GESTURE BASED SIGNLANGUAGE FOR HEARING IMPAIRED PEOPLE

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***Abstract*:**Gesture is one of the method used in sign language for non verbal communication It is most commonly used by deaf and dumb people who have hearing or speech problems to communicate among themselves or with normal people.A disabled person who is not able to speak or a person who speak a different language,the mobile device can be a boon for them as understanding,translating and speaking system for those people.In this paper,we implement a android base hand sign recognition system which can be used by disabled person. Vision based Technique is capturing by an image through a camera which converts the text to speech.Its provides a way for the deaf people to read a text by speech to text conversion technology.Also, it provide a technique for dump people using text to voice conversion.

KEYWORDS : Web Camera, Speaker, Raspberry PI 4B,Mobile Device,LCD Display.

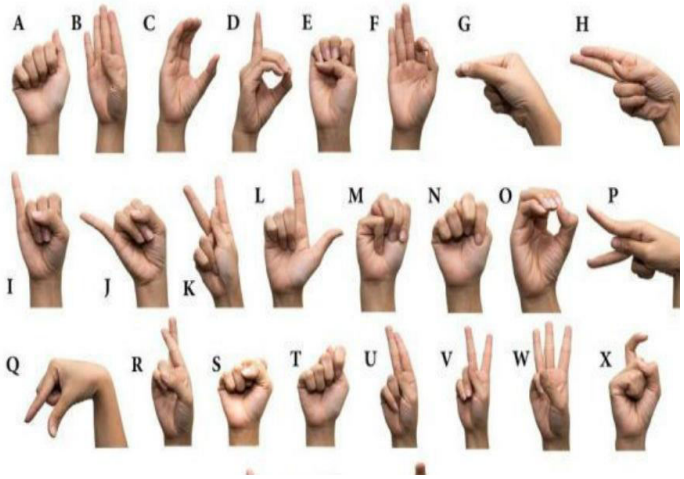
I.INTRODUCTION

Man is a social being so it's natural for him to interact and communicate with the outside world. Humans express their ideas, thoughts, emotions and experiences to the people with the guidance of speech. Communication is the process of exchanging ideas, thoughts and information to people. The only means of communication for the deaf and dumb community is the use of Sign language, . But using sign gestures they are limited to their own world. The limitations prevent them to interact with the outside world, to share their creativeideas. . An Android-based mobile application was developed with a text-to-speech function that converts the received text into audible voice output. The mute/deaf individuals have a communication problem dealing with other people. It is hard for such individuals to express what they want to say since sign language is not understandable by everyone. This paper is to develop a Data Acquisition and Control (DAC) system that translates the sign language into text that can be read by anyone. This system is called Sign Language Translator and Gesture Recognition. We developed a smart glove that captures the gesture of the hand and interpretsthese gestures into readable text. This text can be sent wirelessly to a smart phone or shown in an embedded LCD display. The main device used as input process in Sign Language Recognition (SLR) is camera. The SLR input data is in the form of gesture image that can be easily captured by camera. Some researchers still use simple camera to capture the image.

II SIGNLANGUAGE:

Sign languages (also known as signed languages) are languages that use thevisual- manual modality to convey meaning. Language is expressed via the manual sign stream in combination with non- manual elements, Sign languages are full-fledged natural languages with their own grammar and lexicon. This means that sign languages are not universal and they are not mutually intelligible, although there are also striking similarities among sign languages. This sign language can be detectedusing several methods and convert into voice for dump peopleconvenient.Wherever communities of deaf people exist, sign languages have developed as handy means of communication and they form the core of local deaf cultures.Although signing is used primarily by the deaf and hard of hearing it is also used by hearing individuals, such as those unable to physically speak, those who have trouble with spoken language due to

a disability or condition (augmentative and alternative



with deaf family members, such as children of deaf adults.

III.GESTURERECOGNITION:

Gesture recognition is the ability of a device to identify and respond to the different gestures of an individual. Most gesture recognition technology can be 2D- based or 3D-based. There are two major techniques available to detect hand motion or gesture such as vision based and non-vision based technique. Visionbased technique is nothing but to detect the hand motion using camera or leap sensor which will view the object or hand motion and do image processing. In this method the components are not contact with human body.Gesture recognition can be seen as a way for computers to begin to understand human body language, thus building a richer bridge between machines and humans than primitive text user interfaces or even GUIs (graphical user interfaces), which still limit the majority of input to keyboard and mouse and interact naturally without any mechanical devices. Using the concept of gesture recognition, it is possible to point a finger at this point will move accordingly. This could make conventional input on devices such and even redundant.

