

GESTURE VOCALISER FOR INTERACTION WITH DEAF AND DUMB PEOPLE

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Abstract - Communication is that the only medium by which we will share our thoughts or convey the message except for a person with disability (deaf and dumb) faces difficulty in communication with normal person. Because of this, a person who lacks in hearing and speaking ability isn't ready to substitute with normal person. Communication for a person that cannot hear or speak is visual, not auditory and the one that cannot see is auditory, not visual. Generally dumb people use sign language to communicate, but they find difficulty in communicating with others who does not understand sign language. So there is an obstacle in communication between these two communities. This work aims to lower this obstacle in communication. The main aim of the proposed project is to develop a price effective system which can formulate to deaf and dumb person with the assistance of Gloves. It means using gloves communication won't be an obstacle between two different communities. With the assistance of these gloves disabled person also can get chance to grow in their respective carrier. Using such devices by disabled person also makes nation grow with their growth as we all know that though they have some disability but they are highly talented in some or the other field. Index Terms- Sign Language, Gesture, AVR Microcontroller, Flex Sensors, Accelerometer, Gloves, Bluetooth module, Android.

Key Words: Sign Language, Gesture, AVR Microcontroller, Flex Sensors, Accelerometer, Gloves, Bluetooth module, Basics For Android (B4U) App

1. INTRODUCTION

Deaf and Dumb people uses signing as a crucial and only method of communication. signing may be a formal language and a system of communication using hand gestures and signs. Flex Sensor Plays the main role, which are placed on fingers, as fingers bends it changes resistance counting on the quantity of bend on the sensor. because the name suggests, this technique gives voice to voiceless i.e. voice is given to the one that isn't ready to speak. Deaf and dumb people use signing for communication purpose. Signing uses gestures rather than sound to convey information. This language includes combination of hand shapes, hand movements to generate words. During this system flex sensors plays the main role. Flex sensors are attached to the glove using needle and thread. Flex sensors are the sensors whose resistivity varies with the quantity of bend. AVR microcontroller is employed to require input from flex sensors then this analogue data is converted to digital form by using microcontroller. All the info from microcontroller is shipped to android phone and accordingly the android phone will speak the corresponding character which has been sensed. Also in this project we are going to use special gestures for some daily used sentences like please give me water, please open the door ect. We are also going to use a panic condition gesture by which in case if the user

needs any kind of help or he has some kind of emergency while he is away from the known person, so by signing this special gestures the user can send a message through his mobile to the important contact saved in his mobile that he needs some help with the longitude and latitude of his location and the other person can easily track him by just searching the same latitude and longitude on Google maps.

2. LITERATURE SURVEY

"The Amazing Digital Gloves that provides voice to voiceless." By Praveenkumar S Havalagi, Shruthi (1) Glove-based systems represent one among the foremost important efforts aimed toward acquiring hand movement data. Generally dumb people use signing for communication but they find difficulty in communicating with others who don't understand signing. It's supported the necessity of developing a device which will translate signing into speech so as to form the communication happen between the mute communities with the overall public possible, a Wireless data gloves is employed which is normal cloth driving gloves fitted with flex sensors along the length of every finger. Mute people can use the gloves to perform hand gesture and it'll be converted into speech with the help of an application installed in their android mobile through which the normal people can understand their expression. This project paper provides the idea for developing such a digital glove. It also analyse the characteristics of the device and discusses future work and advantages of same. A foremost goal of this paper is to supply readers with a basis for understanding glove system technology utilized in life science.

"Hand Gesture Recognition and Voice Conversion System for Differentially Able Dumb People" by Shoaib Ahmed V. (2) Generally dumb people use signing for communication but they find difficulty in communicating with others who does not understand signing. This project aims to lower this obstacle in communication. It's supports the necessity of developing an device which will translate signing into speech so as to form the communication happen between the mute communities with the overall public possible. A Wireless data gloves is employed which is normal cloth driving gloves fitted with flex sensors along the length of every finger and therefore the thumb. Mute people can use the gloves to perform hand gesture and it will be converted into speech in order that normal people can understand their expression.

