

Automating communication among special people and others using C-NN algorithm.

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ABSTRACT

A lot of modern day research focuses on addressing the issues of impairment of either Listening or of Vocal but not both in one system. So, we present a unique technique in which the Sign Language (SL) of the dumb people is taken as input, the images of their hand signs are captured by the camera and further converted into text using image processing API and this text is then converted into voice signals using CNN algorithm. Hence the SL for given dataset is interpreted to the enabled people and the deaf people into text readable format. The sign language is also interpreted to the blind people and also to the enabled as they will listen to the voice signals and understand what the dumb person has said. These two solutions were modulated to be in a single unique system. All these activities are coordinated by the Raspberry Pi. The dumb 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).

Key Word: Image Processing, Tensor flow Algorithm, Convolutional Neural Network(C-NN) Algorithm Process, Languages.

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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 number of people visually impaired with eye related diseases have been reduced in the past 20 years according to global estimation of work. In which 80% of all visual restitution can be brought to an end. India is considered to be the home for the world's largest number of blind people.

In this world, about 39 million are blind, out of which 15 million are from India itself. 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 order to overcome the communication motivation

problem faced by 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 system is to assist the 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. Sometimes, persons actions or gestures are difficult to recognize 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 the obstacles in daily communication.

II. LITERATURE SURVEY

| Sr. No. | Author | Title | Advantages | Technology /Methodology/ Algorithm | Lacunas / Not Focused |
|---------|---|---|--|--|---|
| 1. | Sunitha K. A, Anitha Saraswathi.P, Aarthi.M, Jayapriya. K, Lingam Sunny | Deaf Mute Communication Interpreter-A Review | Sensor based detection so better result for mute communication. Fast Detection | Sign Language Interpreter Module (SLIM) | The only disadvantage is that it is quite costly to acquire internet for poor people. |
| 2. | Mandeep Kaur Ahuja, Dr. Amardeep Singh | Hand Gesture Recognition Using PCA | The system is tested with the controlled and uncontrolled database which shows 100% accuracy. | Principal Component Analysis (PCA) | This system can be upgraded to support dynamic gestures and an application for controlling medical operations can be developed using the system. |
| 3. | Kunal Purohit, Prof. Kailash Patidar, Mr. Rishi Singh Kushwah | A Wearable Hand Gloves Gesture Detection based on Flex Sensors for disabled People | The smart glove approach proposed is meant to be a prototype to check the feasibility of recognizing sign languages using smart gloves. | Human-Computer Interface (HCI); Flex Sensors; American Sign Language (ASL) | This system is fully hardware based, not easy to maintain. |
| 4. | Hee-Deok Yang | Sign Language Recognition with the Kinect SensorBased onConditional Random Fields | A novel method for recognizing sign language hand gestures was proposed. In order to detect 3D locations of the hands and face, | 3D depth information from hand motions, generated from Microsoft's Kinect sensor | The system did not focus on work includes improving the detection accuracy of the upper body components. |
| 5. | Giuseppe Bernieri, Luca Faramondi and Federica Pascucci | A Low Cost Smart Glove for Visually Impaired People Mobility | Obstacle detection is best option for mute people. This paper prefer to develop a separate device that improves the reliability and the safeness of the traditional tool | Assistive Technology, Cyber-Physical Systems | The navigation in a large open space populated by a large number of moving obstacles (i.e., airport, train station, etc.) is still a challenge for these users. |
| 6 | Su Myat Mon, Hla Myo Tun | Speech-To-Text Conversion (STT) System Using Hidden Markov Model (HMM) | The performance of the system is more accurate. Reliable by using end point detection Algorithm in preprocessing stage. | Speech-To-Text Conversion Hidden Markov Model (HMM) | This system is based only limited environment. This system no focused to every people. |
| 7 | Kalpattu S. Abhishek, Lee Chun Fai | Glove based hand gesture recognition sign language translator using capacitive touch sensor | This system recognized gesture for the number 0-9 and 26 English alphabets. This system gives the 92% accuracy. | Use Capacitive sensor, gesture Recognition | This not to the every mute people because the development cost is very high. This system not focused on maintenances cost. |

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,

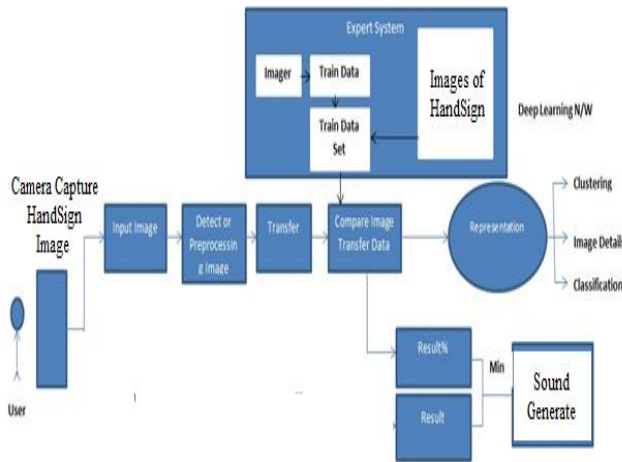


Fig1. System Block Diagram

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

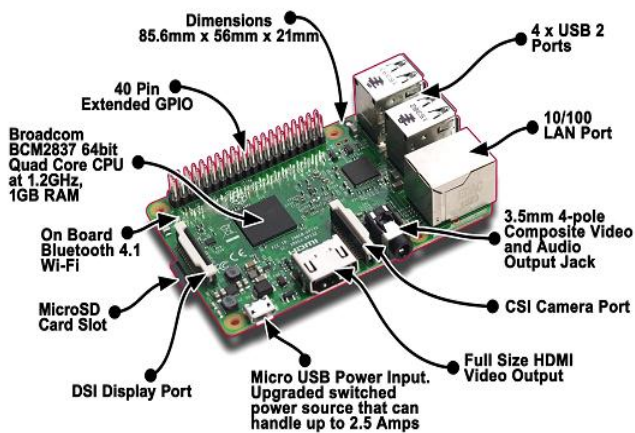


Fig2. Raspberry Pi 3B Model Board

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

- A. Start
- B. Switch On The System
- C. Detect Hand In Camera Frame

- D. Match Gestures using CNN model and tensor flow with image processing using OpenCV
- E. Output In Form of sound
- F. Show Text Output On Monitor

IV. CONCLUSION

The implementation of the proposed system aims to translate hand gestures into speech (voice). The scope 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.

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The literature survey is considered as a part of the work. It interference the queries related the improvement of work already done and clearly outline the development of the research projects.

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