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Design of Multi Model Interface to Establish Communication Among Differently Abled People Using IOT

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ABSTRACT

In daily life, for the people who are deaf, dumb and blind, the communication among them is difficult. Communication is possible only in sign language which is difficult to understand and interpret. So, to prevent this, an electronic frame work is developed using WIFI Module/IOT. The dumb uses the phone to send / receive text messages which are sent to the WIFI Module and the result is displayed using controller which is connected to the LCD display and played over the speaker, i.e. the messages are transferred from the phones to a controller via cloud and played on speaker for the blind who cannot use a phone. Also, when the blind person wants to speak, a mike is provided which in turn converts the audio into text and sends message over the phones.

Keywords : Internet of Things, Liquid Crystal Display, Blindness, Deafness and Dumbness

I. INTRODUCTION

The Internet of Things (IOT) is the major significant trend in recent years. There is an explosive growth of devices connected and controlled by the internet. The wide range of applications for IOT technology mean that the specifics can be very different from one device to the next but there are basic characteristics shared by most.

The IOT creates opportunities for more direct integration of the physical world into computer-based systems, resulting in efficiency improvements, economic benefits, reduced human exertions. The number of IOT Devices is increased by 31 % since last year and is estimated that there will be nearly 30 billion devices by the end of 2020. Science and Technology have made Human life addictive to comfort but still there exists an underprivileged group of people who are fighting for finding an innovative way that can make the process of communication easier for them. According to the World Health Organization, about 285 million people in the world are blind, 300 million are deaf and 1 million are dumb.

During the last few decades, we have come across various technologies that have made our life so easier and comfortable that we even do not have to move

our body to do a task. But always running in the race to be ahead of everyone we have forgotten that we still have a section of our population called the physically disabled people who are deprived of the advancements of Science and Technology because it has not given them that comfort that is required by them to feel that they too are the part of the society and they too can walk hand in hand with others. Communication being a fundamental aspect of human life is very much difficult for the people who are Blind, Deaf or Dumb. There are a little means of communication between there people like the Braille Language for communication Between Blind people and the Sign Language for Dumb and Deaf people.

The technologies that help differently disabled people to communicate among themselves and with the normal world but all of the technologies studied so far were focusing only a certain parameter or extent of disability among the three of Blindness, Deafness and Dumbness. None of the technology was so developed that it can be used as a general approach that can tackle any combination of these three disabilities. So to solve this purpose, we proposed an approach that can be used as a general way in which people suffering from any type of combination of these three disabilities can think themselves as a part of this beautiful world.

For every person communication is the main task for a conversation. So, the primary point of taking this IOT based electronic framework is to prevent the corresponding issue since these individuals use gesture based communication which is very difficult. The Device enables the communication among the people with the impairment of vision, hearing and speaking and also with the normal individuals. The major part of the device is the Arduino Uno which is the fundamental control unit. A voice IC named APR 9600 Voice IC is used in the device for processing the output. This Device provides an easier communication among these physically impaired persons and with the normal individuals.

II. LITERATURE REVIEW

Nikolas Bourbakis explained the challenges problem in human interaction is the communication process between blind and deaf individuals. The challenge here involves several cases like: Deaf person usually does not speak, When a blind person speaks a deaf person cannot hear, When a deaf person makes sign language, a blind person cannot see them. This paper presents a study on multi-modal interfaces, issues and problems for establishing communication and interaction between blind and deaf persons. Tyflos-Koufos is proposed in an effort for offering solutions to these challenges.

Netchanok Tanyawiwat, Surapa Thiemjarus presented a new design of a wireless sensor glove developed for American Sign Language Finger spelling gesture recognition. Glove was installed with five contact sensors. 3D accelerometer on the back of the hand in addition to five sensors on the fingers. In order to save number of channels and installation area into the same input channel on the BSN node, each pair of flex and contact sensors were used.

The signal is analyzed and separated back into flex and contact features by software.

The glove design is thinner and more flexible with electrical contacts and wirings made of conductive fabric and threads. ASL finger spelling gesture recognition experiments have been performed on signals collected from six speech-impaired subjects and a normal subject for validation. The experimental results have shown a significant increase in classification accuracy with the new sensor glove design.

M. Mohandas, S. A-Buraiky, T. Halawani and S. Al-Baiyat explained about the interfaces in sign language systems which can be categorized as direct-device or vision-based. Direct-device use measurement devices, those are in direct contact with the hand such as flexion sensors, styli and position-tracking devices and instrumented gloves. The singer's hand using a camera, which captures vision based movement, which is sometimes aided by making the signer wear a glove that has painted areas indicating the positions of the knuckles or fingers. The main advantage of vision-based systems is that the user isn't encumbered by any complex devices. However, they require a large amount of computation just to extract the hand position before performing any analysis on the images. In this paper, the directed-devise methods were discussed.

