A Review on Multi-communication aided System for Physically Disabled People using Raspberry pi

Chandrakant B.Ingole[1], Prof.Y.S.Chincholikar[2]

ME Student, Department of Electronics and Telecommunication, SYCET, Aurangabad, MS, India

Assistant Professor, Department of Electronics and Telecommunication, SYCET, Aurangabad, MS, India

ABSTRACT: Today to lead our life we had to run with our fast materialistic world. We express our thoughts, by communicating with different people in different languages and in different ways very easily. But, it is difficult for physically disabled people such as such as dump, blind and paralyzed to express their thoughts and ideas. Therefore there is a need to develop such a concrete solution for physically disabled people which will results as a better communication aid for them. An Embedded device shall address the said problems. (1) When blind people speak, Raspberry pi based device converts it into text and viewed in a display. (2) Dump people can express their thoughts by pressing keyboard buttons in the aid system in audio form. (3) The paralyzed people by wearing flex sensor glove can express their thoughts. All these activities are possible with a single embedded system using raspberry pi and disabled people can lead their life peacefully and independently by having smooth communication of their ideas and thoughts with family members, friends and society.

KEYWORDS: Raspberry Pi, Pi camera, Flex sensor, USB keyboard, SD card, Conditioner circuit.

I.INTRODUCTION

The blind people in their school or college life, find unique problems. They need "Human Interpreter" to do their school or college activities. For such people this system will play role of an interpreter. By using this device, the blind person can write their examination with help this device along with any family member or friend smoothly with better speed [2].
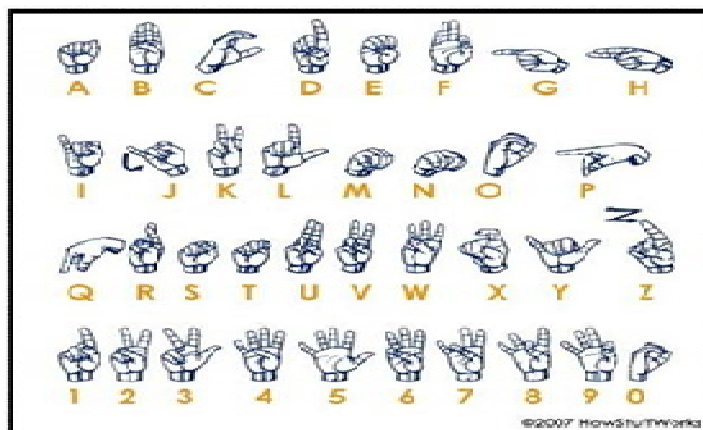

Figure 1: Sign language symbols

The dump person living with family find very difficult to express his/ her thoughts as we do not have enough patience to listen them. They use their specific sign language to express their ideas as shown in figure 1.

By using this device, they can express their thoughts by just pressing keyboard buttons. There is voice recording which is already stored in the memory of the device for that specific button. Therefore whenever dump person wants express his/her requirements, the single button acts as their voice to communicate with others.

Similarly, the person affected by the paralysis face many problems when trying to do physically activity and also feel very helpless while doing so. Therefore as solution these people are found to be using the aids such as wheelchair, guide, supporting dog and white cane. Such a person as single finds it highly difficult while using these aids [1]. But by using this device they can express their requirements or basic needs by just wearing gloves made up of flex sensor. The movement of fingers using gloves is displayed in the form text message which can understand by any other person and accordingly can help the corresponding disabled patient. Thus, this Project mainly focuses on the basis to implement a raspberry pi based portable system which acts as concrete solution for people who are physically disabled so that they can communicate with each other and with the society smoothly. It is a real time visual based project that means inputs of the project are text, audio and physical movement (displacement) which are given to the processor through corresponding transducer and the desired output can be viewed on display screen and listened in audio format. Hence this system is rigid communication aid for blind, dump and paralysed persons.

