Assistance System For Physically Challenged Persons

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Abstract- *Sign language is the language used by mute people and it is a communication skill that uses gestures instead of sound. By simultaneously combining hand shapes, orientations and movement of the hands, arms or body and facial expressions one can express thoughts. In this, we propose to develop an electronic device that can translate sign language into speech and text in order to make the communication take place between the mute communities with the general public possible. In this work, Flex Sensor plays the major role. Flex sensors are sensors that change in resistance depending on the amount of bending of the finger. A glove is used in such a way that the flex sensors are attached with the gloves. Dumb people can use this glove and by performing gestures the bending of flex sensors occur and further processes takes place. As a result, speech signal and text will be generated.*

Keywords- Flex sensors, ATmega328p, 7805 regulator, LM386 IC, LCD display, Bluetooth module.

I. INTRODUCTION

Gesture recognition has been a research area which received much attention from many research communities. A gesture may be defined as a movement, usually of hand or face that expresses an idea. Sign language is a more organized and defined way of communication in which every word or alphabet is assigned some gesture. Sign language is mostly used by the mute, dumb or people with any other kind of disabilities. Our work is based on a system that can understand the sign language accurately so that the signing people may communicate with the non-signing people without the need of an interpreter. It can be used to generate speech or text. There has not been any system with these capabilities so far. By implementing this technology these disabled communities become independent in life so that they can also be a part of this growing technology world.

A gesture is a particular movement of the hands with a specific shape used by the dumb people to convey their thoughts to the public. But most of the times they find difficulty in communicating with others who don't understand sign language. It is based on the need of developing an electronic device that can lower the gap or barrier between the mute people and normal society. Various available sign languages are American Sign Language (ASL), British Sign Language (BSL), Turkish Sign Language (TSL), Indian Sign Language (ISL) and many more.

II. LITERATURE SURVEY

1] Shape Texture and Local Movement Hand Gesture Features for Indian Sign Language Recognition
Author: J.Bhattacharya
Published in :2018.

This paper used a hand region which is segmented and detected by YCbCr skin colour model references. The shape, texture and figure features of each hand are extracted using principle Curvature Based Region (PCBR) detector, wavelet packet decomposition (WPD-2) and complexity defect algorithm for hand posture recognition process. To classify each hand posture multiclass nonlinear support vector machines (SVM) is used for which a recognition rate of 91.3% is achieved

2] Hand Movement Recognition for Brazilian Sign Language: A Study Using Distance-Based Neural Networks
Author: Daniel B. Dias et.al
Published in: 2017

This paper used a artificial neural network model based on distance including neural fuzzy models the experiment explore there shows the usefulness of this model to extract a helpful knowledge about the classes of movement and supporting work and got the 85% accuracy result

3] Gesture Segmentation Based on Monocular Vision Using Color and Motion Cues
Author: Cao Xin-yan et.al
Published in: May 2016.

This paper used a gesture segmentation from the video images sequence based on manicular vision is present by the skin color and motion case. Gestures are separated from video image sequence reliably and complexity using the mathematical morphologic method. The experimental results

show the technique is capable of segmenting the gestures quit effectively.

4] Frame work for recognizing sign language gestures from continuous video sequence using boosted learning algorithm
Author: R. Elakkiya et.al
Published in: 2015

In this paper a frame work for segmenting and tracking skin objects from singing video is described. A boosting algorithm to learn a subset of weak classifiers for extended future to combine them into a strong classifier for each sign is then applied. A joint learning strategy to share sub unit across sign classes is adopted the result they got was 78%.

5] A new approach dedicated to Hand Gesture Recognition
Author: Nguyen Dang Binh et.al
Published in:2014

in this they were used Thai sign language recognition which used the method 5DT Data glove 14 ultra-data glove which was attached with 14 sensors, 10n sensors for fingers and rest 4 sensors between the fingers which measures fluctuation and abductions respectively.   He used a new Pseudo 2-D hidden markov model (P2DHMM) structure dedicated to the time series recognition. In this technique T-com P2DHMM structure was used to develop a complete vocabulary of 36 gestures including the ASL letter spelling alphabets and digits and got 67% result set.

Motivation

People with disabilities like Dumb and Deaf and paralysed people are unable to communicate with anyone, they are our motivation to the project.

Problem Statement

Problems faced by the disable person regarding employment can be overcome by our method. In the implemented work an intelligent microcontroller based system using Flex sensors is developed which is able to Convert gesture into voice and text.

In today's technology wired gloves are not yet reliable because to be used as wire, the gloves should have good battery and some electronics controller board which makes wired gloves heavier and may cause irritation. Thus wireless equipment's are preferred for patients and partial disable people.

