Final Project Instructions

6.838: Shape Analysis (Spring 2017)
Department of Electrical Engineering and Computer Science, MIT

Your main assignment for the semester in 6.838 is an open-ended research project. It is worth 50% of your grade; all parts must be completed to pass the class.

THE BASICS:

- You are welcome to explore any topic related to the lectures in 6.838. The expectation is that you will not only implement a state-of-the-art technique of your choosing but also that you will extend it in some way, e.g. by considering a new application, proposing a variation or improvement, proving a new theoretical result, or by systematically comparing multiple techniques for the same problem.
- Projects can be completed individually or in teams of two. Grading standards are the same regardless of whether you work in a team or individually.
- All parts of the project should be submitted on Stellar by 8pm on the listed due dates. **Late days *cannot* be used for the project.** Late work will not receive credit, except in extenuating circumstances with approval by course staff in advance of the deadline.

REQUIRED MILESTONES:

- **Proposal (5 points, due 8pm on March 8, 2017):** Submit a proposal of 500 words or less describing your plan. Cite at least one paper you plan to implement, either for comparison or extension, and indicate what your *new* idea will be beyond implementing existing work.
- **Checkpoint (5 points, due 8pm on April 5, 2017):** Submit a writeup of ≤ 2 pages describing your progress. Include at least one figure or table with an experiment using your current implementation, as well as a "related work" section citing and describing relevant literature.
- **Writeup (30 points, due 8pm on May 18, 2017):** Submit a writeup of $6-10$ pages (including figures, citations) describing your full project and results in the provided LaTeX template. This writeup minimally should include the following elements:
  - *Introduction:* A few paragraphs with an intuitive/accessible description of the motivation for your project. What is new? What are the applications?
  - *Related work:* Descriptions of and citations to academic research papers and/or existing software products related to your work.
  - *Technical approach:* A description in words, equations, algorithm listings, and/or flow charts describing your approach.

- *Results:* Figures/tables illustrating the results of your work, as well as text interpreting these results.
- *Contributions:* A short description (one paragraph) of the team members' individual contributions to the project.

Additional sections or adjustments to this basic layout are permitted, so long as the content above is contained in your writeup somewhere. For example, a common approach for academic papers is to separate the mathematical approach from implementation details. If you choose to do a purely theoretical project, you may adjust the sections above as needed. You may reuse text from your proposal/checkpoint.

- **Presentation (10 points, in class on May 18, 2017):** Give a $5-8$ minute talk (including a few slides) summarizing your project's motivation, approach, and results.

ADDITIONAL INFORMATION:

- Consult with Prof. Solomon and/or other members of the staff or Geometric Data Processing group as you work your way through the project. We can provide guidance regarding potential topics, related work, interpreting papers, debugging, theoretical ideas, relevant numerical/optimization techniques, and so on.
- Graduate students and UROPs are welcome to choose projects linked to their ongoing work. But, please make clear in your proposal how the project is separate/independent from contributions to a larger research group effort.
- Any programming language is acceptable. Your project will be evaluated by the results rather than by looking at code; please do *not* include code in your writeup (pseudocode is acceptable for explaining an algorithm).
- Your grade will be determined by technical content (75%) and writeup/presentation quality (25%). If you wish, you can bring drafts to office hours for review/editing.