

Final Project Proposal

1 Description

The final project for the class is open ended. The objective is that you apply the concepts and techniques we covered in this class to tackle a problem using Computer Vision and Machine Learning. In particular, you need to use, at least, one of the techniques that we discussed in class and build upon it. 🧠 The minimum expected work is to re-implement an algorithm even if it doesn't solve a particular problem. I encourage you, however, to do more interesting things, and think of a problem that could be solved and make this project a prototype for it. The project's theme is open-ended; ideally, you can incorporate your research agenda in the project.

2 Project Proposal

To ensure the success of the project due to its open nature, it is crucial to assess the feasibility of your ideas early on. During the initial weeks, you can informally discuss multiple ideas with the teaching team. Considering the limited time available, it is strongly advised that you determine your desired project direction from the very beginning. By the deadline of Friday 29/09, you are required to submit a formal proposal for evaluation. 📝 The proposal should consist of a 1-2 page draft, which includes the following:

- A clear motivation for the problem you wish to tackle.
- Identification of existing methods that will serve as baselines or stepping stones for your project.
- Description of the datasets you plan to use and their availability.
- Your proposed plan for dividing the work and an explanation of its achievability within a timeframe of approximately six weeks.

You can use the proposal template provided in the [example-p3](#) repo. Look for `proposal.tex` in the `report` branch.

⚠️ Refer to Section §3 for any restrictions on potential papers or ideas.

⚠️ If you intend to reproduce a current paper, it is important to explain your implementation approach. In the case of a mixed approach, where you combine implementation of an existing paper with your own ideas, clearly state what aspects you will adopt from existing work and highlight your unique contributions.

3 Project Ideas

You are strongly encouraged to find a project that is aligned with the time restrictions. In case you want to find something new or interesting, check the best conferences on Computer Vision (👁️) and Machine Learning (📦):

👁️ CVPR: <https://openaccess.thecvf.com>

👁️ ICCV: <https://openaccess.thecvf.com> (only available for odd years)

👁️ ECCV: <https://openaccess.thecvf.com> or <http://www.eccv2016.org/proceedings/>¹ (only available for even years)

📦 ICLR: <https://iclr.cc>

📦 NeurIPS: <https://neurips.cc>²

📦 ICML: <https://icml.cc>

¹Previous year to 2016 are acceptable too. They are not listed here due to space constraints.

²Formerly known as NIPS at <https://nips.cc>.

Note that you **must** follow a paper from one of these conferences that is related to vision. Do not replicate any paper from machine learning, it should have applications to computer vision. Also, consider the computational resources in case you intend to replicate a paper that uses deep learning (DL). If you still want to replicate a DL paper, I recommend you to use Educloud (<https://research.educcloud.no/>) or Google Colaboratory (<https://colab.research.google.com/>) to run your experiments. However, check that you can run the learning loop on it. You still need to maintain the code on Github, and run the code from the Colaboratory.

4 Final Report

Your final report should be written like the previous two reports. You have more flexibility to explain your problem and present your results. The report is due Tuesday 28/11.

✍ You should include a setup for your problem, that is, motivation and related work, as well as your work (methods, experiments, and results). You should focus on what you found, what did and did not work, and the discussion on the reasons. You should discuss what you accomplished during the project, what you learned and your application, and evidence of the effort. For the experiments execute your methods several times and produce graphics and plots to summarize your results (check the papers you are taking inspiration from to produce a similar evaluation).

✍ You must include a “Group Contributions” section (before the references) where you detail what each member of your group did. You could have a paragraph detailing what each member was responsible for and what tasks did they perform, or you could draw a contribution matrix detailing the main steps and responsibilities and report the percentage of involvement of each team member. This section *does not count towards your page limit*.

5 Poster Presentation

We will be conducting demo presentations during the final week of class, tentatively scheduled for Tuesday 21/11. During this session, you are required to present your method and results to your peers through a poster presentation. Additionally, you are encouraged to participate actively by circulating and discussing the results of your classmates.

Feel free to structure your poster in any way you find suitable. Ensure that you provide a clear explanation of what you did and how you accomplished it. It is also highly recommended to include a demonstration to showcase your project’s functionality.

5.1 Poster Guidelines

- Posters should be A0 in portrait orientation.
- Use high resolution or vector graphics. Remember, the poster will be much larger than the size of your computer screen.
- Use large enough fonts. You can print subsections of your poster out on standard computer paper to get an idea of how large your font is after printing.
- White space is your friend! Your goal is to convey information in a way that someone else can digest, not just throw results onto a slide. Less is usually better, and margins help the viewer organize and process your poster.
- A good rule of thumb for poster content is 50% images or graphics; 30% text; and 20% whitespace. Full sentences should be rare; paragraphs should be extremely rare.
- Use only 2–3 fonts and use them consistently (one for headings, one for text, one for captions). Keep formatting consistent between sections.
- Use only 2–3 main colors and keep them consistent. Many websites will help you choose color schemes that look good (a quick Google search will get you there). *Red on blue never looks good*; there are many other rules of thumb for colors you can avoid by picking a standard color scheme.
- Practice explaining your poster to someone. Reformat and add images where you find yourself struggling to explain.
- For extra guidelines, check <http://www.personal.psu.edu/drs18/postershow/>.

6 Evaluation

Your grade will be defined by the following aspects:

1. Project proposal	5%
2. Poster	35%
(a) Problem setup	5%
(b) Related work (existing solutions)	5%
(c) Explanation of the solution	10%
(d) Demonstration	15%
3. Final report	60%
(a) Introduction, motivation, and background	10%
(b) Related work	10%
(c) Explanation of your methodology	10%
(d) Experiments, discussion, and results	30%

Each item corresponds to the questions and requirements defined in the previous sections. **Your language usage won't be graded**, but your ability to present your results, ideas, and how they are supported will be. Each other point will be evaluated according to the completeness and correctness of the requested items.

7 Submission

Your submission must be through your assigned group on [Github](#). Create³ a repository named `g#-p3` and commit all the code and report there. We recommend cloning the [example-p3](#) repo to your group repo when you start the project. You can find a \LaTeX template for the report in the 'report' branch.

7.1 Code

Your submission must have the following subfolders in the `main` branch of your repository:

- `input`: a directory containing the input assets (images, videos or other data) supplied with the project. Store the images only if they are asked on the project. Otherwise, set up your `Makefile` to automatically download them from a public server or repository.
- `output`: a directory where your application should produce all the generated files (otherwise stated in the problem).
🔗 This folder and all its contents must be added to the artifacts in case you setup a workflow for your code.
- `src`: a directory containing all your source code. You only need to submit files that are not derived from other files or through compilation. In case some processing is needed, prefer to submit a script that does that instead of submitting the files.
- `Makefile`: a makefile that executes your code through a docker image or that is setup in a way that constructs its own environment for reproduction. You are encouraged to use the standard pytorch image, [pytorch/pytorch](#), but other solutions are possible. Discuss with the teaching team early on your setup to ensure its reproduction. The code will be executed through a standard call to `make`, so other dependencies must be provided by you under that constraints.
🔗 Moreover, note that your code **must** run without additional prompt or changes from the user.

In the `report` branch:

- All the source files (e.g., `report.tex`) that produce your report must be here.
- 🔗 Your report **must** be written using \LaTeX (and friends) and compiled within the workflow in this branch. ⚠️ Consequently, **the PDF must not be committed**. You can use the images from [adnrvtexlive](#) to build your PDFs. **Only the PDF of the report** must be added to the [artifacts path on the workflow setup](#), and not other intermediary files of your report (e.g., images, log files, auxiliary files). You can follow the [example repository](#) (or directly clone it into your own repository) to reuse the existing workflow.

³Or guarantee that a repository has been created to your group and that the team members have access to it.

- Your report must show all your work for the given project, including images (labeled appropriately, that is, following the convention given) and other outputs needed to explain and convey your work. **The constraints of this report are explained in § 4.**

🔑 The last commit before the submission deadline will be used to review your code and the report. Do not worry about executing times for building the report.

7.2 Proposal

The proposal must be submitted as a PDF by Friday 29/09. You submit by uploading the necessary files (e.g., `proposal.tex`) to the group repository. The results will be discussed and approved in class. The proposal is graded as a pass or fail. You are advised to start the proposal discussion as soon as possible.

7.3 Poster presentation

Your presentation will be delivered to the evaluators during the poster session, tentatively, on Tuesday 21/11. You will be given the times in which the evaluators will go through your poster to be there.

7.4 Final Report

The final report should be delivered as with previous projects on the repository of this project. The deadline is at 23:59 of Tuesday 28/11.

8 Notes

- ❗ Note that there are several implementations that you can find on the internet.⁴ This project is for **you to implement** the algorithms. Thus, **do not submit code from others**. And if you re-use code from someone for a non-restricted part, disclose it in your report and code.
- ❗ All the submissions must be self-contained and must be executable in a Linux environment. Your code could execute in the docker image `pytorch/pytorch`, available at docker hub (<https://hub.docker.com/r/pytorch/pytorch/>). If not, then you must ensure that your entry point sets up the environment needed to reproduce your work without further inputs from the user.
- ❗ It is your responsibility to make sure your code compiles and executes correctly. No effort will be made to run your code besides executing `make`.
- ❗ You must program in Python. If you need to install other packages you must do so within your `Makefile` as automatic prerequisites.

⁴And even more with these conferences, several authors either publish their code or replicate the code of others. If you are going to replicate a paper you should do it yourself. If you are constructing on top of the code of others, then cite them properly and explain your work and how it differentiates on your report.