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Hand Gesture Recognition Using Image Processing For Mute People

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ABSTRACT

Addressing the issues of People with Hearing and Vocal Impairment through a single aiding system is a tough job . A lot of work in modern day research focuses on addressing the issues of one of the above challenges but not all. The work focuses on finding a unique technique that aids the mute by letting them hear what is represented as text and it is achieved by the technique that captures the image through a camera and converts the text available to voice signals. The system displays messages to the people with Hearing impairment to read the output by speech to text conversion technique and we also provide a way for the vocally impaired to represent their input by the aid of text to voice conversion technique. All these three solutions were modulated to be in a single unique system. All these activities are coordinated by the Raspberry Pi. The vocally impaired people are helped by the process in which the image to text and text to speech is given by the Tesseract OCR (Online Character Recognition). The system assists deaf users by converting speech input into text and displaying the output as a message to the user. Vocally impaired people can convey their message by means of text which is converted to speech output so the other people can hear the message in a speaker.

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I. INTRODUCTION

Approximately 285 million people are judged to be visually impaired worldwide in which 39 million are blind and 246 are said have low vision. Approximately 90% of this world's vocally impaired is from the dispirited income people and 82% of people living with blindness aging persons and above. The numbers of people visually impaired from eye related diseases have been brought down in the past 20 years according to global estimated work. In which 80% of all visual restitution can be prevented or cured. India is considered to be the home for the world's largest act of blind people. In this world, about 37 million are blind, in which 15 million are from India. There are so many researches have been getting along in this universe, but the visual impairment could not be broken for good. In lodge to facilitate these people we have developed the assistive device for blind people who does not want the assistance of other neighbours.

Dumber people can simply tilt the message by sign language which could not be understandable by other people. In resolving these difficulties with visually and vocally impaired people we have used the tiny credit card sized computer named raspberry pi. By this device we provide the solution for blind, deaf and dumb people. For blind people the image is converted to voice by using Tesseract software, the deaf people received their content by message as soon as the opposite person speaks out it displayed as a message. The dumb persons conveyed their message through text instead of sign language which is delivered via e speak. We have provided necessary steps to resolve the problems of those masses.

The motivation for a hand gesture recognition is to assist handicapped users. We can provide quality assistance to the physically challenged users, also for senior citizens by devising Image Processing techniques.

It is manual operation. Persons actions are difficult to understand. Sometime persons action or gestures are difficult to recognized as it is tough job. Then in that case communication getting difficult and more inconvenient. Conveying information to be take more time. It is difficult as well as very time consuming. These are main problems which create disturbance in communication.

II. LITERATURE SURVEY

Testing Phase-The second stage begins when a user submits his query image representing an ASL alphabets for recognition.

Jeonghee Kim, Hangue Park, and Maysam Ghovanlo proposed Tongue-Operated Assistive Technology with Access to Common Smartphone Applications via Bluetooth Link. In this paper they developed the Tongue Drive System (TDS) for people with severe disabilities to control computers and their environment using their tongue motion. TDS translates the user's volitional tongue movements into commands, which is then interfaced to external devices. They also have developed iPhone apps as a key controlled device by TDS to dial phone numbers and as interface to control the powered wheelchairs (PWC) using tongue motion. To implement the mouse function on the Smartphone, they emulated a mouse sensor inside a commercial Bluetooth mouse using TDS commands. The new interface introduced in this paper allows the external TDS (eTDS) headset to communicate with the Smartphone and relay the sensor data to the signal processing algorithm, running on the Smartphone, and turn the raw data into control commands for computers, Smartphone's, and PWCs.

S. R. Aarthi Avanthiga and V.Balaji presented A Design Prototypic Sarcastic Gadget Technology for Perceptual Disabilities This system is for indian sign language.