3. PROPOSED SYSTEM

The most aim of the proposed project is to develop price effective system which can formulate to voiceless person with the help of Smart Gloves. It means using Smart Glove by the person enables them to talk with others which also helps to bridge the gap between person with disability and normal person. Problems faced by the person regarding employment are often overcome by this method. So within the proposed work an intelligent microcontroller based system using Flex sensors and accelerometer. The proposed system

are getting to be consisting of combination of hardware and software. Hardware part will include flex sensors on each finger for bend movement and accelerometer for wrist movement, microcontroller, power supply, and android phone and Bluetooth module. Software part will include programming and coding for android phone application which can be used by the user for interaction. Hardware part are getting to be consisting of flex sensors to need input from different gestures through gloves, microcontroller to convert input analogue data to digital data and for further processing, power supply to provide voltages to specific units, and eventually Bluetooth module to send the data from controller to android mobile. Here HC-05 Bluetooth module are getting to be used.

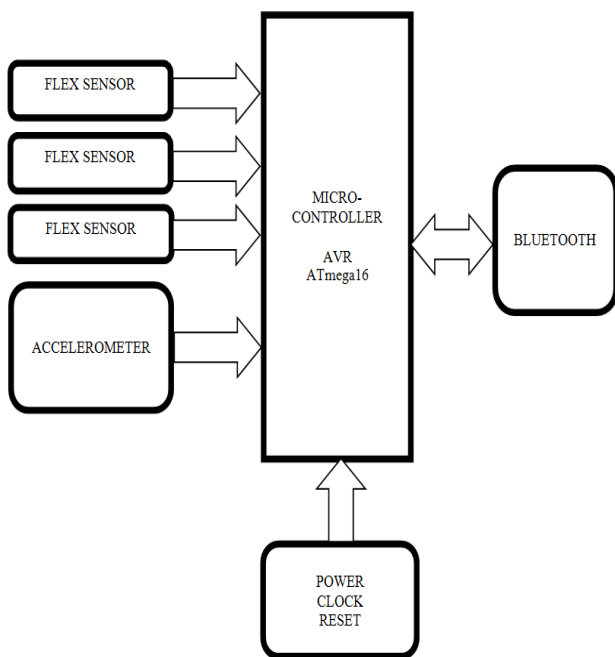


Fig-1: Block Diagram

Block Diagram this is often the diagram of our system. During this the Microcontroller ATMEGA16 is that the guts of our system. In conjunction with this Flex Sensors, Accelerometer, Bluetooth and Power Supply are connected to atmega16. The foremost work of Microcontroller is to manage all the operation of the system. The Flex Sensors are used to sense the motion of Fingers bending. The accelerometer is used to detect the motion of wrist. When the gesture is completed using finger the accelerometer will detect the motion and may forward the analog data to microcontroller. Then the microcontroller will receive the analog data and convert it into digital data by using analog to digital convertor which is inbuilt in our microcontroller ATMEGA16. Then the digital data are getting to be forwarded to the mobile app via Bluetooth. On the mobile app we'll see the letter on mobile display and with the help of text to speech convertor one can hear the letter displayed on the screen.

3.1 HARDWARE DISCRIPTION

AVR Microcontroller

Atmega16 is based on amplified RISC (Reduced Instruction Set Computing) architecture with 131 powerful instructions. Most of the instructions execute in one machine cycle which consists of three steps: fetch, decode and execute. Atmega16 can work on a

maximum frequency of 16MHz. ATmega16 has 16 KB programmable non-volatile storage, static RAM of 1 KB and EEPROM of 512 Bytes. ATmega16 could also be a 40 pin microcontroller. There are 32 I/O (input/output) lines which are divided into four 8-bit ports designated as port A, port B, port C and port D.

