Face Recognition And Emotion Detection

Presentation

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Face Recognition

- Face Detection in Python using the Viola-Jones algorithm on the CBCL Face Database published by MIT's Center for Biological and Computational Learning.
- Part One: The Basic Algorithm
- Part Two: The Additional Cascade

Code

1. viola_jones.py
   - An implementation of the Viola-Jones algorithm
   - Viola-Jones is an ensemble method which uses a series of weak classifiers to create a strong classifier.
2. cascade.py
   - An implementation of the attentional cascade introduced by Paul Viola and Michael Jones.
3. face_detection.py
   - Methods to train and test a ViolaJones classifier on the training and test datasets.
   - Methods to train and test a CascadeClassifier on the training and test datasets.

Algorithm

Data

1. Get dataset from www.ai.mit.edu/courses/6.899/lectures/faces.tar.gz and compiled into pickle files.
2. Each image is 19x19 and greyscale. There are Training set: 2,429 faces, 4,548 non-faces Test set: 472 faces, 23,573 non-faces.
3. training.pkl
   - An array of tuples. The first element of each tuple is a numpy array representing the image. The second element is its clasification (1 for face, 0 for non-face).
   - 2429 face images, 4548 non-face images.
4. test.pkl
   - An array of tuples. The first element of each tuple is a numpy array representing the image. The second element is its clasification (1 for face, 0 for non-face).
   - 472 faces, 23573 non-face images.

Models

1. 50.pkl
   - A 50 feature Viola Jones classifier
2. 200.pkl
   - A 200 feature Viola Jones classifier
3. cascade.pkl
   - An Attentional Cascade of classifiers looking at 1 feature, 5 features, 10 features, and 50 features.

Results

1. The hyperparameter T for the ViolaJones class represents how many weak classifiers it uses.
2. For T=10, the model achieved 85.5% accuracy on the training set and 78% accuracy on the test set.
3. For T=50, the model achieved 93% accuracy on both the training and test set.

The End