Pattern Recognition and Machine Learning

James L. Crowley

ENSIMAG 3 - MMIS   Fall Semester
Lab Project 2:   27 November 2019

The Viola Jones Face Detector

The objective of this project is to evaluate the effectiveness the Viola Jones face detector using the "FDDB: Face Detection Data Set and Benchmark Home" of the University of Massachusetts. You can also test the procedure with other annotated data sets of face images found on the internet, such as WIDER, MALF, and AFW data sets listed on the course web page.
(http://www-prima.inrialpes.fr/Prima/Homepages/jlc/Courses/2019/PRML/ENSI3.PRML.html)

Each programming team should
1) Detect faces using different scale factors.
2) Plot error rates for the detector when applied with different scale factors.
3) Interpret the results, describing the effectiveness of the detectors and explaining the sources of errors.

Lab work will be reported with a written report in either French or English. Work will be evaluated based on the effectiveness of the experimental evaluations, and the clarity and depth of the explanation of experimental results.

The following is an indicative Barometer for Grading. Actual grades will depend on a subjective appreciation for the amount of effort deployed and the depth of understanding displayed in the results. Creativity is encouraged and will be rewarded!

Grade	Example of Criteria
10	Error curves showing results of face detection with OpenCV version of Viola Jones using all of the FDDB data set. Description of experiments. Discussion of results.
12	Error curves showing results of face detection with OpenCV version of Viola Jones using the FDDB data set. Tests over a range of scale factors. Clear description of experiments. Insightful discussion of results.
14	Error curves and other metrics showing results and other metrics showing results of face detection with OpenCV version of Viola Jones using both FDDB and a second data set (see course web page). Tests over a range of scale factors. Clear description of experiments. Insightful discussion of results. Analysis and explanation of common sources of errors.
16	Error curves and other metrics showing results of face detection with OpenCV version of Viola Jones using several different data sets. Tests over a range of scale factors. Clear description of experiments. Insightful discussion of results. Analysis and explanation of common sources of errors. Demonstration of Viola Jones running in real time on a lap-top computer using the computer's web cam.
18	Error curves and other metrics showing results of face detection with OpenCV version of Viola Jones using several different data sets. Tests over a range of scale factors. Clear description of experiments. Insightful discussion of results. Analysis and explanation of common sources of errors. Demonstration of Viola Jones running in real time on a lap-top computer using the computer's web cam. Insightful explanation of problems with real time demonstration in real world environments.
20	All of the above plus additional unexpected insights or results.