Sign Language Prediction

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Description

American Sign Language translator that helps bridge the gap between signers and non-signers. Our web application takes still images of signs of the American Sign Language alphabet and is able to return a prediction of the signs in the images with their accuracy. Along with returning the predicted letter, the web application will return the accuracy of the prediction as well as other possible letters it could be and their accuracy. The application also has camera interaction where signs can also be predicted and the corresponding letter will be displayed along with the accuracy of the prediction. The algorithm being used is based on the Inception V3/Mobilenet models and is used to train our data. As training progresses, accuracy increases.

Technologies Used

Django 1.11, Python 3.6, Tensorflow 1.6, JQuery, HTML5, JavaScript

Figure 1: Home page

Objective

There are many people who do not know American Sign Language. It is our goal to help others understand what people are saying when they sign. Our application can possibly help a non-signer understand an American Sign Language signer in various situations from asking for direction to answering questions coming from law enforcement.

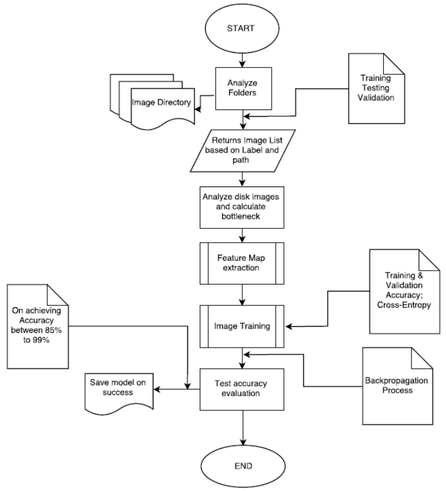

Figure 2: Flow chart

Results

American Sign Language letter predictions may come from either our camera interaction feature or still image uploading feature. With an active camera feed, we can sign to the camera and a letter will predicted and displayed on-screen along with the prediction's accuracy as shown in Figure 4. We also can upload still images and receive a prediction result along with the respective accuracy as shown in Figure 3. For each prediction, other letter suggestions are also displayed with the corresponding accuracy reading. We have achieved approximately 85%-99% accuracy for each prediction.

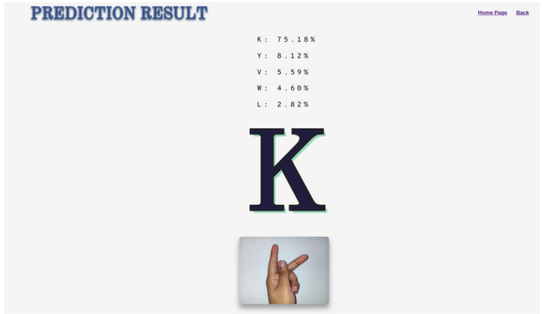

Figure 3: Sign prediction using uploaded still image

Discussion

This web application can accurately predict American Sign Language alphabet letters. This may be a viable for users in need of an easy-to-access translator in order to communicate with a signer. This application can also be further developed to recognize full words and sentences with satisfactory accuracy. With our translation accuracy at 85-99%, this will benefit us nicely as we further progress into translating sentences and phrases.

Conclusion

We conclude that this web application is a great option for any person who is in need of an American Sign Language translator. This application can be a great option to bridge the gap between non-signers and signers. No longer will there be confusion when a signer is attempting to communicate.

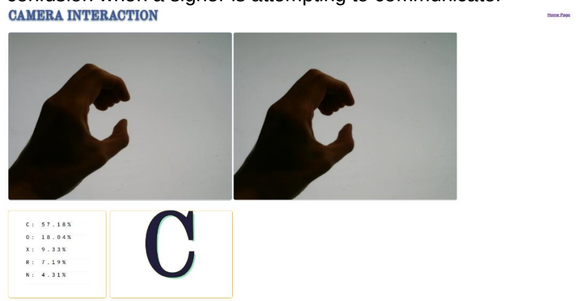

Figure 4: Sign prediction with camera interaction

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References:
1. Tensorflow
2. YouTube
3. Digital Ocean
4. Django
5. ANN
6. Github

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