II.RELATED WORK

S.Shaheen and A.Umamakeswari (2013) proposed "3in 1 device for physically disabled people" as shown in figure 2. The speech to text IC connected to the processor which converts the blind person's voice and can be viewed on the display.
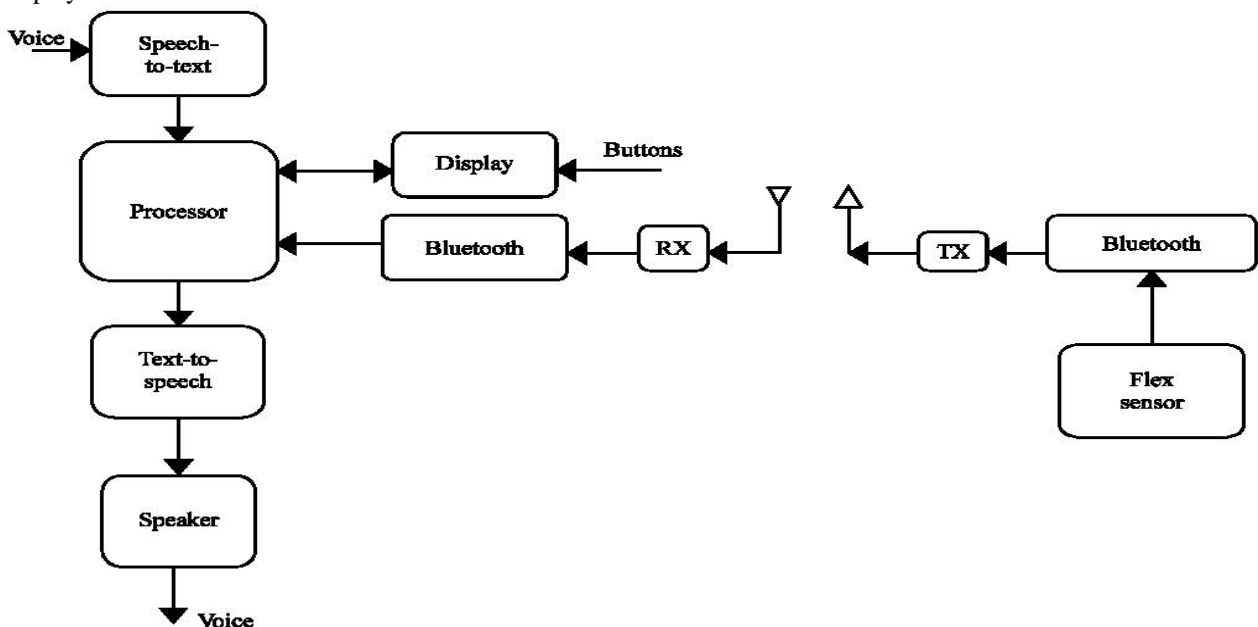

Figure 2: Block diagram of 3 in 1 device.

The dump person conveys his/her basic needs by pressing keyboard buttons .The keyboard sends text signal to the processor and the processor converts it into audio format [1].

The paralyzed people by wearing flex sensor monitored gloves convey their basic requirement with the movement of fingers. The fingers movement are predefined within the processor. All these three processes getting executed using Bluetooth Tx and Rx model as shown in figure. The drawback of this device is that only single word or short

commands are processed using speech to text IC. Also accuracy gets reduced due false triggering [2].

D.D.Pande, M.Praveen Kumar (2014) proposed "A Smart Device for People with Disabilities. In this project, ARM7 LPC2184 based smart device is discussed which is helpful for physically handicapped and blind person, It is controlling flex sensor, text to speech conversion and speech to text conversion. The only drawback is in this device is that speech to text is happening with short commands [3].

Mantisha Gupta, Shriya Abrol, Taniya Anand, Hanish Verma, Gurpreet Raina (2017), proposed the "AVR and ARM based speaking System for Deaf and Dumb". In this system is a microcontroller based system designed to make it convenient for the deaf and dumb to call for help. In this paper Arduino nano boards, NRF transceiver, AT mega 328, GSM module based interacting system is presented.The Nordic nRF2401 integrates a computer 2.4GHZ RF transceivers, RF synthesizers and a base band logic including the enhanced shock burst hardware protocol accelerator supporting a high-speed SPI interface for the application of controller. This as per stated manner is helpful for deaf and dump people[4].

