

Term Project

ECE/OPTI 533 Digital Image Processing

Choose a digital image processing topic, implement some relevant image processing algorithms on a suitable computer, and then write a report. You are encouraged to be creative in forming a topic to study. But your project must include algorithms beyond the ones discussed in class and must be distinct from your thesis/dissertation project and distinct from your term projects for other courses. Of course, an easy project will have less potential for a good grade than a more complex topic will. The term project report will be due on the date specified in the syllabus. The project report must represent your own work. Any portions of text taken from elsewhere must be within quotation marks and properly attributed to the original author.

The project report should include a brief summary of the theoretical foundations relevant to the project, a description of the algorithm, the user interface and data file format used, a well-documented software listing, example images, and quantitative results demonstrating the performance of the algorithm. One effective approach is to implement and compare two algorithms so that you can assess the relative performance. Vary each parameter (e.g., window size, sigma, and any thresholds) individually, and provide tables and/or graphs to show how the performance is affected. A fancy GUI is not required. You must clearly identify which portions of the algorithm you implemented yourself, and which portions were obtained elsewhere. E.g., did you write your own FFT code, or did you just call an existing function? Popular programming languages for digital image processing are C/C++, Python, and MATLAB. Qualities that make a good algorithm implementation include the following: a detailed written discussion of the practical considerations in translating the theory into working code; a concise, well-organized, and easy-to-read programming style in which the final code is easy to relate to the written description; several examples of the results of the algorithm; a discussion of possible shortcomings of the algorithm and the program; a thorough quantitative performance analysis; and a discussion of possible improvements that could be made. Explain the steps you have taken to make sure that your code works, especially if it doesn't. Discuss any bugs that may still remain.

Project Proposal

To initiate the term project, you must submit a one-page project proposal.

The proposal should include the following items:

- A description of the proposed project.
- The major references that will be used (books, journal articles, conference articles, web pages, etc.) including all the publication details such as date, page numbers, etc.
- The resources that will be required. I.e., will you need any special computing or hardware resources, or any special types of data? If so, where will you obtain them?
- Which portions do you plan to implement yourself, and which portions will you obtain elsewhere?
- Which programming language will you use?
- How will you test your program? Which quantitative measures will you use to determine the performance?