The Simpsons Characters detection and recognition

1. Collecting the data and preprocessing

The data was collected from a dataset containing 4400 images taken from The Simpsons series. The positives examples were the faces of the characters, and the negative examples were extracted randomly at different scales from the images in the dataset.

- Augmentation of the dataset

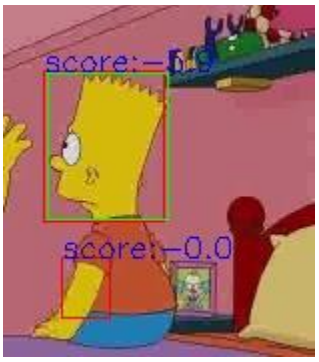
The dataset was augmented with positive examples. Each image of a face was flipped, translated and rotated using methods from openCV. Hence, for every positive example I generated another 53 examples.

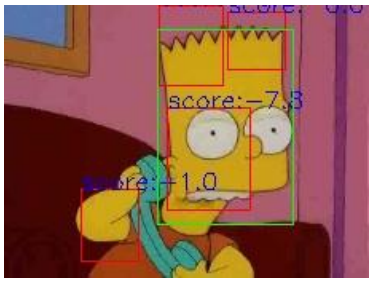
2. Training the Classifier

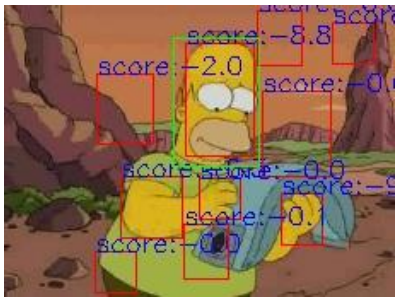
Using HoG features, I have tested 3 types of classifiers Linear SVM, a simple perceptron, and various configurations of a neural network. The best results were given by the neural network with 100 neurons in the hidden layer with a score of 0.999 on training data.

3. Making detections using sliding windows

By iteratively resizing the test image and passing a template across it, I have obtained a sliding window detector on multiple scales, that outputs the bounding boxes corresponding to the region of the detections and the scores representing the confidence values. Finally, non-maximal suppression eliminates overlapping bounding boxes. Below you can see how the detector performs on the test data. Some of them look good, some not so much. =)))







4. Evaluate Predictions

The best classifier got a MAP of 0.66, here is the graph with final results: