

## **Details for Final Projects (CS 445)**

### **Project Topic**

Final projects are an opportunity to independently explore a topic of personal interest. For example, your project could relate to a topic, such as single-view geometry or image morphing, that was not assigned as a programming assignment. Or you pursue a question or application of interest to you. For example, students have implemented systems to read sheet music, count kernels of corn on a cob, score the Carcassonne game, track and analyze ball movements in sports, transfer expressions across faces, and create an AR experience. You may also implement a paper of interest, e.g. from SIGGRAPH, CVPR, ICCV, ECCV, or ICCP. The project must be related to Computational Photography or Computer Vision, but it does not necessarily have to be based on topics covered in lecture. For example, you could complete a more machine learning oriented project like object detection.

### **Project Scope**

The scope of the project should be similar to assigned projects 2-5. Try to choose a topic that you can implement in 15-20 hours (per person) using resources (data, computing) at your disposal. You may build from open source code, but you need to be clear about which parts of the project are your original contribution.

### **Outside Resources**

You may build from open source code, but you need to be clear about which parts of the project are your original contribution.

### **Working in Groups**

You should complete the project in groups of 2-4. You need to delineate the contributions of each person in the proposal and report on the contributions in the submission. Each person must contribute to implementation in some way – not just planning or reporting. Each student in the group must submit proposal, report, and code, but the submissions can be identical. A group of 4 may be expected to have a scope that is 50% larger than a group of 2.

### **Project Proposal**

Your proposal should be about ½ of a page in PDF and must include the following:

- Motivation (2-4 sentences): Why did you choose this topic? What do you hope to learn?
- Milestones (table or bullet list): What steps are required to complete the project? When do you expect to complete each. You should hold yourself to this plan?
- Evaluation (2-4 sentences or list): How will you test your method? What do you consider a successful outcome?
- Resources (bullet list): What resources do you need to complete your project (data, computation, equipment, etc.)? Verify that you have them or explain how you will acquire them.
- Group: what will be the contributions of each group member

Rubric (20 pts total):

- Motivation is clear and topic is relevant (5 points)
- Milestones plan to complete project is provided and realistic (5 points)
- Evaluation criteria is clearly specified and appropriate (5 points)
- Required resources are identified and appropriate (5 points)

As feedback, we will tell you if the project looks too easy or hard, or if the scope is inappropriate for group size. Since project ideas do continue to evolve after the proposal, it's not always easy to tell in advance.

### **Project Submission**

Submit a 2-4 page short paper describing your motivation, approach, and results. You may optionally have one additional page for references and figures (for 5 total pages) and may also link to an online results video (e.g. Vimeo or YouTube). Use size 11 or 12 Times New Roman font. You must also submit your code in a zip file with a README explaining its organization and how to run it (if possible). Provide a link to your data, e.g. to Google Drive. The submitted paper must include:

- Motivation and impact: Why did you choose this topic? What is the more general importance or impact?
- Approach: Describe how to achieve your results.
- Results: Explain your results and their significance
- Implementation details: Provide details, such as programming language, packages, etc. Include a list of any external resources used, such as open source code and data.
- Challenge / innovation: Describe what you think was challenging or innovative about your project. Explain the effort required to interpret unclear steps to a paper's implementation or get a proposed new idea to work. Write and justify how many points you expect to receive for the challenge/innovation component of grading.

Rubric:

- Paper completeness and quality (30 points)
  - Motivation and potential impact of topic is clear (5 points)
  - Approach is described as clearly as space allows (15 points)
  - Results and their significance is clearly presented (5 points)
  - Implementation details are clearly described (5 points)
- Implementation (70 points)
  - Completeness (50 points): Based on the submitted paper and code, the implementation addresses the proposed objectives.
    - If implementing an existing paper or known technique, full credit requires that the method is fully implemented with expected results demonstrated
    - If proposing something new where outcome is uncertain, full credit can be given as long as the proposed method is fully implemented and tested and results are described, even if results are not as good as hoped.

- Innovation / Challenge (20 points)
  - Project implements a basic technique (e.g. template matching or contrast enhancement) with low risk, such that most students could design and implement within a few hours (0 / 20 points)
  - Project implements a moderately complex paper or technique that would be expected to take 10-15 hours to complete. The risk for failure is low, but moderate effort is required. Or the proposal is risky and the outcome is not successful. (10 / 20 points)
  - Project proposes and successfully executes a new application or new technique, expands on an existing technique, performs experimentation that provides insights not present in the initial paper, or implements a difficult paper, such that the student overcomes potential setbacks or risk of failure to achieve a successful outcome. (20 / 20 points)