DESIGN AND IMPLEMENTATION OF HAND TALK - SIGN LANGUAGE RECOGNITION USING MOBILE PERSONAL AREA NETWORK (MPAN)

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ABSTRACT

This paper introduces an efficient and fast algorithm for identification of the number of fingers opened in a gesture representing an alphabet of the Binary Sign Language. The idea consisted of designing and building up an intelligent system using group of Flex sensor, machine learning and artificial intelligence concepts to take visual inputs of sign language's hand gestures and generate easily recognizable form of outputs. Hence the main objective of this paper is to develop an intelligent system which can act as a translator between the sign language and the spoken language dynamically and can make the communication between people with hearing impairment and normal people both effective and efficient. The signals are expressed in terms of voice and text for display.

Keywords: ***Flex sensor, machine learning, sign language and artificial intelligence***

INTRODUCTION

Disabled people are usually deprived of normal communication with other people in the society. It has been observed that they find it really difficult to interact with normal people with their gestures and so they have to depend on some sort of communication. Sign Language is the primary means of communication for the disabled people. In the motive of supporting the visually impaired, text to speech conversion process is used [1]. Text to speech technology is the process wherein the computer is made to speak. It uses the concepts of natural language processing.

This paper introduces an efficient and fast algorithm for identification of the number of fingers opened in a gesture representing an alphabet of the Binary Sign Language. The idea consists of designing and building up an intelligent system using group of Flex sensor, micro controller, camera, speaker to take inputs as hand gestures and generate easily recognizable form of outputs. Hence the objective of this paper is to develop an intelligent system which can act as a translator between the sign language and the spoken language dynamically and can make the communication between disabled people and normal people both effective and efficient. The signals are expressed in terms of voice and text for display.

EXISTING SYSTEM

The system explains the characteristics of a commercial glove, the available programming languages and provides a guide to develop an application to communicate with the device and the presentation of data on a screen for further analysis and interpretation on a specific interface and also as a voice message. Virtual reality is a computer interface that includes simulation and interactions through different sensory channels in real time, which may be visual, acoustic, tactile, and olfactory stimulus [2].

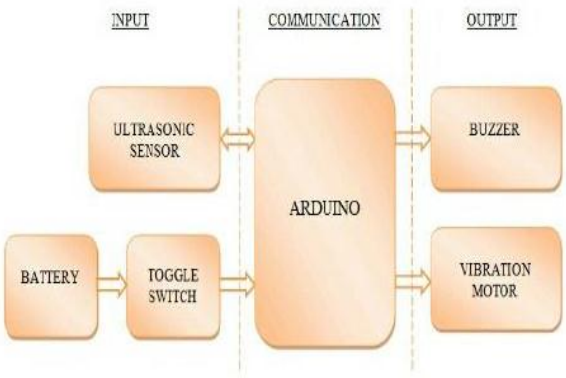

Fig 1: Block diagram of Existing Prototype

The high prices that characterize virtual reality devices, has led the search for alternative, less sophisticated as the simulation by conventional computing

devices such as keyboard, mouse, and monitor [3]. This is known as desktop virtual reality and into the main computer programs can be mentioned VRML (Virtual Reality Modelling Language), Java 3D, Direct X, Maya, etc. The limitation of these programs is the complicated interaction for the user as he navigates a three dimensional environment, this becomes a difficult task, since it must combine the functions of the mouse and keyboard to perform more complex movements like walking forward and turn, or rotate and rise [4].

PROPOSED SYSTEM

In this paper data glove and camera are implemented. The data glove is fitted with flex sensors along the length of each finger [5]. The flex sensors output a stream of data that varies with degree of bend. The analog outputs from the sensors are then fed to the arduino microcontroller. It processes the signals and perform analog to digital signal conversion.

The gesture is recognized and the corresponding text information is identified. Text to speech conversion takes place in the voice section and plays out through the speaker [6].

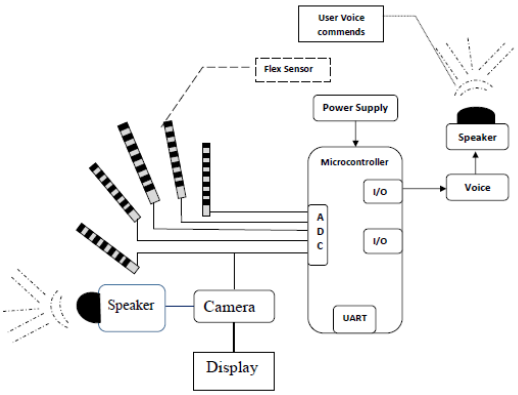

Fig 2: Proposed Block Diagram

The new gesture introduced should be supported by the software used in the system. The system can also be designed such that it can translate words from one language to another. A pair of gloves along with sensors enables mute people to interact with the public in the required language.

