012.
[10] Abjhijt Auti", V. G. Puranik, Dr. A. K. Kureshi, "Speaking Gloves for Speechless Persons" by april 2014.

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