Due: 1^{st} **May 2018 11:55 PM** Total points: 20

The final contains quiz part and programming part. **Remember, no late days are allowed for the final exam.**

Quiz

10 point

For the quiz part, there is no time limit, but the estimated time is less than 1 hour. Entire quiz part has to be taken in one session. Most of the questions in the quiz are about general knowledge covered in the class. No peeking at the questions before you begin the quiz. No internet, no books, no class notes allowed during the quiz.
Please type your answers and save as a PDF for submission. Along with the questions and answers provide the following in your submission:

- Student Name
- Date you took exam
- Time exam started
- Time exam ended
- Signed Honor statement declaring that you followed all the exam rules (typing your name under the statement is sufficient).

The password for the quiz part is HONORCODE.

Face Detection with OpenCV

For the programming part, you are going to implement face detection with OpenCV. You are free to use online resources for the following parts of the exam.
OpenCV is an open-source library that includes several hundreds of computer vision algorithms. Most algorithms discussed in the class can be found here. The goal of this assignment is to help you get familiar with OpenCV.

1 Install OpenCV

3 point

OpenCV has C++, Python and Java interfaces and supports Windows, Linux, Mac OS, iOS and Android. You can download it here: `https://opencv.org/releases.html`. It is your choice to pick any interface as long as you are able to import the OpenCV package successfully.

Here are some useful links:
Windows - Python:
https://docs.opencv.org/3.0-beta/doc/py_tutorials/py_setup/py_setup_in_windows/py_setup_in_windows.html
Windows - C++:
https://www.youtube.com/watch?v=7SM5OD2pZKY
Mac - Python:
https://www.pyimagesearch.com/2016/12/19/install-opencv-3-on-macos-with-homebrew-the-easy-way/
Linux - Python:
https://docs.opencv.org/3.4.0/d7/d9f/tutorial_linux_install.html

In your report, write a short summary of the steps you have followed to install OpenCV and any challenges you have faced. After the installation, follow the tutorial below and write a short program to read and display an image. Add a screenshot with your displayed image into your report.
Python version: https://docs.opencv.org/3.0-beta/doc/py_tutorials/py_gui/py_image_display/py_image_display.html
C++ version: https://docs.opencv.org/3.4.0/db/deb/tutorial_display_image.html

2 Face Detection

2 point

Write a program to implement real-time face detection with OpenCV functions. Record your screen showing the execution of your program and the demonstration of real-time face detection with a webcam. Submit a 20-30 seconds screen-recorded video. You are welcome to add other tasks (e.g. eye detection) if you want.
The following tutorial might be helpful for you:
Python version: https://docs.opencv.org/3.4.1/d7/d8b/tutorial_py_face_detection.html.
C++ version: https://docs.opencv.org/3.0-beta/doc/tutorials/objdetect/cascade_classifier/cascade_classifier.html

Grad Credits: Computer Vision in the Real World

5 point

Pick one computer vision application, such as object recognition for autonomous cars or depth-sensing cameras for smartphones. Discuss the difference between how it was taught in class and how it is implemented by industry in the real world. Write a two-page report.

Submission Instructions

Every student must submit following 3 files:

- An organized report submitted as a PDF document. The report should describe the implementation, issues (problems encountered, surprises), and an analysis of the test results (interpretation of effects of varying parameters, different image results). Intermediate and final results must be provided.
- A video to demonstrate your face detection result.
- A ZIP file containing the necessary codes.

The heading of the PDF file should contain the assignment number and topic. Also, attach a photo of yourself at top-left of the PDF along with your name and department.

Late Submission Policy

No late days are allowed for this assignment.

Collaboration Policy

I encourage collaboration both inside and outside class. You may talk to other students for general ideas and concepts but the programming must be done independently.
For the written part, there will be no collaboration permitted.

Plagiarism

Plagiarism of any form will not be tolerated. You are expected to credit all sources explicitly. If you have any doubts regarding what is and is not plagiarism, talk to me.