CAP 6415: Computer Vision
Project Guidelines

Course Project Overview

You need to propose a project that is appropriate for a 4-weeks scope. Do not bite too much, but do not go hungry! You can base the project on your PhD research or reimplement some aspects of an existing paper. See some others suggestions at the end of this document.

Each project should have two partners. Choose your own partner. Everyone must take part in a group project. All members of a group will receive the same score; that is, the project is assessed and everyone receives this score. However, that number is only 75% of your grade for this project. The final 25% is individual and refers to your teamwork. The instructor will assign a grade that is informed by declaration of work division in the project report and performance during project presentations. Once formed, groups cannot be altered or switched, except for reasons of extended hospitalization.

Important Dates and grade distribution

Feb 21, 2019 – Project proposal (5% of grades)
March 21, 2019 – Project midterm report (5% of grades)
April 9, 2019 – Project presentation slides (Slides + presentation = 10% of grades)
April 30, 2019 – Final report due. (10% of grades)
Individual contribution: (10% of grades)

Grading Rubric

Your project will be graded on

1. Presentation
    a. Quality of slides
    b. Style of engagement
    c. Time
2. Writing Style
    a. clarity, structure, language, references
    b. background literature survey, good understanding of the problem
    c. good insights and discussions of methodology, analysis, results, etc
3. Technical
    a. correctness
    b. depth
    c. innovation
4. Evaluation and Results
    a. sound evaluation metric
    b. thoroughness in analysis and experimentation
    c. results and performance

Project Submission Details

Write-up and Code submission

Submit your project proposal, midterm report, presentation slides, and final report on canvas, with the following naming convention, where the titles have all the last names of the group members.

Proposal – LastName_LastName_Proposal.pdf,
Midterm Report – LastName_LastName_midReport.pdf,
Presentation – LastName_LastName_Presentation.ppt,
Code – LastName_LastName_Code.zip,
Final Report – LastName_LastName_FinalReport.pdf,

Project Proposal

Your write-up should be between 1 - 2 pages using the CVPR template at http://cvpr2018.thecvf.com/submission/main_conference/author_guidelines

The following is a suggested structure for your proposal:

1. Title, Author(s)
2. Introduction: this section introduces your problem, and the overall plan for approaching your problem. What is the computer vision problem that you will be investigating? Why is it interesting?
3. Problem statement: Describe your problem precisely specifying the dataset to be used, expected results and evaluation What method or algorithm are you proposing? If there are existing implementations, will you use them and how? How do you plan to improve or modify such implementations?
4. What image or video data will you use? If you are collecting new datasets, how do you plan to collect them?
5. Which reading will you examine to provide context and background?
6. How will you evaluate your results? Qualitatively, what kind of results do you expect (e.g. plots or figures)? Quantitatively, what kind of analysis will you use to evaluate and/or compare your results (e.g. what performance metrics or statistical tests)?
7. Timeline with weekly subtasks to be accomplished.

Mid-term Report Guidelines

Your write-up should be between 4 - 5 pages using the CVPR template at http://cvpr2018.thecvf.com/submission/main_conference/author_guidelines

The following is a suggested structure for your report:

1. Title, Author(s)
2. Abstract: It should not be more than 300 words;
3. Introduction: this section introduces your problem, and the overall plan for approaching your problem
4. Background/Related Work: This section discusses relevant literature for your project

5. Approach: This section details the framework of your project. Be specific, which means you might want to include equations, figures, plots, etc.
6. Intermediate/Preliminary Results: State and evaluate your results to date.

Project Presentation Guidelines

Each team will give a 25 min project presentation. Make sure you provide enough detail of the theory underlying your project. This is your chance to teach your friends about something that is, mostly likely, new to them. After your presentation, there will be 5 minutes for audiences to ask questions. If there are no questions that you did not succeed in your presentation, so make sure you connect with your audience!

Final Report Guidelines

Your final write-up should be between 8 - 10 pages using the CVPR template at http://cvpr2018.thecvf.com/submission/main_conference/author_guidelines

The following is a suggested structure for your report:

7. Title, Author(s)
8. Abstract: It should not be more than 300 words;
9. Introduction: this section introduces your problem, and the overall plan for approaching your problem
10. Background/Related Work: This section discusses relevant literature for your project
11. Approach: This section details the framework of your project. Be specific, which means you might want to include equations, figures, plots, etc.
12. Code Reuse: Cite and very clearly describe any code that you have reused for this project. Clearly specify what you have coded for this project.
13. Experiment: This section begins with what kind of experiments you're doing, what kind of dataset(s) you're using, and what is the way you measure or evaluate your results. It then shows in details the results of your experiments. By details, I mean both quantitative evaluations (show numbers, figures, tables, etc) as well as qualitative results (show images, example results, etc).
14. Conclusion: What have you learned? Suggest future ideas.
15. Division of labor: Outline in detail what each member of the team did for this project. Remember 10% of your grade depends on this section. Even if you equally divided the work, you need to specify detail each members tasks/subtasks.
16. References: This is absolutely necessary.

Honor Code

You may consult any papers, books, online references, or publicly available implementations (such as SIFT) for ideas and code that you may want to incorporate into your strategy or algorithm, so long as you clearly cite and describe your sources in your code and your writeup. However, under no circumstances may you look at another group's code or incorporate their code into your project.

Some project ideas (taken from Fei-Fei Li)

Generic Object/Scene recognition for the Smart Album Project

Text Detection and Character Recognition in Scene Images with Unsupervised Feature Learning

Learning Slow Features for Object Recognition

RoboGrader: Scoring Multiple Choice Tests with a Smartphone

Joint Subclassing and Classification

Heuristics for Decision Tree Selection and Weight Assignment in Random Forest for Fine-Grained Image Classification

RGB-Z Segmentation of Objects in a Cluttered Scene Using a Kinect Sensor

KFace3D: Facial Recognition using RGBD Data

Comparison of Aircraft Tracking Using Top-Down and Bottom-Up Approaches

Geometric Understanding of Indoor Scenes

Real Time Subcutaneous Vein Recognition of Forearm Veins

Face Detection and Tracking for BabyCam

Image Retrieval, Semantic & Geographic Annotation using visual/multimedia representations and textual information

Computer-assisted Detection of Defects during the Fabrication of PDMS chips

Unsupervised Learning of Invariances with Temporal Coherence

Image-based Web Page Classification

Using a Functionality Model for Chair Detection

Fusing Multi-Channel Cues for Image Organization

Generalizing ImageNet to SmartPhones

Motion-sensitive Low-noise Imaging

Unsupervised Image Segmentation using Deep Belief Nets

The Retinal Algorithm to Detect, Segment and Track Moving Objects with Observer Motion

Unsupervised Feature Learning of Bi-modal Features

Efficient Classification and Segmentation of Specular Objects

Feature Descriptors for Tiny Image Categorization

A feature tracking approach to painted aperture

Baseline Scene Classifications

Camera Tracking with Fixed Point Math for Mobile Devices

Modeling Mutual Context of Object and Human Pose in Human-Object Interaction Activities

Sub-meter Indoor Localization in Unmodified Environments with Inexpensive Sensors

Segmentation of seismic images

Object Detecting in Images using Time Series Ensemble Methods

Learning Visual Invariance in a 2-Layer Neural Network