Categorizing Facial Expressions with Deep Learning

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Abstract

Background... Objective... Methods... Results... Conclusions...

We have always had the innate ability to recognize faces. Now computers are capable of doing the same. The dominant ... for this 'trend' is 'increased' ... Previous experiments have ... The data used is from ... to ... decompose ... "major findings and implications..."

The objective of this project is to develop a convolutional neural network capable of distinguishing five of my facial expressions: angry, astonish, neutral, happy, and sad. The development of the model is documented within the report along with attempts to improve its performance.

Contents

1 Introduction

We have always had the innate ability to recognize faces. Now computers could be capable of doing the same. We are emotional creatures, and we express emotions

through our facial appearances. If we can build a machine learning model to recognize just a handful of human emotions, then this could lead to a more sophisticated computer recognition system. This project aims to develop a machine learning model to categorize several facial expressions.

For further references see Something Linky or go to the next url: http://www.overleaf.com

2 Data Preparation

2.1 Image Selection

A total of 1000 images of five unique facial expressions were randomly collected of my face. The images were selected such that a single class is present within the image. They were chosen so that each are relatively unique. Each facial expression was captured in groups of nine with random a face direction and lighting condition. Images that were blurry or not in frame were discarded.

2.2 Preprocessing Data

The images were cleaned to ensure the facial expression is clearly visible. All were adjusted to a 256 x 256 grayscale image. They should now be free of errors and ready to be used as a dataset for a model.

2.3 Data Distribution and Visualization

The distribution of the data is defined in Table 1, along with the visualization of the data in Figure 1.

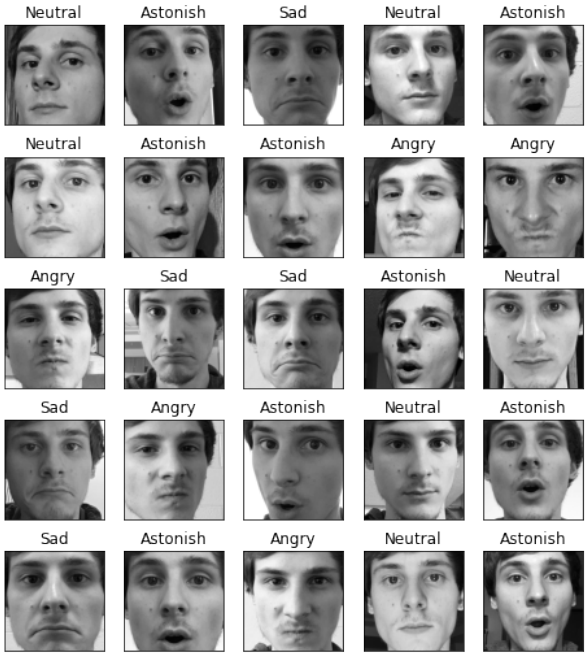

Figure 1: Visualization of Facial Expression Samples

Angry	200
Astonish	200
Neutral	200
Happy	200
Sad	200

Table 1: Data

No data imbalance exists in the dataset as there are 200 images for each class.

2.4 Data Normalization

This is data normalization.

Rescaling Formula

$$Y_{new} = \frac{Y}{Y_{max}}$$

3 Building an Overfit Model

This is building an overfit model.

4 Evaluating on Test Set

This is evaluating on the test set.

5 Effects of Data Augmentation

This is effects of data augmentation.

6 Effects of Regularization

This is effects of regularization.

7 Using Pretrained Architectures

This is using pretrained architectures.

7.1 Feature Extraction

This is feature extraction.

8 Conclusion

This is the conclusion.