Facial Expression Recognition (FER) Project Proposal

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Abstract

Facial Emotion Recognition (FER) is an important field of computer vision. Facial expressions are a form of nonverbal communication, as they reveal a person's inner feelings and emotions. Applications of FER can be found in a variety of actions such as biometrics, social media, video games testing, consumer research and tracking of audience response. The total addressable market is likely to grow to 56B in 2024.

Dataset

Categorization Output

The task is to categorize each face based on the emotion shown in the facial expression into one of seven categories (0=Angry, 1=Disgust, 2=Fear, 3=Happy, 4=Sad, 5=Surprise, 6=Neutral).

Source

The dataset which we'll use is fer2013 which was published in the International Conference on Machine Learning in 2013. The dataset can be downloaded from Kaggle "FER-2013 Learn facial expressions from an image".

Dataset Description

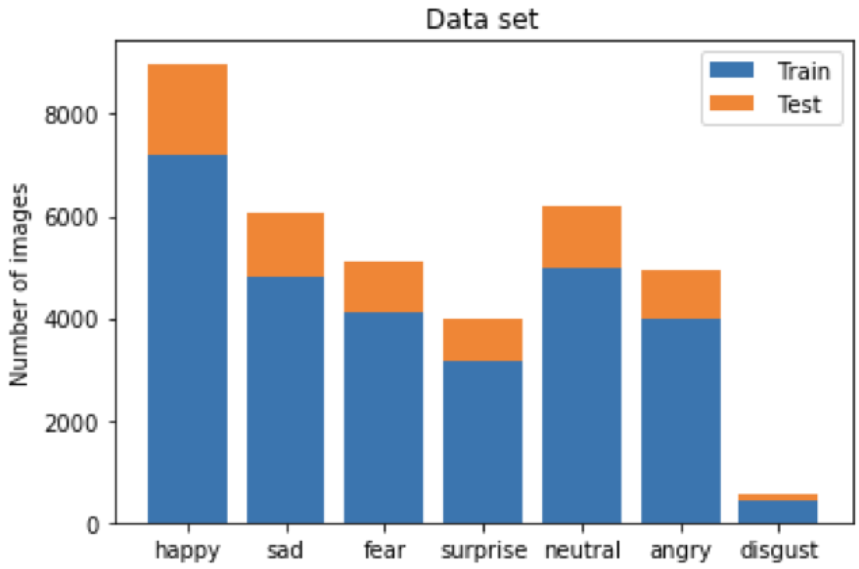
The data consists of **48x48** pixel grayscale images of faces. The faces have been automatically registered so that the face is more or less centered and occupies about the same amount of space in each image.

The training set consists of **28,709** examples and the public test set consists of **3,589** examples.

The number of images in each category is provided in the table below.

Category	Train dataset	Test dataset

angry	3995 files	958 files
surprise	3171 files	831 files
disgust	436 files	111 files
fear	4097 files	1024 files
happy	7215 files	1774 files
neutral	4965 files	1233 files
sad	4830 files	1247 files



Example Images

Methodology

Feature extraction

The traditional algorithms for facial extraction can be divided into two categories: 1) geometric approaches such as Active Appearance Models (AAM); and 2) appearance-based methods like Gabor wavelet representation and Local Binary Pattern (LBP); in a geometric approach, various geometrical parameters such as position, angle, points of reference, etc. are considered. The entire input image is considered in an appearance-based process, and features are extracted from the picture that best represents the input image ("Facial Expression Recognition Based on Deep Learning Convolution Neural Network: A Review").
In the recent research papers on FER there has been the dominance of appearance-based methods primarily consisting of local binary pattern (LBP), local directional pattern (LDP), local ternary pattern (LTP), gradient local ternary pattern (GLTP).