

# Final Project - Guidelines

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Overall, the final project is comprised of:

1. A project *proposal*, which must be approved by myself previously.
2. A ten-minute class *presentation*;
3. A *report* documenting your work, results and conclusions.

## Goals

You are learning some techniques that are applied in computer vision today. With these tools you can actually solve some interesting and challenging problems. The project is your chance to apply some of these tools to a problem that is of interest to you.

There are a number of components to a good project:

- Choosing the project. It's hard to choose something that is both interesting and doable in a couple of weeks. I am here to help in this process;
- Formalizing the problem. This involves taking an idea like "finding mouths in single images" and formalizing it (e.g. using Bayesian probability) and then turning this into something that can be computed;
- Data collection. You will need data with which to test your algorithm. The safest bet is to use data that others have already gathered and made available. Maybe it is a good idea not to plan on collecting new data;
- Algorithm development. Develop your software in Matlab or OpenCV. Set incremental goals. Test your software in stages. Use good programming practices (don't let Matlab make you lazy). Try to break your code! If it works the first time don't believe it; try strange cases;
- Experimentation. You want to show me experiments that illustrate the ideas and the behavior of your method. Don't overwhelm me with results but rather choose good illustrative examples (of success and failure);
- Report. A key part of any research project is effective communication of the results (more below).

## Tips

Don't get carried away. Choose something that seems small and then set intermediate goals. You want to have a fall-back strategy if you don't meet your ultimate goals.

These projects should not be basic research. If nobody has ever done this before then the risks are too high for a final project. Choose something from the literature that seems doable and implement that.

## **The Internet**

The Web is a great source of ideas, papers, data, and even code. If you do get data, code, or ideas from the web you **MUST** disclose this. Become a fanatic about appropriately citing work from any source.

## **Final Project Proposals**

The proposals should be just ONE page, and should describe what you plan to do (and who with, if appropriate). In the proposal, persuade me that it will be feasible for you to do it: lay out the tasks, and give a timeline for when you will do each task. You can work by yourself or in pairs. Projects by pairs should be correspondingly more substantial.

The project proposal should have the following sections:

- Title: A short descriptive title for your project;
- Name: Your name;
- Overview: Briefly describe your project goals. From this overview, I should be able to understand what you are going to do and the scope of the project. Be specific about what your input is and what your output is. How will you know if your output is correct; that is, how will you know that you solved the problem;
- Previous: What sources (papers, web pages, etc) will you use? What has been done before?
- Data: What data will you use? Do you have it? If not, how will you get it?
- Risks: What are the biggest unknowns in starting this project? What don't you have or don't you know?

Important: the project proposal must be something new that you do for this class, so you can not submit a project from another class. But something topically related to your research (graduate students) is fine, and if it becomes a paper you submit for publication, that is ideal, of course.

## **Final Project Report**

The report should be 5 - 8 pages (the upper limit of 8 pages is strict!) in SIBGRAPI format. It should be structured like a research paper, with sections for Introduction, related work, the approach/algorithm, experimental results, conclusions and references.

The related work section should discuss what has been done previously and (importantly) how it relates to what you have done. Previous work will be cited and references will appear in the bibliography. Of course, this does not need to be at the level of what is expected in a publishable paper.

Explain your method in clear English (highly encouraged) or Portuguese. Use equations and figures to communicate your ideas more clearly. When using equations, make sure you define all the terms and explain the notation fully.

You should describe and evaluate what you did in your project, which may not necessarily be what you hoped to do originally. A small result described and evaluated well will earn more credit than an ambitious result where no aspect was done well. Be accurate in describing the problem you tried to solve.

Don't just show me results, but rather use the results to illustrate ideas and to explain the uses and limitations of the method. I am specifically looking for how you took a problem in the real world and formalized it. What models, abstractions and approximations did you use? State your assumptions clearly. How did you then find a solution using your formulation? Where does your method fail? What does that tell you about your assumptions?

Finally, I want to see clear conclusions about what you did, what worked and what didn't, and how this work might be improved in the future.

Your report is the key – it is where you explain the problem and the solution. Your results should illustrate what you did. I have zero tolerance for plagiarism. If someone else has said something better than you could ever say it, then there is a right way to use their words: you quote.

Submit your report to [cardeal@decom.cefetmg.br](mailto:cardeal@decom.cefetmg.br) as a pdf file named YOUR\_LAST\_NAME.pdf. Submit any supplementary material as a single zip file named YOUR\_LAST\_NAME.zip. Add a README file describing the supplemental content. Late submissions are not allowed.

## **Final Project Presentation**

The project presentation should be clear, informative, and short. You should briefly describe the problem you have chosen, and present an overview of your approach and results. The time allotted to each presentation is 10 minutes. I will have to be strict with the timing to accommodate all the students, so make sure your presentation fit within that time.

Submission: I will use one computer for the presentations in order to avoid the cost of everyone setting up their laptops. You should send your presentation to [cardeal@decom.cefetmg.br](mailto:cardeal@decom.cefetmg.br) by the due time established as a single ppt or pdf file named YOUR\_LAST\_NAME.ppt (or .pdf). If your presentation has additional files (e.g. videos), send them as a single zip file with the same naming convention. Late submissions are not allowed, and no further editing will be possible after submission.

## **Observation for Graduate Students**

Graduate students must do a little bit more. One of the biggest factors in a person's research success is their ability to communicate their ideas well.

You can be brilliant but if nobody understands you, then your work will not make an impact. This part of the assignment gives you experience writing your work up in a format appropriate for publication.

IMPORTANT: your project is in no way expected to be publishable work, but your presentation of it should be in the format of a publishable paper and should have the same level of clarity.