Divyanshee Mertiya, Ayush Dadhich, Bhaskar Verma, Dipesh Patidar.(August 2016) proposed "A Speaking module for Deaf and Dumb". This system discussed about a speech recognition unit along with embedded controllers and audio pre recorder which will provide help to dumb and deaf people to express their need to the normal people. This module reduces the communication gap between deaf, mute community and normal person s[5].

III.PROPOSED SYSTEM

The proposed system is the multi-communication aid system for physically disabled people using advanced ARM processor raspberry pi. The block diagram is shown as follows in figure 3.
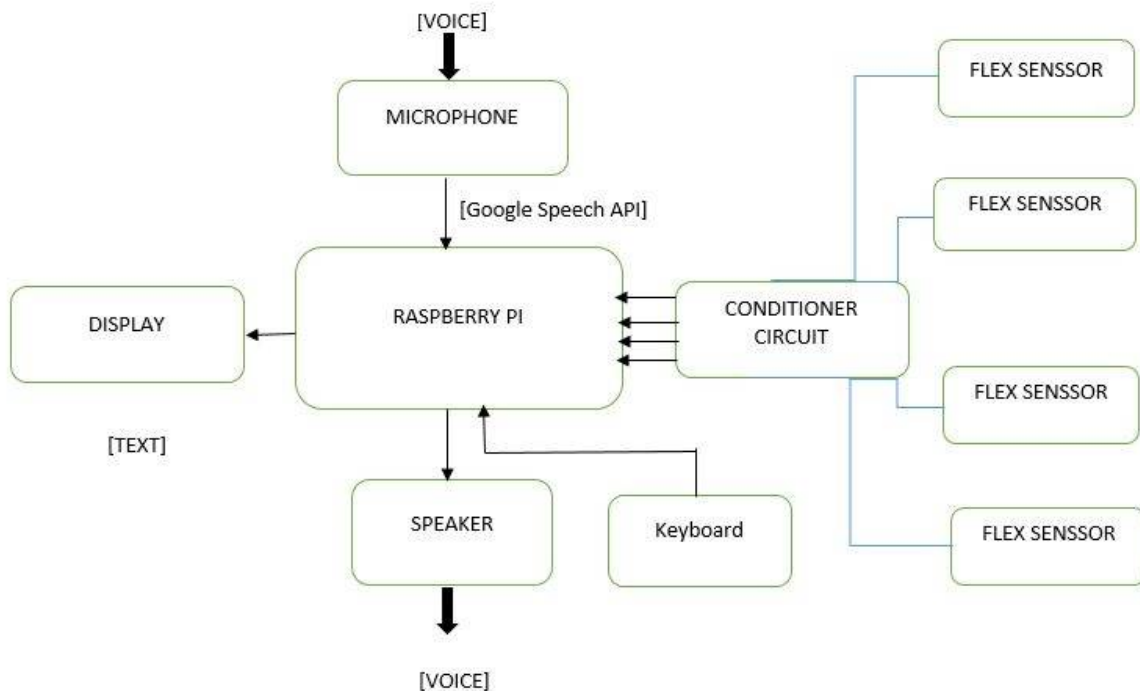

