Digital Art using Hand Gesture Control with IoT

Dr.P.Gnanasundari[1], K. Jawahar[2], J. Elango[3], M .Anburaj[3], K. Harish[4]

HOD, Dept. of Electronics and Communication engineering, SNS College of Engineering, Coimbatore, India

B.E Student, Dept. of Electronics and Communication engineering, SNS College of Engineering, Coimbatore, India

ABSTRACT- This paper proposes the need of people who are handicapped as well as suffering from deaf and dum. The major concern of this paper is to connect them with real world with great esteem. It is based on Human Computer Interaction were the patient is connected to the real world by understanding their sign language into a normal communication. Here hand is considered to be one of the most important parts of our body which is being most frequently used for the interaction in this digital world. Initially the hand glove system is helped in virtual reality in gaming and other aspects. An individual can get connected to the real world people and access their needs effectively.

KEYWORDS*:* Human Machine Interaction, Virtual reality, sign language, hand glove.

I.   INTRODUCTION

India is one of the largely populated country in the world. There are over millions of people still suffering from deaf and dum. This proposal helps them to communicate with normal people by understanding their sign language into normal one through mobile communication using internet of things.

This proposed system helps in effective way of disabled people who is often need of help. This system recognises their gesture movement from their hands and relate it through the database and matches their needs which displays in a mobile application over internet to their responsible person. This system with Internet of Things helps in receiving the message over internet irrespective to the distance, it enables worldwide connection.

This system makes them more interactive than struggling to convey their views or seeking help from the respective ones. Also helps in huge manner that destroy the gap in next generation of people and build a bridge between the disabled people and normal a normal one.

II.   PREVIOUS WORK

The previous work is designed on hand glove which is used to interface between human and machine.it is found that the static keyboard and mouse are having many limitations with them, while in the case with data glove can be used for same. The existing system is designed on a hand Data Glove and it is used to interface between human and machine. It is found that the static keyboard and mouse are having many limitations with them, while in the case with data glove

can be used for the same purpose without any limitations. The degree of freedom of data glove is more than mouse resulting better inputs in the world of virtualization. The existing system proves that such device are good technological for interacting and controlling the devices, software or hardware. The air writing and sketching with 3-D game are the software applications that involved data glove as input devices.

DRAWBACKS OF EXISTING SYSTEM:

- The equipment's used in virtual reality are very expensive.
- It consists of complex technology.
- In virtual reality environment we can't move by our own like in the real world.

- Existing system of gesture based technology is adapted only in the field of entertainment.

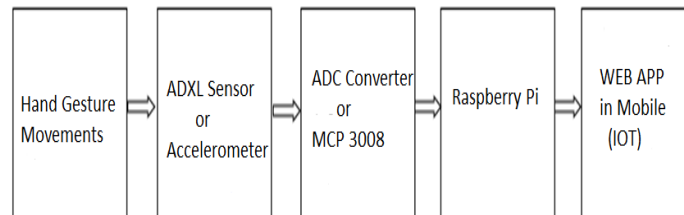## BLOCK DIAGRAM OF PROPOSED SYSTEM:

Fig.1. Proposed system

III. RASPBERRY PI

The raspberry pi is a low cost credit card sized computer that plugs into a computer monitor or television or mobile through IOT and it uses a standard Keyboard and a mouse. Various types of microcontrollers are exist, even though the best are found to be raspberry pi with latest all functions which makes things feasible. The raspberry pi was designed for a linux operating system. It is mainly used in home and industrial automation used to network and monitor the entire system to work in a proper condition. It promotes scratch or python as the main programming language with support for many other languages.

All in one unit

Pi is a full blown device with OS it allows just to be done without any extras needed from the start. Whereas other microcontrollers need separate components to be used for various purposes like LCD display, Ethernet shield.

☐ **Space is our limit**

Another major use of pi is there is no space restrictions. It is being able to control RC tanks from it, can send it to space and takes a picture, use it as home media centre, play a Minecraft on it.