IV.COMPONENTS

(a) Web camera:

webcam is a compact digital camera you can hook up to your computer to broadcast video images in real time (as they happen). Just like a digital camera, it captures light through a small lens at the front using a tiny grid of microscopic light-detectors built into an image-sensing microchip (either a charge-coupled device (CCD) or, more likely these days, a CMOS image sensor). As we'll see in a moment, the image sensor and its circuitry converts the picture in front of the camera into digital format—a string of zeros and ones that a computer knows how to handle. Unlike a digital camera, a webcam has no built-in memory chip or flash memory card: it doesn't need to "remember" pictures because it's designed to capture and transmit them immediately to a computer. That's why webcams have USB cables coming out of the back. The USB cable supplies power to the webcam from the computer and takes the digital information captured by the webcam's image sensor back to the computer—from where it travels on to the Internet. Some cams work wirelessly and don't need to be connected to a computer: typically they use Wi-Fi to transmit their pictures to your Internet router, which can then make them available to other machines on your home network or, using the Internet, to anyone, anywhere in the world.

(b) RASBERRY PI 4B:

Raspberry Pi 4 Model B is the latest product in the popular Raspberry Pi range of computers. It offers ground-breaking increases in processor speed, multimedia performance, memory, and connectivity compared to the prior-generation Raspberry Pi 3 Model B+, while retaining backwards compatibility and similar power consumption. For the end user, Raspberry Pi 4 Model B provides desktop performance comparable to entry-level x86 PC systems.This key features include a high-performance 64-bit quad-core processor, dual-display support at resolutions up to 4K via a pair of micro-HDMI ports, hardware video

decode at up to 4Kp60, up to 4GB of RAM, dual-band 2.4/5.0 GHz wireless LAN, Bluetooth 5.0, Gigabit Ethernet, USB 3.0, and PoE capability The dual-band wireless LAN and Bluetooth have modular compliance certifcation, allowing the board to be designed into end products with signifcantly reduced compliance testing, improving both cost and time to market.The new Raspberry Pi 4 has 3 versions depending on the size of RAM, you can choose according to your needs:

- Raspberry Pi 4 Computer Model B 1GB
- Raspberry Pi 4 Computer Model B 2GB
- Raspberry Pi 4 Computer Model B 4GB

Specifications :

- Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz
- 1GB, 2GB or 4GB LPDDR4-3200 SDRAM (depending on model)
- 2.4 GHz and 5.0 GHz IEEE 802.11ac wireless, Bluetooth 5.0, BLE
- Gigabit Ethernet
- USB 3.0 ports; 2 USB 2.0 ports.
- Raspberry Pi standard 40 pin GPIO header (fully backwards compatible with previous boards)
- × micro-HDMI ports (up to 4kp60 supported)
- 2-lane MIPI DSI display port
- 2-lane MIPI CSI camera port
- 4-pole stereo audio and composite video port
- H.265 (4kp60 decode), H264 (1080p60 decode, 1080p30 encode)
- OpenGL ES 3.0 graphics
- Micro-SD card slot for loading operating system and data storage
- 5V DC via USB-C connector (minimum 3A*)
- 5V DC via GPIO header (minimum 3A*)
- Power over Ethernet (PoE) enabled (requires separate PoE HAT)
- Operating temperature: 0 – 50 degrees C ambient

(c) SPEAKER:

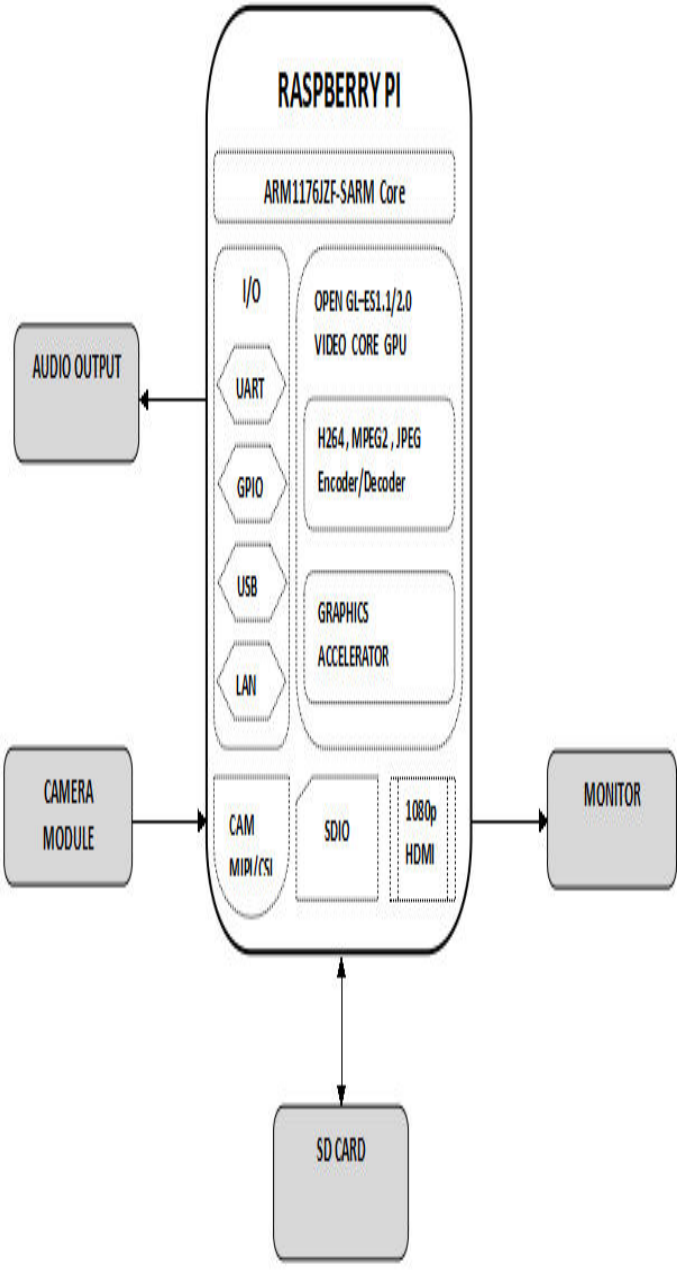
Speakers are one of the most common output devices used with computer systems. Some speakers are designed to work specifically with computers, while others can be hooked up to any type of sound system. Regardless of their design, the purpose of speakers is to produce audio output that can be heard by the listener.Speakers are transducers that convert electromagnetic waves into sound waves. The speakers receive audio input from a device such as a computer or an audio receiver. This input may be either in analog or digital form. Analog speakers simply amplify the analog electromagnetic waves into sound waves. Since sound waves are produced in analog form, digital speakers must first convert the digital input to an analog signal, then generate the sound waves. The sound produced by speakers is defined by frequency and amplitude. The frequency determines how high or low the pitch of the sound

