

Gesture Based Sign Language for Deaf and Dumb 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 an android based 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. It provides a way for the deaf people to read a text by speech to text conversion technology. Also, it provide a technique for dumb people using text to voice conversion.

Keywords: Sign language, Webcam, Raspberry Pi

a disability or condition (augmentative and alternative) with deaf family members, such as children of deaf adults.

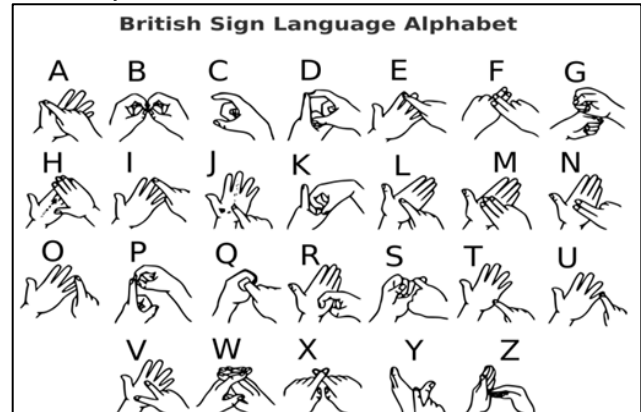


Fig. 1: Sign language

I. INTRODUCTION

Man is a social being so it's normal for him to associate and speak with the outside world. People express their thoughts, musings, feelings and encounters to the individuals with the direction of discourse. Correspondence is the way toward trading thoughts, musings and data to individuals. The main methods for correspondence for the hard of hearing and unable to speak network is the utilization of Sign language. 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 creative ideas. An Android-based mobile application was developed with a text-to-speech function that converts the received text into audible voice output. Vision based technique has become the well-known technique utilized for sign acknowledgment. It is a framework which utilizes camera to detect the data that has been gotten through finger movements.

II. SIGN LANGUAGE

Sign languages (also known as signed languages) are languages that use the visual- manual modality to convey meaning. Language is expressed 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 detected using several methods and convert into voice for dumb people convenient. 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

III. EXISTING SYSTEM

All the systems proposed earlier provide one way communication only i.e., 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 framework in with two-way correspondence is conceivable i.e., a debilitated individual can speak with a typical individual and vice-versa.

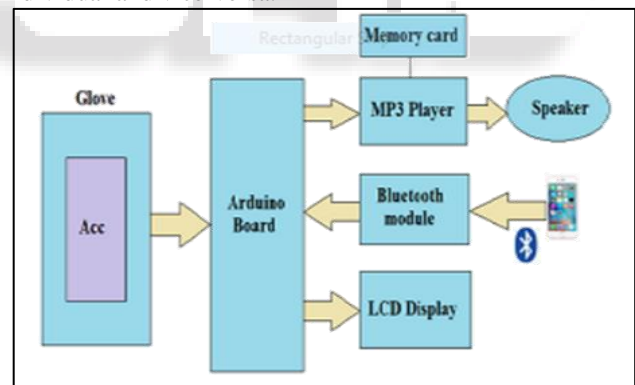


Fig. 2: Block diagram of Existing system

A wired glove is utilized which typical material is driving glove fitted with an accelerometer. Accelerometer is a simple sensor which detects simple signs from the earth. Condition is really 3D yet we just take esteems in two organizes, that is, x and y (anyway we can accept three arranges also). The Arduino is interfaced with mp3 so that the accounts in memory card of mp3 player will be played by the conditions and the yield will be created through the speaker. Depending upon simple qualities read by Arduino from the accelerometer, a specific message will be played by mp3 player through speaker. The LCD interfaces with arduino in 4-piece mode. Likewise we have a Bluetooth module that is matched with PDA on one side and associated sequentially with arduino through sequential pins Rx and Tx. The mobile phone will contain an application to

be specific "AMR_Voice" which will change over our voice to string. This element of Bluetooth is utilized by typical individual to speak with the debilitated individual.

In this manner the task adds to the upliftment of the Deaf people group. The yield is displayed both as voice just as instant message. The principle downside of the undertaking is the significant expense of the flex sensors. So the quantity of motions is downsize to six. The fruition of this undertaking proposes that these wired gloves can be utilized for complete gesture based communication acknowledgment.

IV. PROPOSED SYSTEM

In this proposed system the dumb people hand motion or gesture can be detected and then it will be converted into human hearing voice signal.

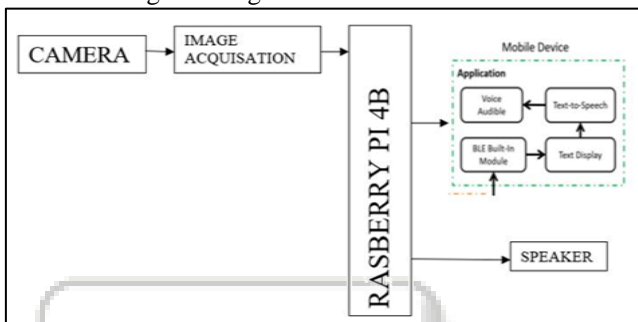


Fig. 3: Block diagram of roposed system

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. The algorithms for detection using webcam and android are shown in Figure.

First an image is caught by utilizing the web camera and changes over the motions into voice and the yield is given at the speaker and a portable application. Then on the otherway the hard of hearing and unable to speak individuals can utilize Text to discourse technique likewise to pass on the message to the collector. Then again for a coordinated correspondence a Speech to content technique will likewise be given which encourages the individual to peruse the content at the sender side.