☐ **Constant improvement**

The Raspberry pi is being constantly improved, it now comes with 1GB RAM, the ability to overclock to 1 GHz without voiding warranty.
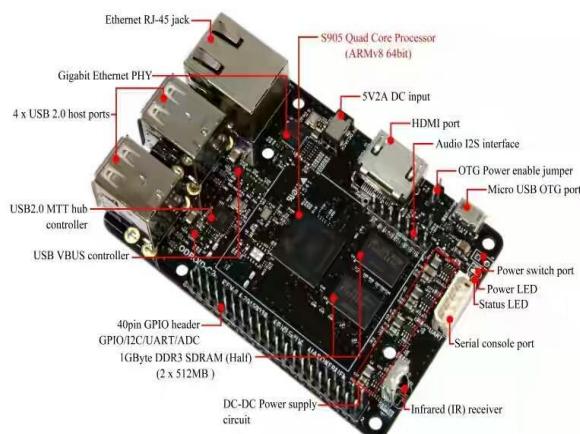

Fig.2. Raspberry Pi

IV.ADXL SENSOR

The ADXL sensor is a small, ultralow power, 3-axis accelerometer with high resolution. The sensor has 14 pin. In this the digital output data is formatted and it is access through either a SPI or I²C digital interface. The SPI has 4 wires. It measures the static acceleration and also dynamic acceleration. The sensor contains several special sensing functions in that activity and inactivity sensing is detect the presence or lack of motion by comparing the acceleration on any axis with user set threshold voltage. An integrated memory management system can be used to store data to minimize host processor activity and lower overall system power consumption.
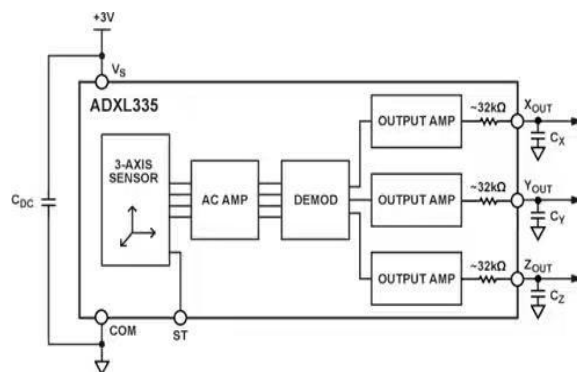

Fig.3. Functional block of ADXL sensor

Poly silicon springs suspend the structure over the surface of the wafer and provide a resistance against forces due to applied acceleration. Deflection of the structure is measured using differential capacitor that consist of independent fixed plates and plates attached to the moving mass. Acceleration deflects the proof mass and unbalances the differential capacitor, resulting in a sensor output whose amplitude is proportional to acceleration. Phase-sensitive demodulation is used to determine the magnitude and polarity of the acceleration. The functional block diagram is shown in Figure.3.

V. ADC CONVERTOR (MCP 3008)

Fig.4. MCP 3008

The microchip technologies Inc. MCP3008 devices are successive approximation 10 bit analog to digital converters with on board sample and hold circuitry. The MCP3008 programmable to provide two pseudo differential

input pairs or eight single ended inputs. It is offered in 16-pin dip packages. This device can operate over a broad voltage range (2.7-5.5v). Differential nonlinearity and integral nonlinearity is given by ±1 LSB. Image of a ADC MCP 3008 is shown in Figure 4.

SPECIAL FEATURES:
- 10- bit resolution
- ±1 LSB max DNL
- ±1 LSB max INL
- 8 input channels
- On chip sample and hold
- Single supply operation (2.7-5.5v)
- Low power CMOS technology
- Industrial temperature range -40 to +85 degree.

PRINCIPLE OF OPERATION:

The flash ADC comprises on array of comparators. Each comparators is connected to a resistive voltage divided and to the analog input voltage. The resistive voltage divider consists of equal valued resistors connected in series with the reference voltage VREF. Thus each comparator compares the analog input voltage with a slightly different voltage from the divider. Those comparator which are connected to divider resisters where the divider voltage is lower than the analog input voltage will give a high output. The other comparators will produce a low output. Large analog input voltages will result in more comparator high output. The pattern of comparator high/low outputs is applied to encoder's circuits which converts the data into a binary output number which is proportional to the ratio of the analog input voltage to reference voltage.

The MCP3008 A/D convertors employ a conventional SAR architecture. With this architecture, a sample is acquired on an internal sample/hold capacitor for 1.5clock cycles starting on the first rising edge of the serial clock once CS has been pulled low. Following this sample time, the device uses the collected charge on the internal sample and hold capacitor to produce a serial 10-bit digital output code. Conversion rates of 100kpbs are possible in MCP3008.

