ASL Hand Gesture Classification

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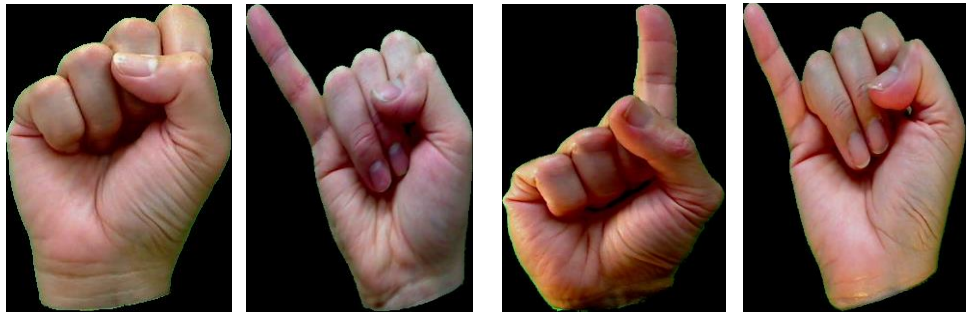
Abstract

Hand gesture classification problem has a wide area of application in human computer interaction and sign language. The intention of this work is to create a hand gesture classification model using machine learning (deep learning) techniques.

Dataset



Experiments

- Logistic regression model
- Random Forest model
- A simple Convolutional Neural Network with custom architecture
- Fine-tuned VGG16 Convolutional Neural Network.

Results

Model	Logistic Regression	Random Forest	CNN	VGG16 transfer learning
Validation accuracy (%)	98.2	95.5	94.444	97.2
Test accuracy (%)	98	95.6	94.40	97.6

Conclusions

- The results of experiments show that the best performing model on our dataset is the logistic regression model. One conclusion that we made was that with small datasets a simple logistic regression model may fit good than convolutional neural nets. The reason of this is that the classification problem with this dataset seems to be linearly separable. On small datasets it is harder to control for overfitting using conv nets compared to logistic regression model. But when we have big dataset and nonlinearities the CNNs will outperform and achieve a better fit.

- Since our dataset was not big enough the transfer learning method was useful. In fact, out dataset was not enough to train convolutional neural net from scratch and get high accuracies