**SIGN LANGUAGE TRANSLATOR**

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**INTRODUCTION**

● Gestures are the most common body language, which can be used for human computer interaction.

● Gesture recognition is a challenge while using gesture as a communication medium.

● We need to extract features and perform recognition based on those features.

● Mostly neural networks are used for this purpose.

**PROBLEM DESCRIPTION**

“How the problems faced by mute people can be accommodated with technological assistance and the barrier of expressing emotions can be overshadowed.”

**EXISTING SYSTEM**

Gesture detection :

~ Contact devices :- Data gloves

~ Non contact devices :- Information entropy algorithm

Kinect’ Sensor by Microsoft

**PROPOSED SYSTEM**

Application that can recognize American Sign Language using a Convolutional Neural Network

Features :

● Real time (ASL) detection based on gesture made by user.

● Customized gesture generation.

● Sentence formations and TTS assistance

**a**

**b**

**c** palm forward thumb bent out

palm is always forward

except where noted

thumb also often lower (like a claw)

palm in

palm faces opposite

side of body

index finger points out

like p but points down and unseen fingers curled in

palm forward thumb can be over fingers

whole palm can be slanted to side away from body

palm in

N

**MODULES DESCRIPTION**

Core Modules :

1. Scanner

2. Data Pre-Processing

3. Gesture Processing

4. Custom Gestures

5. Predicted Output

Scanner

• The module that uses the webcam to capture images

• OpenCV is used for capturing the images

Data Pre-Processing

• Here we are converting the image to HSV format

• HSV is alternative representation of RGB

• This HSV values are adjusted to get sharper image

• OpenCV package is used

Gesture Processing

• This module act as the classifier .

• We are using a CNN with 3 convolution layers.

• Dataset : ASL alphabet by Kaggle

• Training Data : 45500 (1750x26)

• Test Data : 6500 (26x250)

• The Evaluation Results 90% of accuracy with 9% loss.

• This module returns an alphabet corresponding to the sign.

Custom Gestures

• User can define gesture with custom meaning like words, emotions etc.

• Initially image is captured and its HSV mask is generated

• HSV file is saved as a .png file

• The file is saved in a directory named with the word that means

Predicted Output

• Gestures are recognized and corresponding meaning can be displayed

• These outputs can be combined to form sentences

**DATA FLOW DIAGRAM**

Gesture Processing

Output prediction

Pre

-

Scanner

processing

Custom Gesture Scan

Associated

Define

Label

Create Gestures

With Label

Gestures

Stored

Generate Label

Data Pre Processing

Generated

Labels

Show

Export to file

Export to

file

Compare

Stored

Value

With

Pixel

Scan Gestures

Single Gestures

with Label

Scanner Generate

Scanner

Sequence of Gestures

Encountered

Stop When

Delimiter

**REQUIREMENTS**

Minimum Hardware Requirements

• Intel Pentium Dual Core E6600 2.6Ghz / AMD Athlon II X2260

• 512 MB Disk Space

• 2GB RAM

• 256 MB VRAM

• USB Keyboard, Mouse & Speaker

• 2MP VGA webcam & Monitor

Software Requirements

• OS : Window 7 or later, Linux or macOS

• Python 3.6.

• TensorFlow framework, Keras API

• Real-time computer vision using OpenCV

• Industrial standard GUI application (PyQT5),

Tkinter.

• Offline TTS assistance for python

**SAMPLE OUTPUT SCREENSHOTS**

Fig 1 : Model Training

Fig 2 : Model Evaluation

Fig 3 : Main UI

Fig 4 : Create Customizable Gesture

Fig 5 : Scan Single Gesture

Fig 6 : Stream Of Character Formation

Fig 7 : Convert to Voice & Export to File

**FUTURE ENHANCEMENT**

• Image pre-processing can be improved using advance algorithms

• Contrast slider can be automated

• Software can be embedded in wearables

• Software can be modified for playing games and chatting

**CONCLUSION**

A method of gesture recognition based on CNN is introduced and evaluation of the model in a real-world environment.The experimental results show that our model can achieve good results.The network also supports the addition of more gestures. In the future, we can even use gestures to play games, chat and email with others. Although the accuracy obtained by the experiment has been very high, we feel that it is necessary to further improve for the application to real life

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