Predict Human Facial Expression by Using CNN

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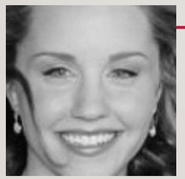
Introduction

- The goal of our project is to monitor one's facial expression. It can be observed as "happiness," "surprise," to name just a few. The outcome will be classified into 8 categories.
- The technology of analyzing a person's emotion can help copious industries, from commercial to medical, progress in different ways. So far, it can be applied in children care, which can help babysitter to tell the child's emotion.

Amanda Bynes was in "happiness."



Dataset

- The training and validation dataset that we use is credit from "Kaggle," and it includes around 2,000 pictures of many celebrities. [1]
- This repository is a dataset of different facial expressions used for training machine learning algorithms.
- Regarding the test data, we use other 200 photos of famous figures as long as our researchers' selfies.

Methodology and Results

- First, all the images will be changed into grayscale, then transformed to matrix form, and the size will be reshaped as 300*300.
- After that, the data will be processed by four layers of convolution.
- Next, we will max pool the dataset with 3 fully-connected layers.
- At the end, we will have 8 classifications of expression.

Convolution

Convolution

Max Pooling

Convolution

Convolution

Max Pooling

Fully Connected

Drop Out

Fully Connected

Fully Connected

Softmax

Input

Resize

300*300

Input

Greyscale & Resize

Discussion and Conclusion

- Convolutional Neural networks are able to analyze a person's current emotion by monitoring his/her facial expression, and the accuracy of the project can be over 80%.
- In terms of the test data, the overall accuracy of predicting human's expression can reach about 75%.

Future Work

- Include more emotional feelings to neural network, for instance creepy, painful, diffident, anxious, nervous, excited, agonal, depressed, and so on.
- These expressions, accordingly, can be used in future criminal preventions and medical cares, especially for elderly.

References

[1] Brian Lee Yung Rowe. https://github.com/muxspace/facial_expressions

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