



CS549/RBE549 Computer Vision

Final Group Project Guidelines

Proposal, Presentation, Report

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Report Due: 15-December-2017

1 Introduction

The purpose of this final group project is to learn something new and, perhaps, to contribute something to the field of computer vision. Most projects should be done in groups of two or three. Larger projects could have a group of four, and in special cases groups of one are acceptable, if approved. You will be required to meet outside of class to work on the project as a team. Each group will submit a single proposal, presentation, and report as outlined below.

Groups of 1 person require permission. If you want to work by yourself, explain why its not possible to work with a partner (e.g., because youre building on your own existing research). Not wanting to work as a team due to the inconveniences of chat, Zoom, Piazza is not an acceptable reason for an on-line course.

1.1 Project Components and Due Dates

- Proposals: Due Monday 13-November
- Presentations: During Week 13 via ZOOM
- Report: Due Friday 15-December

2 Project Proposals

2.1 Written Proposal

List the group members and a short (1/2 page) description of the goals of the project. If known, sketch a potential approach with references. You could switch later, but think it through as best you can now given the time constraints of the semester. As a guide to scope, you should expect to spend around 30 to 40 hours per person on the project. Indicate what each group member will work on and how the project will be evaluated.

2.2 Participation

Participation via feedback (as a group) to another group(s) project on Piazza is required. If feedback is done in-person or via Q&A sessions, you must document your feedback on Piazza for credit. You should review other proposals as a group and provide feedback from your group. Insights gained from other's project can be incorporated into your original proposal.

3 Project Presentations

Each group will be required to develop and submit a PowerPoint presentation that illustrates the key ideas, approaches, and results of the project. Each group will present during week 13 of the course via Zoom during a 30-minute time slot that maximizes participation. All presenting group members are required to be present and talk. At least one member from the non-presenting groups must attend and complete an evaluation of talks.

4 Project Reports

For your final project report, please submit the following three files to Canvas:

- Two page abstract that briefly describes the motivation, technical approach, and key results. Include a statement of individual contribution if there is more than one group member. If one person has done more or less than his/her fair share, please e-mail me separately. The project will be graded as a whole, but I may modulate individual grades based on this feedback. Finally, list any source code used that is not part of a standard package. (pdf format)
- A separate pdf containing the PowerPoint you presented.
- A zip file containing your code. Please do not include images or results in this zip to keep file size manageable. (we may ask for them later if needed).

Only one team member should upload files. Please ensure all PDFs clearly indicate all team members!

5 Grading

Grades will be based on the quality of the project (originality, thoroughness, extent of analysis, etc.) and the clarity of the written report and project presentation. Ideally, you will try something new or apply ideas from class to your application domain or research. More will be expected of larger groups. Its great if you do something publishable, but you can also get full marks if you do something challenging or interesting that helps you learn something new.

6 Rubric (100 Points)

All three components (proposal, presentation, report) will contribute towards the Final Project portion of your grade, itemized as follows:

- +5 pts: Project Proposal
- +5 pts: Participation via Piazza
- +10 pts: Written Presentation (PowerPoint)
- +20 pts: Oral Presentation
- +60 pts: Project Report

7 Topic Ideas

7.1 Try something new or interesting

Apply vision to a mobile robot, make a data-driven interface for image editing, organize home photos, do visual search in a home photo collection, reconstruct a 3D scene from multiple images, estimate material properties, etc.

7.2 Compare two or more approaches

Implement two approaches (e.g., for object recognition) and try to understand when one works better than the other. As part of this, you could try to create a better benchmark dataset (maybe a smaller prototype).

7.3 Specific Ideas

- Shadow detection: Try to find cast shadows in outdoor images
- Pedestrian detection: Build a detector for standing/walking people
- Multiview reconstruction: Build a system to reconstruct an object or a scene from multiple images.

- Evaluation of object detection: Run a stateoftheart detector on a PASCAL VOC dataset and study (quantitatively and qualitatively) which factors make detection difficult.
- Similar category differentiation: Make a classifier that can tell the difference between dogs/cats or bicycles/motorbike, etc.
- Material detection: Try to classify materials on natural objects in images.
- Action recognition: Try to detect when somebody is performing a particular action in a video.
- Tracking: Try to track players and the ball in a sports video.
- Photo organization: Build a system that can organize your photos by the people in them.
- Gender/age classification: Given a face, try to predict the age and gender.
- Fake or Real: Try to predict whether an input image is natural or was generated by a computer.

8 Acknowledgements

This assignment is adapted from Derek Hoiem's final project in Computer Vision at UIUC.