Flex Sensors

The Flex Sensor patented technology is predicated on resistive carbon elements. As a variable printed resistor, the Flex Sensor achieves great form factor on a skinny flexible substrate i.e. on a plane surface. When the substrate is bent, the sensor produces a resistance output correlated to the bend radius i.e. as the sensor bends the radius of the sensor decreases thus increases the resistance value which helps in detecting the alphabet.

Bluetooth Module

Bluetooth Communication could also be a 2.4GHz frequency based RF Communication with a spread of roughly 10 meters. It's one of the foremost popular and most frequently used low range communication for data transfer, audio systems, handsfree, computer peripherals etc. HC-05 Bluetooth Module could also be an easy Wireless Communication device supported the Bluetooth Protocol.

Accelerometer

A 3-axis accelerometer could also be a tool that's designed to measure acceleration along three axes in space - the forward and back X-axis, the left and right Y-axis, and thus the up and down Z-axis. Since an accelerometer measures acceleration as related to a state of free fall, where no forces are performing on it aside from gravity, 3D acceleration is taken under consideration at a default state of zero or during a weightless state, albeit the accelerometer itself has mass.

3.2 SOFTWARE DESCRIPTION

Bascom Avr

AVR is a family of microcontrollers developed by Atmel since 1998, now its under Microchip technologies since 2016. These are modified HAVARD ARCHITECTURE 8-bit RISC single-chip microcontrollers. AVR was one among the primary microcontroller families to use on-chip non-volatile storage for program storage, as against just one occasion prograommable ROM, EPROM, or EEPROM employed by other microcontrollers at the time. AVR microcontrollers find many applications as embedded systems. They are especially common in hobbyist and academic embedded applications, popularized by their inclusion in many of the Arduino line of open hardware development boards. BASCOM-AVR may be a Windows BASIC COMPILER IDE for the AVR family. It will run on all versions of Microsoft Windows from 95 to 10 (32&64-bit).

Key Benefits

- Structured BASIC with labels.
- Structured programming with the help of IF-THEN-ELSE-END IF, DO-LOOP, WHILE-WEND, SELECT- CASE.
- Fast machine language rather than interpreted code.

- Variables and labels are often as long as 32 characters.
- Bit, Byte, Integer, Word, Long, Single and String variables are available.
- Compiled programs which works with all AVR microprocessors that have internal memory.
- Local variables, user functions, library support.
- Integrated terminal emulator with download option.
- Integrated simulator for testing.

Basics for Android

Basic4android (basic for Android) may be a simple though powerful development system that targets Android devices. Basic4android language is analogous to Visual Basic(VB) language with additional features and support for objects. Basic4android compiled applications are easy to use. Android applications, there are not any extra runtimes or reliance.

Why Basic4Android?

- Simple and powerful development tool.
- IDE and programing language 100% focused on Android development process
- No runtime libraries are required. APK files created are precisely the same as APK files created with Java / Eclipse
- Performance almost like applications written with Java coding.
- Event driven programing language almost like VB with support for objects and code modules
- Supports all of Android core features like GPS, Home screen widgets, Background services and broadcast listeners, Bluetooth (serial ports)USB host, Web services,Camera, Views animations, Multitouch gestures, Push notifications (C2DM), Text to speech and voice recognition, Sensors, Files I/O, Objects serialization and lots of more.
- Highly accurate with support for custom Java libraries
- A powerful framework built by Android development experts which makes your development process rasier and better.
- Strong and helpful online community which is always available for solving doubts.
- Modern IDE with autocomplete & rooted documentation and other features.

B4A Bridge-

It is a bridge which is used to share our app from computer to mobile. It can be easily downloaded from Google PlayStore. It can be connected by turning on the bluetooth of both the device and can share application. Once the app is shared by the B4U bridge we can latter share it by any sharing application or by mail.