VI.MOBILE (SMARTPHONE)

We require a smartphone which is a mobile phone with an integrated computer and other features that performs many of the functions of a computer, typically having a touchscreen interface, internet access and an operating system that is capable of run downloaded applications. Smart phones are small computers, they run an operating system that is often common between devices to ensure compatibility. Most of the smartphones are able to run more than one program at the same time which helps the user to do things quicker and easier.

Communication has become faster than other mobile phones can send and receive data much faster. It support 4G networks operate in many places with estimated as fast as 100mb/s to 1 Gb/s.

Fig.4. Mobile application

Specification:

- A recognized operating system Google's Android.
- Internet connectivity
- Embedded Memory
- Hardware and software based keyboard.
- Wireless synchronization.
- Ability to download and run applications.
- Support third party applications.
- Touchscreen and Wi-Fi.

POWER SUPPLY

Power supply is very essential thing for a proper system. The official power supply recommended for Raspberry Pi +5.1V with 2A for its proper performance. Micro USB connection goes straight into the PI's power supply unit.
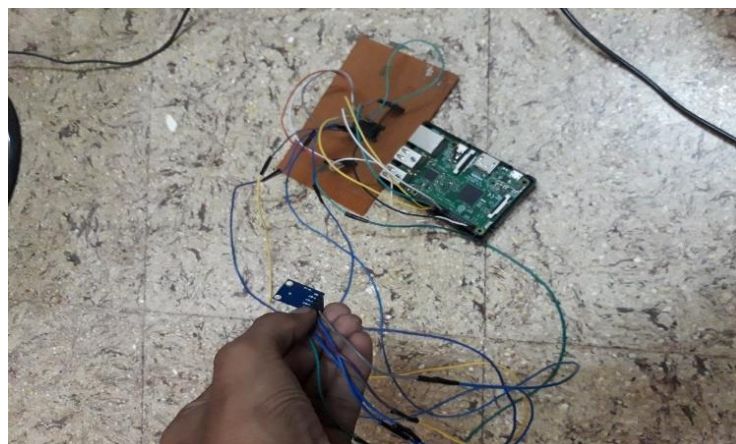
VII.RESULT

Fig.5. Sensor movement

Program for gesture movements has been done and the result is made to be displayed in a personal computer. Mobile application is been developed using MIT App Inventor and the result of PC is Mapped to cloud and made it to displayed in a smartphone.

The purpose of each gesture has been programmed through raspberry pi and it has been mapped to cloud using cloud storage. Later it is being accessed through mobile application to our convinence. For each gesture movement it is being displayed over mobile around anywhere all over the world.
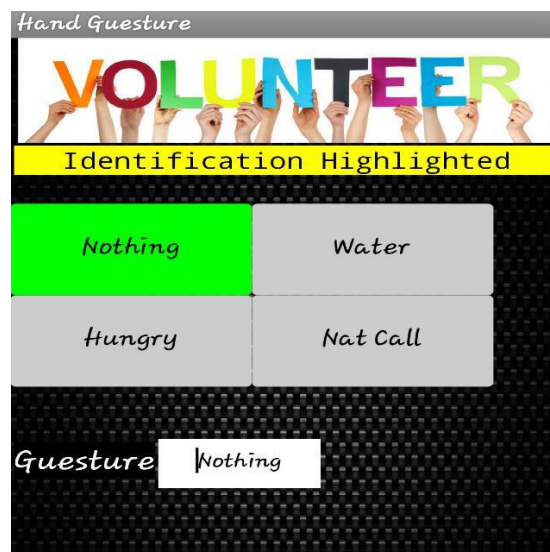

Fig.5. Result displayed in APP using IOT

VIII.CONCLUSION

By using this proposed system we can make the disabled deaf and dumb people to be interactive to our environment. It helps need of person who is monitored continously 24x7 with the help of human power. And also the patient can access their needs in a time without any struggle in conveying their thoughts. This helps them more with ease and it takes away the need of continuous monitoring. By implementing these they can feel free to share their needs and requirements in time and without any struggle and delay. It eliminates the need of a person at all times.

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