The performance accuracy of this device can be improved by increasing the number of sensors in the series. These sensors are attached along the fingers and thumb. The degree of bending of fingers and thumb produces the output voltage variation which in turn on converting to analog form produces required voice.

The camera used in this paper reads the text and convert the text into voice signals using the text-to-speech conversion process and also displays the text in the monitor.

SYSTEM IMPLEMENATION

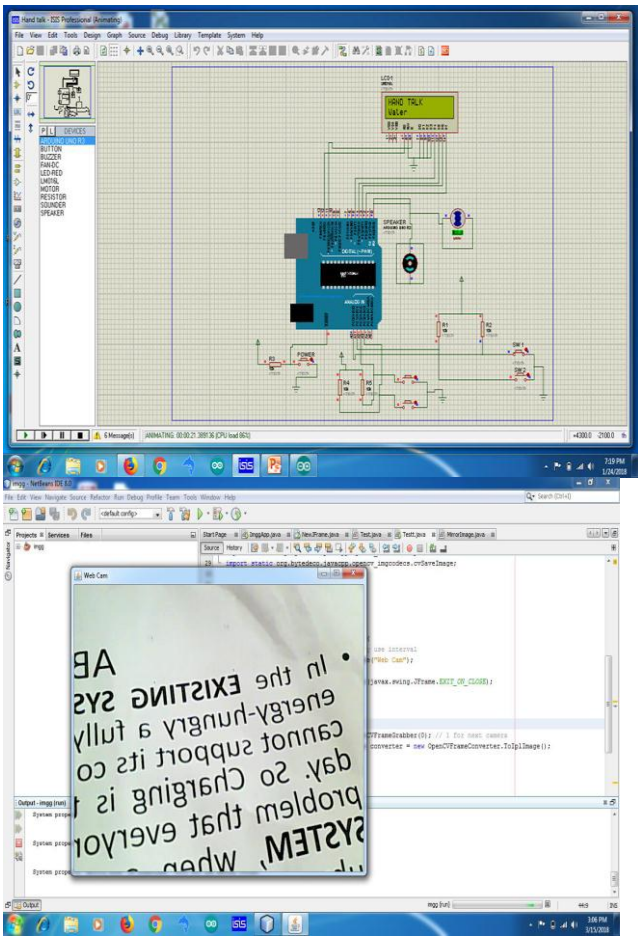

Fig 3: Simulation Output

The above figure shows the simulation output, wherein when a key is pressed the particular comment is displayed in LCD. Here there are few sensors were attached when they are pressed, the particular comment is displayed in the LCD.

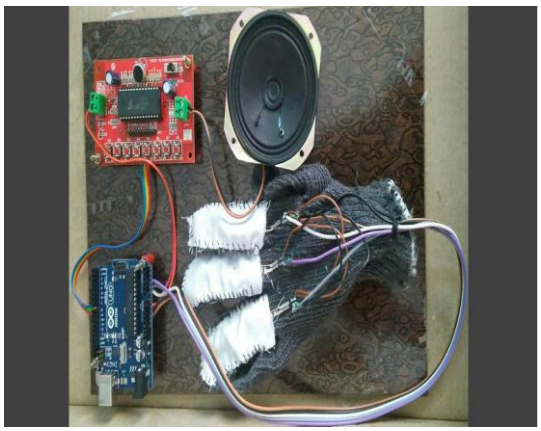

Fig 4: Hardware Implementation

The kit shows the hardware part of the paper. The glove with flex sensors is wornand when a gesture is made the particular comment is conveyed via speaker and a camera attached, converts the text to speech and conveys via speaker[7].

CONCLUSION

Sign language is a useful tool to ease the communication between the disabled people and the normal people. Yet there is a communication barrier between these communities with normal people. This paper aims to lower the communication gap between the disabled community and the normal world. This paper was meant to be a prototype to check the feasibility of recognizing sign language using sensor gloves and camera. In this paper, the disabled people can use the gloves and camera to perform sign language and it will be converted in to speech so that normal people can easily understand.

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