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Research Paper

On

**SIGN LANGUAGE RECOGNITION USING
PYTHON**

BACHELOR OF ENGINEERING

COMPUTER SCIENCE & ENGINEERING



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ABSTRACT

There have been various developments in science & technology and a bulk of researches has already done for the people, especially deaf and dumb. Resolving the cause, Machine learning, and computer vision could be used to reduce this cause. This could be beneficial for the dumb and deaf persons in communicating with other people as knowing the sign language

is not that is common to others, apart from this, it has extended to create automatic editors, where persons can write with ease by just using the gestures of hand. In our sign language recognition project, we had created a detector of sign, which detects the numbers 1 to 10 that extended to shelter another sign. We have made this particular project by using libraries like OpenCV and Keras of python.

INTRODUCTION

People with speech impairments use signals and gestures to communicate. Ordinary people have a hard time understanding their language. Therefore, there is a need for a system that can transmit information to the general public by recognizing various signs and gestures. Bridging the gap between people with disabilities and normal people.

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METHODOLOGY

TRAINING MODULE:

Supervised machine learning: It is one of the ways of machine learning where the model is trained by input data and expected output data. To create such model, it is necessary to go through the following phases:

1. model construction
2. model training
3. model testing
4. model evaluation

Building up a project on sign language was a great piece of experience, it not only helped me in gathering information and learn about the programming language python but also made me realize that we can use programming for doing such minimal tasks and make our life much easier.

Discussing about how this learning process started and journey up to building up this project goes like this.

I have created three jupyter notebook and named them as Create_gesture_data, DataFlair_trainCNN and model_for_gesture.

I have created 2 folders named as train and test. Train folder contains 10 folders named as 1,2,3,4,5,6,7,8,9 and 10 and same for test folder.

SYSTEM ARCHITECTURE

We have used following technologies to accomplishment of our project:

1. PYTHON
2. IDE
3. NUMPY
4. CV2 (OPEN CV)
5. KERAS
6. TENSORFLOW

These are some basic and important libraries & software used in building my project.

- Keras including TensorFlow in backend and then goes to image processing.

- Jupyter notebook is an open-source web application that integrate live code, equations along with explanatory text in a single document.

- Open cv is used in image processing and computer vision tasks. It is basically a open source library that is used in face detection, sign language recognition.

Our proposed system is sign language recognition system using convolution neural networks which recognizes various hand

gestures by capturing video and converting it into frames. Then the hand pixels are segmented and the image is obtained and sent for

comparison to the trained model. Thus our system is more robust in getting exact text labels of letters.

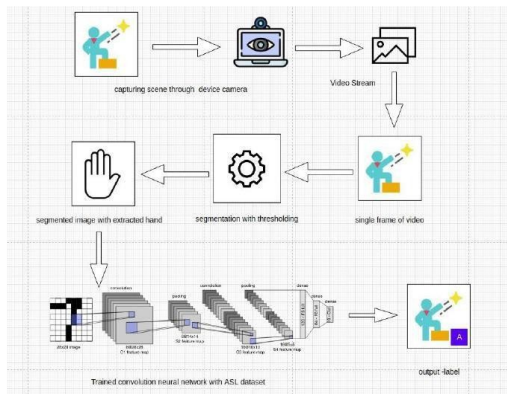


Fig: Architecture of Sign Language recognition System

RESULT

Applications currently require several kinds of pictures as sources of knowledge for description and analysis. You need to extract multiple functions to run other applications. Degradation occurs when the picture has converted from one extension to other, like digitizing or scanning or transmitting, or storing. Therefore, the output image goes through a procedure called image enhancement, in which, it involves a bunch of techniques which aims at development of visual

perception of the image. Image enhancement significantly improves the describable or perception of image information for the audience and provides better input to another automated image processing systems. The image is then characterized using a variety of techniques to make it easier to read by a computer. Sign language recognition systems are powerful tools that can prepare you for professional experiences.

CONCLUSION

The proposed sign language recognition system used to recognize sign language letters can be further extended to recognize gestures facial expressions. Instead of displaying letter labels it will be more appropriate to display sentences as more

appropriate translation of language. This also increases readability. The scope of different sign languages can be increased. More training data can be added to detect the letter with more accuracy. This project can further be extended to convert the signs to speech.

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