3.3 METHODOLOGY

1. Deciding the topic of Research

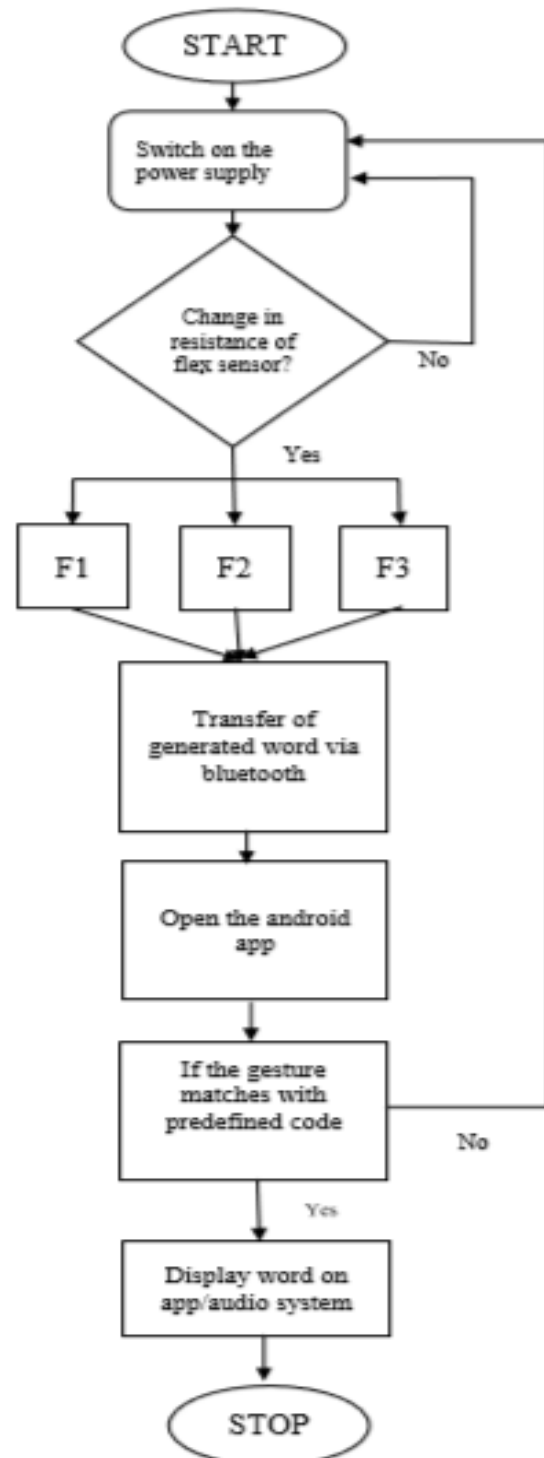
Initially we had tons of ideas for survey-based project. Then it had been mutually decided that the survey sample should be huge. So we decided to require a topic during which we will get wide selection of sample size. so as to face 21st century internet prepares people of various age groups to adapt to social and technological changes that are happening at an unprecedented rate. during this context internet especially may be a resource for continued education for the acquisition of latest knowledge and skills, for

gaining information through media. Online shopping is an example of internet.

2. Framing appropriate Questionnaires

The initial steps of our project was to border a simpler questionnaire in order that our sample have a transparent idea what's being required from them and save their precious time .

The questionnaire was constructed to mirror many of the queries that are asked in previous studies of online shopping, internet usage (i.e. between 15-30 years, 30-45years, 45-60 years).