III. METHODOLOGY

In this electronic support system gloves is used as the main feature of the user. In this system data glove is implemented to capture the hand-gestures of a user. At first the kit is started by using a Recharge battery. The hand glove is fitted with flex sensors along the length of each finger. The flex sensors output varies with degree of bend and gives change in voltage. The analog outputs from the sensors are then fed to the microcontroller. It processes the signals and perform analog to digital signal conversion. The corresponding resistance value is taken as the signal and it is transmitted to the audio decoding system. Whereas a memory device is attached to this audio decoding system from where the audio signal corresponding to the gesture is transmitted via speaker. The components used are flex sensor, microcontroller, battery, LCD display, voice generator module, Memory card, speaker. Flex means bendor curve. Sensor refers to a transducer which converts physical energy into electrical energy. Flex sensor is a resistive sensor which changes its resistance as per the change in bend or curvature of it into analog voltage. By increasing the curvature from $0°$ to $90°$, resistance changes from 45K to 75K. Arduino is an open-source platform that creates microcontroller-based kits for building digital devices and interactive objects that can sense and control physical devices.
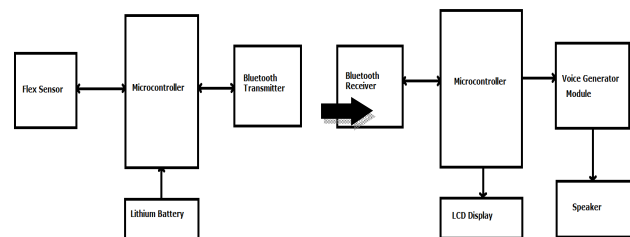

Block Diagram

The project is based on microcontroller board designs, produced by several vendors, using various microcontrollers. These systems provide sets of digital and analog input/output (I/O) pins that can interface to various expansion boards(termed shields) and other circuits. The boards feature serial communication interfaces, including Universal Serial Bus (USB) on some models, for loading programs from personal computers. For programming the microcontrollers, the Arduino provides an integrated development environment (IDE) based on a programming language named Processing, which also supports the languages C and C++. Based on the bending of fingers, Flex sensor resistance values are changed and these range of resistance values correspondingly provide data about the gesture movement, accordingly different words or phrases are voiced out through the speaker with the help of voice

generator module, which is a MP3 module that uses external memory device to store the words or phrases that has to be pronounced. A memory card or flash card is an electronic flash memory data storage device used for storing digital information. Here we also use a LCD module to display the corresponding word or phrases that are voiced out through the speaker.

FLOWCHART: Transmitter End
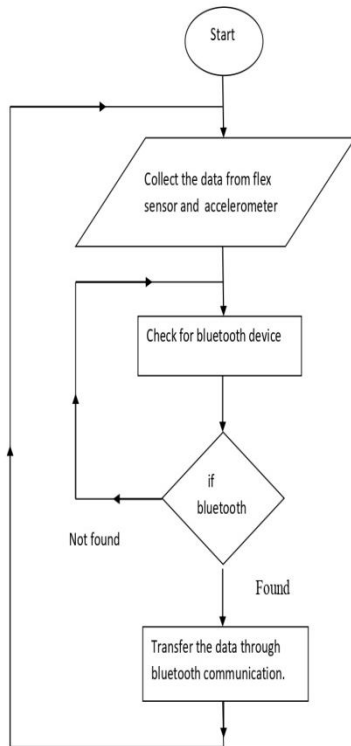
FLOWCHART: Receiver End
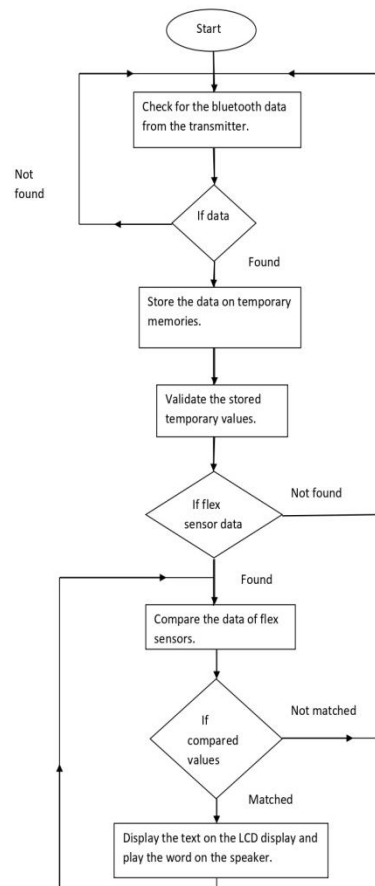
IV. CONCLUSION

Sign language is one of the useful tools to ease the communication between the deaf and mute communities and normal society. Though sign language can be implemented to communicate, the target person must have an idea of the sign language which is not possible always. Hence it lowers such barriers. This paper was meant to be a prototype to check the feasibility of recognizing sign language. With this, deaf or mute communities can use the gloves to form gestures according to sign language and the gestures will be converted to speech.

V. ACKNOWLEDGMENT

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