V. RASPBERRY PI

Raspberry Pi 4 Model B is the most recent item in the famous Raspberry Pi scope of PCs. It offers historic speeds up, sight and sound execution, memory, and network contrasted with the earlier age Raspberry Pi 3 Model B+, while holding in reverse similarity and comparable force utilization. For the end client, Raspberry Pi 4 Model B gives work area execution practically identical to section level x86 PC frameworks.



Fig. 4: Raspberry pi

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.

VI. 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 find in a minute, the picture sensor and its hardware changes over the image before the camera into advanced configuration a series of zeros and ones.



Fig. 5: Web camera

VII. LCD DISPLAY

LCD is a flat panel display technology commonly used in TVs and computer monitors. It is also used in screens for mobile devices, such as laptops tablets, and smart phones. Instead of firing electrons at a glass screen, an LCD has backlight that provides light to individual pixels arranged in a rectangular grid. Each pixel has a red, green, and blue RGB sub-pixel that can be turned on or off. When all of a pixel's sub-pixels are turned off, it appears black. At the point when all the sub-pixels are turned on 100%, it seems white. By modifying the individual degrees of red, green, and blue light, a great many shading mixes are conceivable.



Fig. 6: LCD Display

VIII. SPEAKER

Speakers are one of the most common output devices used with computer systems. 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 get sound contribution from a gadget, for example, a PC or a sound recipient. This info might be either in simple or advanced form. The sound delivered by speakers is characterized by recurrence and adequacy. The recurrence decides how high or low the pitch of the sound.



Fig. 7: Speaker

IX. SYSTEM DESIGN

This project is purely for two way communication. So in this module we try to convert the normal people voice into dump people understandable text through controller. For conversion we used three library function that should be installed in raspberry pi. The libraries need to be installed.

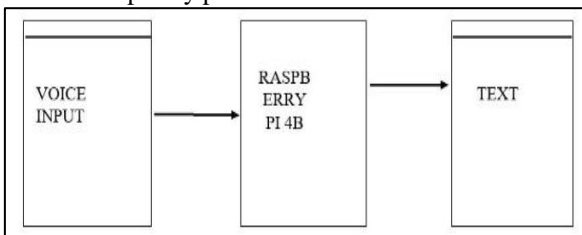


Fig. 7: Block diagram of module 1

The second procedure gets on for the vocally debilitated people who can't talk and they pass on their contemplations by text, which are as of now caught and stored to cloud (the put away information may fluctuate depending on the developer's decision) that could be changed over into the sound sign. The changed over voice message is sent over the speak.

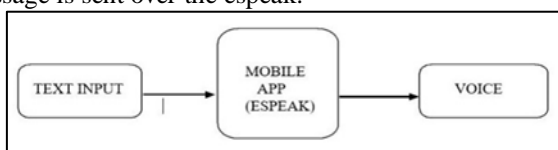
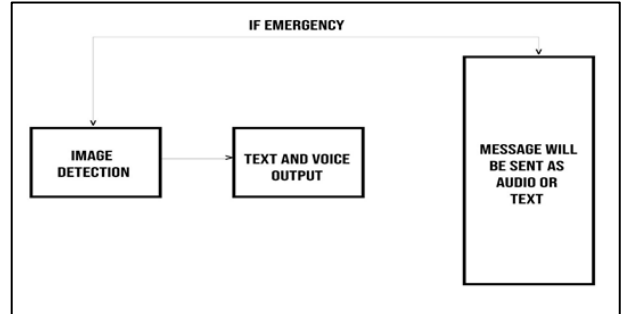


Fig. 8: Block diagram of module 2

Voice recognition software must be installed on the raspberry pi 4. To make the Raspberry Pi speak and read some text aloud, we need a software interface to convert text to speech on the speakers. For this we need a Text To Speech engine. The TTS engine we are using in this project is eSpeak. The voice may be a little robotic, however it runs offline which is an added plus.



X. RESULT AND 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 system was meant for checking the feasibility of recognizing gestures using images. 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.. Gesture based smart devices such as HD TV and smart phone can also be developed. The same system can be modified for easier interaction of blind people with outside world.



Fig. 9: Result

REFERENCE

- [1] B.G Lee, member IEEE and S.M Lee (2018), "Smart Wearable Hand devices for sign languages interpretation system with sensor fusion", IEEE Sensor Journal.
- [2] Abhinandan Das, Lavish Yadav, Mayank Singhal (2016), "Smart glove for Sign Language Communications", Institute Of Electrical and Electronics Engineers (IEEE).
- [3] L.J. Kau, W.L su, P.J. yu, and S.J. Wei,(2015) "A Realtime Portable Sign Language Translation System",IEEE 58th Int. Midwest Symp., pp. 1-4,Fort Collin.

- [4] Merin Mary Koshin,(2018),”A Survey on Advanced Technology Communication between deaf/dumb people Using Eye Blink and Flex Sensor”,IEEEJournal.
- [5] Namitha Agarwal,(2015)”Electronic speaking System for Speech impaired people speak up”, IEEE Journal, Vol 3, issue:7.
- [6] Asha G. Hagargund, Sharsha Vanria Thota, Mitadru Bera, Eram Fatima Shaik, “Image to Speech Conversion for Visually Impaired”, International Journal of Latest Research in Engineering and Technology, Volume 03, Issue 06, June 2017.
- [7] Martin Goldberg CUNY Graduate Center New York, NY. USA for “Assisting Visually Impaired People with Mobility through Technology in the Age of Context” in 2015.
- [8] S.B.Shroke, Nandar Dehpande, Prashant Deshmukh, Sanjay Kumar Mathapati. ”Assistive Transulator For Deaf And Dumb People”-in July-20