4. EXPERIMENTAL RESULTS

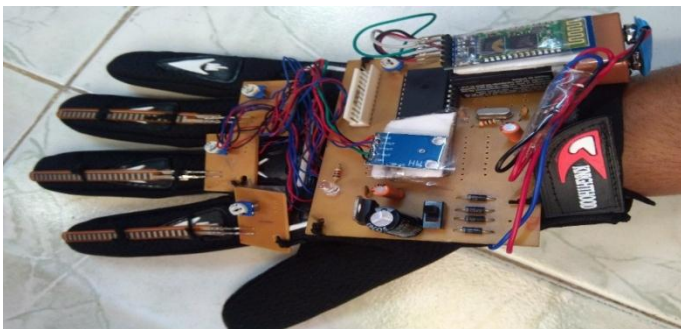


Fig-2: Model

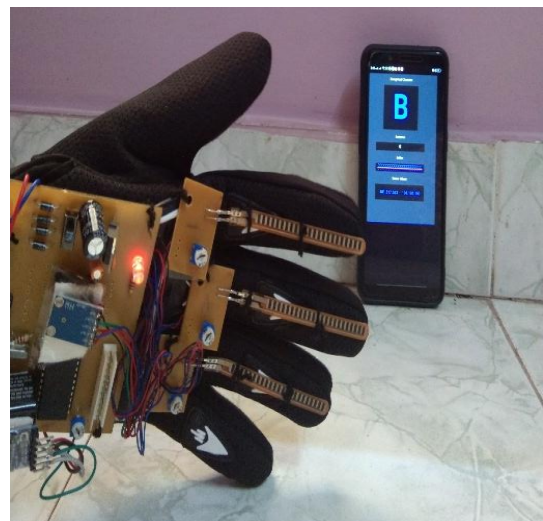


Fig-4: Generation of letter B



Fig-5: Generation of letter C

INDEX FINGER	MIDDLE FINGER	RING FINGER	WRIST MOVEMENT	ALPHABET
OPEN	OPEN	OPEN	LEFT	A
OPEN	OPEN	OPEN	RIGHT	B
OPEN	OPEN	OPEN	DOWN	C
OPEN	OPEN	OPEN	UP	D
CLOSE	OPEN	OPEN	LEFT	E
CLOSE	OPEN	OPEN	RIGHT	F
CLOSE	OPEN	OPEN	DOWN	G
CLOSE	OPEN	OPEN	UP	H
OPEN	CLOSE	OPEN	LEFT	I
OPEN	CLOSE	OPEN	RIGHT	J
OPEN	CLOSE	OPEN	DOWN	K
OPEN	CLOSE	OPEN	UP	L
OPEN	OPEN	CLOSE	LEFT	M
OPEN	OPEN	CLOSE	RIGHT	N
OPEN	OPEN	CLOSE	DOWN	O
OPEN	OPEN	CLOSE	UP	P
CLOSE	CLOSE	OPEN	LEFT	Q
CLOSE	CLOSE	OPEN	RIGHT	R
CLOSE	CLOSE	OPEN	DOWN	S
CLOSE	CLOSE	OPEN	UP	T
OPEN	CLOSE	CLOSE	LEFT	U
OPEN	CLOSE	CLOSE	RIGHT	V
OPEN	CLOSE	CLOSE	DOWN	W
OPEN	CLOSE	CLOSE	UP	X
CLOSE	OPEN	CLOSE	LEFT	Y
CLOSE	OPEN	CLOSE	RIGHT	Z
CLOSE	OPEN	CLOSE	DOWN	Please give me water
CLOSE	OPEN	CLOSE	UP	Please open door
CLOSE	CLOSE	CLOSE	LEFT	Order some food for me
CLOSE	CLOSE	CLOSE	RIGHT	Give me medicine
CLOSE	CLOSE	CLOSE	DOWN	Word formation
CLOSE	CLOSE	CLOSE	UP	Panic condition