(D)LCD:A liquid crystal display (LCD) is a type of display technology that makes use of liquid crystals that open or close when stimulated by an electric current. These liquid crystals are the basis for LCD technology.LCD is considered a major innovation in display devices and is frequently used in mainstrean electronics like microwave ovens, laptop computers, smartphones and televisions. LCD technology is preferred to other display technologies because it is lighter, thinner and uses less power.

PROPOSED SYSTEM

First an image is captured by using the webcamera and converts the gestures into voice and the output is given at the speaker and an mobile application.Then on the otherway the deaf and dumb people can use Text to speech

method also to convey the message to the receiver.



On the other hand for an one to one communication a Speech to text method will also be provided which helps person to read the text at the sender side.We are developing a system using an android device and also would be tested with webcam. This system will be useful for deaf and dumb person carrying an android device or a system with webcam.

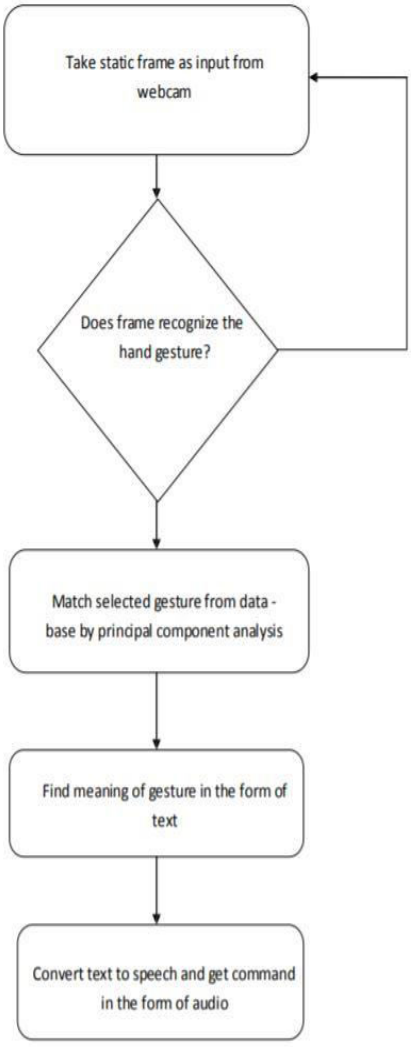


Figure 3: Block Diagram of Sign Language Recognition Model Using Webcam

(V)FUTURE SCOPE:

The goal of the project is develop is to develop an innovative two way communication system .they facilitate communication either of a normal person with an impaired person or impaired person with a normal person but two-way communication is not possible. We have proposed a system in with two-way communication is possible i.e., an impaired person can communicate with a normal person and vice-versa.

(VI)CONCLUSION:

This project aims to develop a useful tool that uses gesture recognition for reducing the communication barrier between the deaf and dumb community and the normal people.This project was meant to be a prototype for checking the feasibility of recognizing gestures using image processing.Using the designed project it is possible to convert hand gestures into speech which can be understood

easily by normal people.The idea of the proposed system has greater possibilities of future expansions.If more programming logic is introduced,more number of gestures could be incorporated.It could be developed into a multilingual speech enable system.Gesture control could be developed using the same thought.gesture based smart devices such as HD TV and smartphone can also be developed.The same system can be modified for easier interaction of blind people with outside world**.**

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