Kanwal Yousaf, Muhammad Altaf, and Zhang Shuguang proposed an application, named as vocalize to mute (V2M), uses automatic speech recognition (ASR) methodology to recognize the speech of Deaf-mute and convert it into a recognizable form of speech for a normal person. In this work Mel Frequency Cepstral Coefficients (MFCC) based features are extracted for each training and testing sample of Deaf mute speech. The hidden Markov model toolkit (HTK) is used for the process of speech recognition. The application is also integrated with a 3D avatar for providing visualization support. The avatar is responsible for performing the sign language on behalf of a person with no awareness of Deaf-mute culture. The prototype application was piloted in social welfare institute.

III.METHODS AND MATERIAL

A. Existing System

- Hand gesture based models are used
- Manual communication via signs
- Sign language was difficult to interpret
- Sensors were used to interpret the signs and convert it into a means understood by others.
- Sensors used were FLEX and MEMS

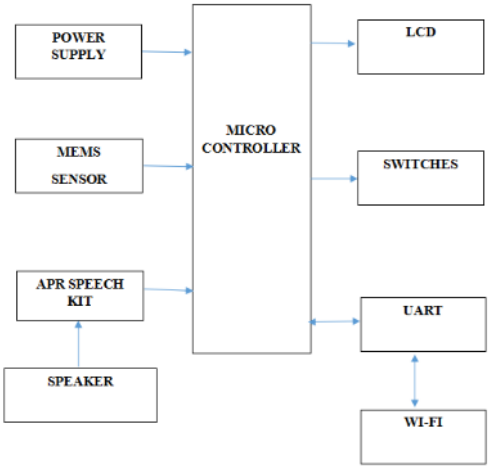

Figure 1: Existing System

B. Proposed System

- The proposed methodology is implemented by using an electronic framework.
- It consists of a voice kit with a speech recognition and Wi-Fi.
- The voices are identified by the recognition kit and it sends to the Arduino UNO and through the voice IC
- The output is played on speaker and it is displayed on LCD.

IV.SCOPE AND METHODOLOGY

A. SCOPE

Designing of a gesture system using facial expressions (face recognition)

- Perfection in monitoring and sensing of the dynamic movements involved in "Hand gesture recognition system"
- Designing of a whole jacket, which would be capable of
- vocalizing the gestures and movements of animals

- This device can be developed into a device that includes
- various sign languages in different countries
- The robot control system to regulate machine activity at remote sensitive sites
- Vision based recognition system
- Real time hand gesture recognition system using digital camera

B. METHODOLOGY

This project is about the deaf, dumb and blind people; they can't hear and speak for themselves. The introduced embedded device helps them to feel and react to the thing sharpening in their surroundings. The device starts vibrating according to its features developed. The device can hang in their neck along with the vibrating motor with it. For example if a stranger tries to enter their house without their knowledge the device start to vibrate and they can able to sense it. If the person wants to cross the road the device will help them, through vibrating while the red signal goes on. If a person crosses by and if someone calls their name they knew it by the means of vibration. The developed device helps them to run their routine life.

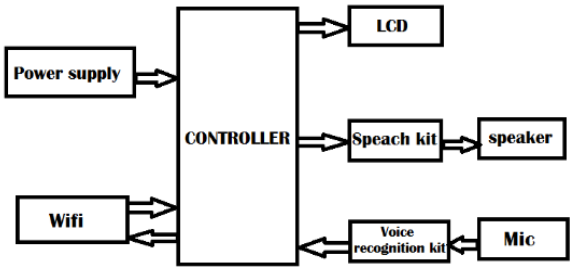

Figure 2: System Architecture

V. RESULTS AND CONCLUSION

The principle reason for this task is to help the visually impaired, hard of hearing, and dumb individuals to speak with each other and further more with the typical individuals. This electronic frame work helps the unusual individuals with typical individuals in reality. An electronic framework is created for the visually impaired, hard of hearing, and dump individuals. Presently they don't need to confront any issue to impart .Arduino is customized such that design settings promptly change without changing the whole code. In the wake of getting right outcomes, the equipment is actualized. Last outcomes are broke down after equipment usage. This framework can be created more later on. The correspondence procedure of the visually impaired, hard of hearing, and moronic individuals by this electronic framework will roll out a progressive improvement.

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