Sign Language Recognition

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Introduction

According to the World Federation of the Deaf (WFD), there are 70 million deaf people using sign language as their first language; many hearing people also use sign language as their first or second language. In the U.S. alone, there are one half to two million people using American Sign Language (ASL) in the 1990s . There is a huge barrier between the Deaf community and people that do not understand or know little about sign language. A sign language recognition system would help break this barrier. There are some sign language recognition systems using cameras.

Scope of the Project

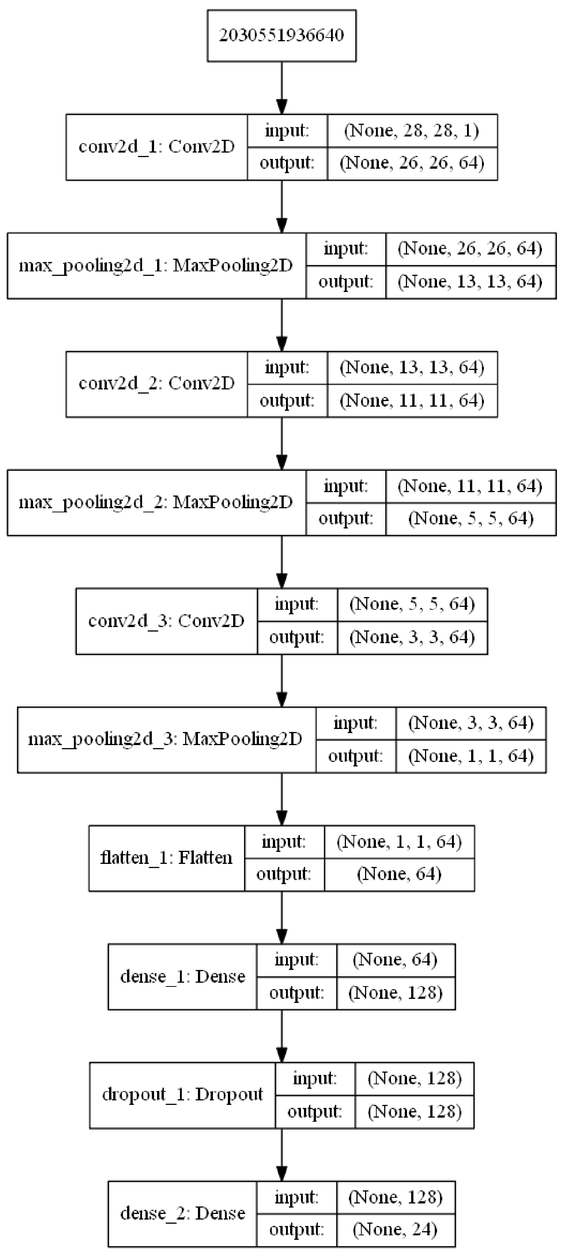
- The ultimate aim of the project is to bridge the gap in access to next generation Human Computer Interface.
- Currently the project uses a dataset and perform supervised learning to recognize different sign alphabets in American Sign Language. After building a neural network and training the model, we can recognize sign alphabets of real time captured image.
- Future scope of the project is to execute unsupervised learning of sign models i.e. to learn sentences and sign from a series of live images in real time.

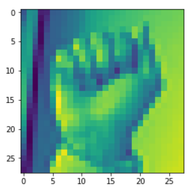
Methodology

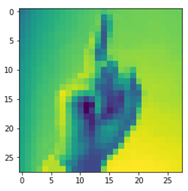
We propose to accurately recognize sign gestures using a 5-layer Convolutional Neural Network (CNN).

The activation function used for convolution layer is ‘relu’

The activation function used for dense layer is ‘softmax’

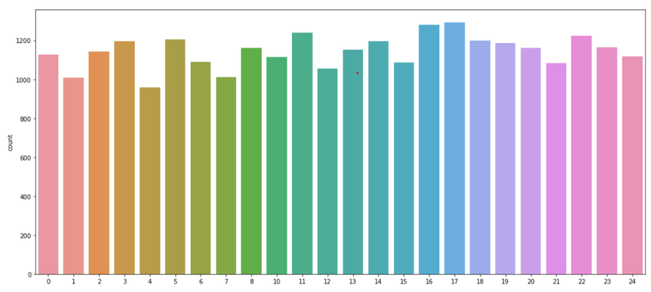






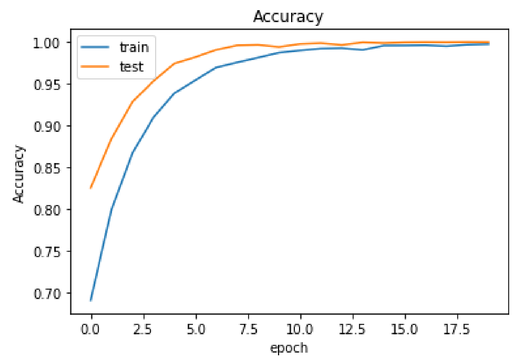
Two sample images from the MNIST Sign language dataset we used to train the model

Results



Distribution of the data

Accuracy during training



Conclusion/Summary

After testing the weighted model, we received an accuracy of 81.73

The dataset we used for this project is perfect and it happened to be exactly as our requirement

This project can further be improved by adding more signs, and also forming sentences instead of single characters. The next step would be real time implementation for video processing and converting it to text.

References

[1] https://pythonprogramming.net/introduction-deep-learning-python-tensorflow-keras/

[2] http://cs231n.github.io/convolutional-networks/

[3] https://github.com/loicmarie/sign-language-alphabet-recognizer

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