Sign language recognition

INTRODUCTION:

It's generally challenging to speak with somebody who has a consultation disability. People with hearing and discourse disabilities can now impart their sentiments and feelings to the remainder of the world through gesture based communication, which has permanently turned into a definitive cure. It works with and improves on the combination interaction among them and others. Nonetheless, essentially it is deficient to create gesture based communication.

Sign language recognition is an active research field in Human-Computer Interaction technology. It has many applications in virtual environment control and sign language translation, robot control, or music creation. In this machine learning project on Sign Language Recognition, we are going to make a real-time Sign Language Recognizer using the MediaPipe framework and Tensorflow in OpenCV and Python.

OBJECTIVES:

Every day we see many people who are facing illness like deaf, dumb and blind etc. They face difficulty interacting with others. Previously developed techniques are all sensors based and they didn't give the general solution. This paper explains a new technique of virtual talking without sensors. An image processing technique called Histogram of gradient (HOG) along with an artificial neural network (ANN) has been used to train the System. Web Camera is used to take the image of different gestures and that will be used as input to the Mat lab. The software will recognize the image and identify the cores pending voice output which is played using voice replay kit. This paper explains two way communications between the deaf, dumb and normal people which means the proposed system is capable of converting the sign language to text.

PROBLEM DEFINITION:

1. **INTELLIGENT SIGN LANGUAGE RECOGNITION USING IMAGE PROCESSING**

Computer recognition of sign language is an important research problem for enabling communication with hearing impaired people. This project 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 system does not require the hand to be perfectly aligned to the camera. The project uses image processing system to identify, especially English alphabetic sign language used by the deaf people to communicate.

2. SIGN LANGUAGE RECOGNITION USING IMAGE PROCESSING

One of the major drawbacks of our society is the barrier that is created between disabled or handicapped persons and the normal person. Communication is the only medium by which we can share our thoughts or convey the message but for a person with disability (deaf and dumb) faces difficulty in communication with normal person. For many deaf and dumb people , sign language is the basic means of communication.

3. HAND GESTURE RECOGNITION BASED ON DIGITAL IMAGE PROCESSING USING MATLAB

This research work presents a prototype system that helps to recognize hand gestures to normal people in order to communicate more effectively with the special people. Aforesaid research work focuses on the problem of gesture recognition in real time that sign language used by the community of deaf people. The problem addressed is based on Digital Image Processing using Color Segmentation, Skin Detection, Image Segmentation, Image Filtering, and Template Matching techniques. This system recognizes gestures of ASL (American Sign Language) including the alphabet and a subset of its words.

4. GESTURE RECOGNITION SYSTEM

Communication plays a crucial part in human life. It encourages a man to pass on his sentiments, feelings and messages by talking, composing or by utilizing some other medium. Gesture based communication is the main method for Communication 23for the discourse and hearing weakened individuals. Communication via gestures is a dialect that utilizes outwardly transmitted motions that consolidate hand signs and development of the hands, arms, lip designs, body developments and outward appearances,

BASIC FUNCTIONALITIES

Modules

1. Importing packages
2. Initialize MediaPipe
3. Initialize Tensorflow
4. Converting video to frames
5. Recognize hand gesture
6. Testing

MODULE DESCRIPTION

1. Importing packages

To build this Hand Gesture Recognition project, Import necessary packages for hand gesture recognition using Python

2. Initialize MediaPipe

MediaPipe can detect multiple hands in a single frame, but we'll detect only one hand at a time in this project. Mp.solutions.drawing_utils will draw the detected key points for us so that we don't have to draw them manually.

3. **Initialize Tensorflow**

Using the load_model function we load the TensorFlow pre-trained model. Gesture.names file contains the name of the gesture classes. So first we open the file using python's inbuilt open function and then read the file. After that, we read the file using the read() function.

4. **Converting video to frames**

Capturing video and converting it into frames . Image frames of captured video stream

5. **Recognize hand gesture**

Image frame that contains hand object.

6. **Testing**

The purpose of testing is to discover errors. Testing is a process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product.

SOFTWARE AND HARDWARE REQUIREMENT HARDWARE

REQUIREMENTS

- Processor:Intel(R)Core(TM)i7-5500UCPU@2.40GHz2.40GHz
- Ram: 8.00 GB

SOFTWAREREQUIREMENTS
- Front end:OpenCV,
- Back end:TensorFlow,Python

TOOLS

- OpenCV
- Python
- TensorFlow