Figure 3: Block diagram of proposed system
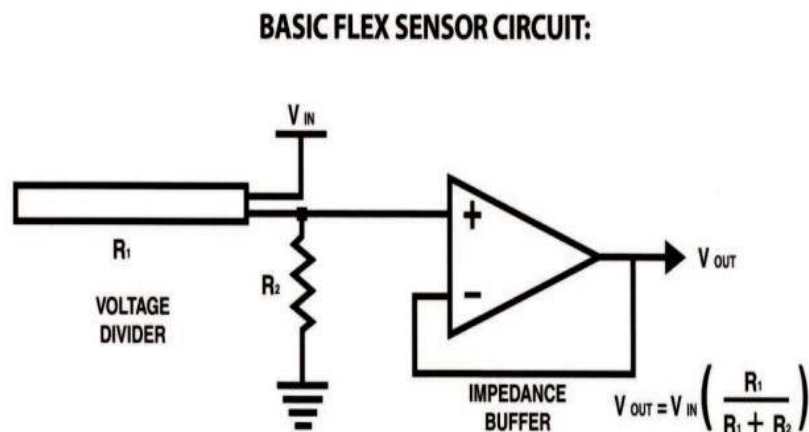
A.Raspberry pi

B.Flex sensor circuit :

Figure 5: Flex sensor circuit.

In the proposed system, the dump person can express his/her basic need by pressing keyboard button. The signal generated by button is given to conditioner circuit which converts it into proper binary sequence. This binary sequence will read by the raspberry pi controller (as shown in figure 4) and will produce the output in the form of audio/voice. Thus, any person along-with him can understand his demands and needs very easily.

The paralyzed person as single feels very helpless. When these people want something, they find it very difficult to express and also we are not having such enough patience to listen them. Therefore this problem is solved in this system, by using hand gloves which can be designed with flex sensor (as shown in figure 5) Using these gloves, the simple physical displacement of figure can reveals his/her ideas or needs. This displacement can be produced in text or audio/ voice format and it is easily understood by any other person.
Similarly, when blind persons speak, the audio input is processed through google speech API and will be given to the controller. The spoken statements will get converted into text using raspberry pi coding and such text can be easily understood by dump or deaf person.

Thus all the physically disabled people can easily communicate with each other and society smoothly and effectively as that of normal person's.

IV. CONCLUSION

The proposed system raspberry pi controlled embedded system which can acts as the concrete solution of communication for dump, blind and paralysed people. This device resolves the maximum problems faced by these people such poor communication, less confidence, feeling of helpless. These people can express their thoughts or basic requirements to each other and society using this system. This device acts as communication channel to these people and can lead their life in a smooth way as all other people living in the society. It is a multi-communication aided device having better lifetime and great stability, reliability and efficiency.

REFERENCES

[1] S.Shaheen and A.Umamakeswari, 2013. "ARM based 3-in-1 Device for People with Disabilities". Journal of Artificial Intelligence 6 (1) : 75-81, 2013.
[2] D.D.Pande, M.Praveen Kumar, "A Smart Device for People with Disabilities using ARM7". International Journel of Engineering Research & Technology Vol.3 Issues 12, December 2014.
[3] Mantisha Gupta, Shriya Abrol, Taniya Anand, Hanish Verma, Gurpreet Raina, 2017. "AVR and ARM Based Speaking System for Deaf and Dumb". International Journal of Advanced Research in Science, Engineering and Technology Vol. 4, Issue 4, April 2017.
[4] DivyansheeMertiya, Ayush Dadhich, BhaskarVerma, Dipesh Patidar, "A Speaking module for Deaf and   Dumb",SSRG International Journalof Electronics and Communication Engineering (SSRG-IJECE) – Volume 3 Issue 8 – August 2016.
[5] AbhijeetSondhi, Paresh Kasa, Kuldeep Solanki, "Interacting Device for Deaf & Dumb using Atmega 328 Processor", International Journal Of Engineering And Computer Science ISSN: 2319-7242Volume 4 Issue 9 Sep 2015, Page No. 14439-14442.
[6] Ramiro Velazquez, "Wearable assistive devices for the blind", Wearable and Autonomous Biomedical Devices and Systems for Smart Environment: Issues and characterization, LNEE 75, Springer, PP 331-349, 2010.

BIOGRAPHY

Mr. Chandrakant B. Ingole is a student persuing his ME from Dr.BAMU Aurangabad at the college Shreeyash College of Engonnering and technology Aurangabad (M.S.).His area of interest is Embedded system and Image processing.