Table-1: Testing Results



Fig-3: Generation of letter A

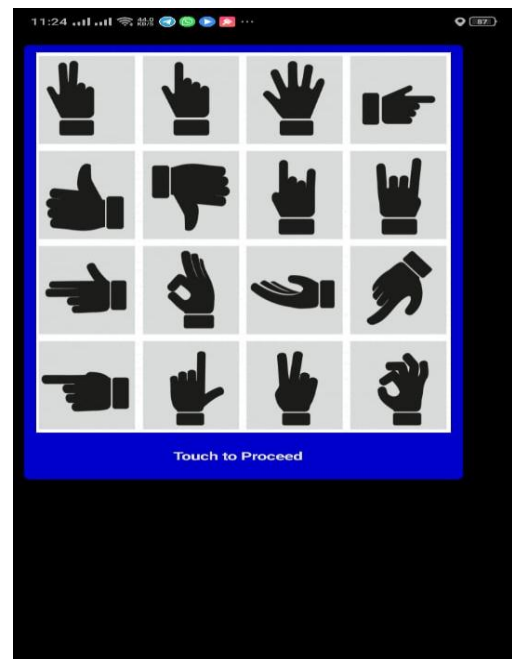


Fig-6: App theme

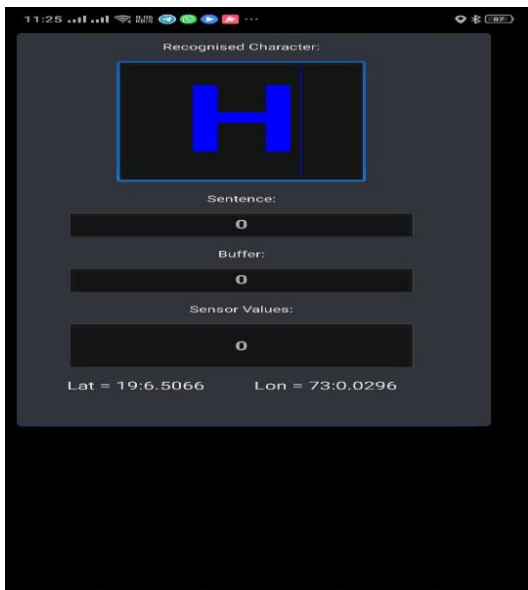


Fig-7: Generation of letter H on Mobile App

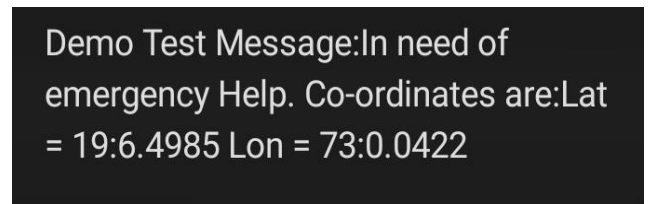


Fig-10: Panic condition message

5. CONCLUSION

The project aims to reduce the communication gap between deaf or mute community and normal people. This system will improve dumb and deaf persons lifestyle. Even it will be beneficial for the communication between the blind person and thus the dumb person. Overall System is effective and efficient thanks to the use of AVR microcontroller and android phone. This paper may be a superb exposure for the people working within the world of designing systems supported microcontroller and android applications.

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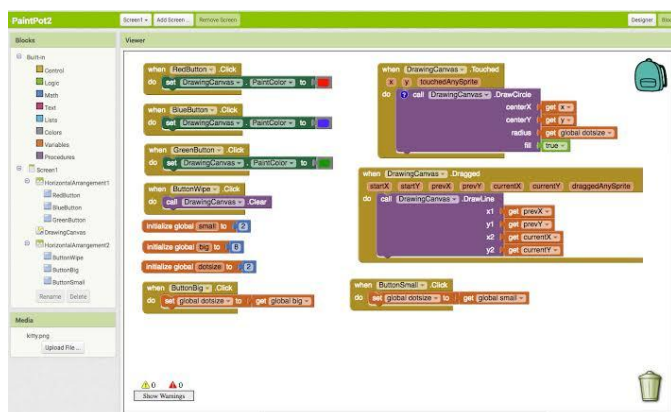


Fig-9: App logic design



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