Pallavi verma, S.L. Shimi and S. Chatterji proposed Design of Smart Gloves Solanki Krunal presents Microcontroller Based Sign Language Glove Electronic Speaking Glove for Speechless Patients: A Tongue to a Dumb is proposed by Syed Faiz Ahmed, Syed Muhammad Baber Ali, Saqib Qureshi Deaf-Mute Communication Interpreter is proposed by Anbarasi Rajamohan, Hemavathy R, Dhanalakshmi M. Switching Rate Changes Associated with Mental Fatigue for Assistive Technologies was developed by Ashley Craig, Yvonne Tran, Nirupama Wijesuriya, Ranjit Thuraisingham and Hung Nguyen

Richard M. Goff, Janis P. Terpenny, Mitzi R. Vernon, William R. Green, and Clive R. Vorster proposed Work in Progress-Interdisciplinary Design of Assistive Technology for the Third World.

III. PROPOSED SYSTEM

In proposed system we will be using raspberry pi board as processing unit, which has camera and sound connected as shown in below figure,

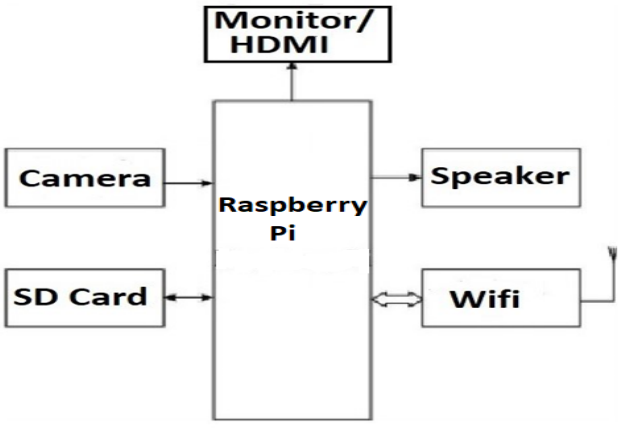

Fig1. System Block Diagram

The raspberry pi uses SD card as storage device, camera is sued for taking live streming and of hand gestures, speakers are used to speak out the gesture recognized. Overview of raspberry pi is as shown in below figure,

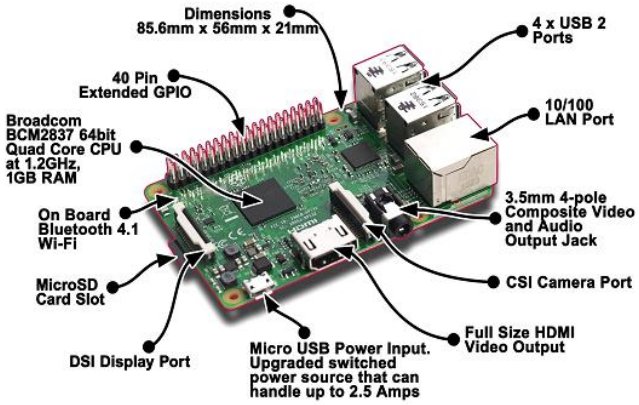

Fig2. Raspberry Pi 3B Model Board

Raspberry pi uses Raspbian OS which is a type of debian linux. It has opencv libraries installed for image processing and all the execution code is written in python programming. For convolutions and CNN algorithm tensorflow is installed.

Basic working algorithm of overall system is as follow,

1) Start
2) Switch On The System
3) Detect Hand In Camera Frame
4) Match Gestures using CNN model and tensorflow with image processing using OpenCv
5) Output In Form of sound
6) Show Text Output On Monitor

IV. CONCLUSION AND FUTURE SCOPE

Human hand gestures provide the most important means for non-verbal interaction among people. At present, artificial neural networks are emerging as the technology of choice for many applications, such as pattern recognition, gesture recognition, prediction, system identification and control. Gesture recognition is very challenging and interesting task in terms of accuracy and usefulness in computer vision. Rotation, illumination change, background variations and pose variations of hands makes the problems are more challenging. Most important advantage is that physically challenged persons can efficient interact without any physical restriction. The implementation of the proposed system aims to translate gestures into speech (voice). The scope of the project is to enhance the recognition capability for various lightning conditions and achieving more accuracy. Implementing and identifying the more number of gestures. The miniature of the system should be done.

V. ACKNOWLEDGEMENT

We studied the literature work and designed this system successfully under the guidance of Prof. R.U. Yawale.

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