UNIVERSITY OF CALIFORNIA, DAVIS
DEPARTMENT OF COMPUTER SCIENCE

A Hitchhikers Guide to the ECS 221 Project

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General Instructions: You have 6 weeks to work on the topic of your choice that is in the interface of biology and computer science. The last part of your project assignment is to write a report that resembles a technical research paper. The report will be 8-10 pages, single space, 12pt font. It has to be written in latex and it is expected to have (roughly) 6 pages of text, 4-5 figures (either *in situ* or at the end of the document) and about half to one page of references. This guide contains some general advice on how to write a technical paper. Although a silver bullet doesn't exist, the general structure that is summarized below is a good starting point.

1 ORGANIZATION AND STRUCTURE

General Information: When you design a project to test a hypothesis, try to lay out how you will address a method and what simulations/experiments you should perform. Always think of the questions that you have to answer so that the manuscript presents a complete, compelling story. Before you start writing any report, you should have a general idea of how the main figures will look like and it always help to actually create these figures beforehand.

Abstract: One-two sentences on what is the problem that you addressing. Two-three sentences that contain a high-level description on how you address the problem (your method). 2-3 sentences on the results. 1 sentence on what the advance that has been achieved with this work can influence the field (what it will enable, for the specific field and whole area in general)

Introduction: 1-2 sentences of the general area, 1-2 sentences on the specific sub-area. A paragraph on the specific problem and how it has been addressed so far. 1-2 sentences to a paragraph on what is missing on current approaches and why this is important.

Then a paragraph on what this paper contributes - how you approach this problem and the results of the approach - This paragraph should have ***clear, definite claims*** on what you have achieved in relation to what you claimed that is missing in the field (from the previous paragraph). You should not add items that do not relate to the previous "missing/desired" advances that you introduced before. If this happens, then either you have not introduced the challenges/missing/desired in the previous paragraph adequately, or your claim is irrelevant to this paper and has to be removed.

Some people include a last paragraph with the structure of the paper as the closing introduction paragraph. This is up to you.

Methods: Divide it into sections that are well-defined on the distinct components/algorithms/sub-problems. Put references whenever you use/step on previously published work. Use sub-section indexing (3.1, 3.2, etc.). Describe fully your algorithms and methods, so that if anyone wants to reproduce your results can do so (sometimes this is difficult if there are many parameters, in which case a parameter file should be included as suppl. mat.).

Results: This should only describe the results that you have obtained. Sometimes it make sense to discuss your guess/opinion why this is happening, but this should be rare. This section is to only present the facts about the method performance, robustness, complexity, etc.

Discussion: This is where you discuss everything that was presented in the Results section. Why did the algorithm perform better in X and not in Y. It is ok to succinctly re-state strong result claims (that were included in the previous section), as long as you continue to explain, even speculate why this may be the case. For example: *"Our algorithm was faster in X% of the scenarios than what is currently available. The main drive behind this performance boost is the Y module, which takes advantage of the Z characteristic of the problem. Indeed, ..."*

Finally, in what some papers refer to as "Conclusion", you provide 1-2 sentences of the purpose of this report and 1-2 sentences of what was achieved (these 2-4 sentences are usually similar or re-stating what was said in the abstract). Then you go on to discuss about what remains to be done (the road ahead), why (the impact to the field) and how you think it can be achieved (future work). You end the report with 1-2 sentences on how the work presented advances the field in the grant scheme of things.

References: Please include all relevant references for the paper, to provide a succinct and accurate summary of past work and challenges in the field. Research has found that the more articles you cite, the more you will be cited too. For this report you are expected to have 10-20

references.

Author contributions: Here you clearly state what the contributions of each author are, in cases where you work in teams.

2 PRESENTATION

You will be giving a presentation in class. Prepare slides for 20-25 minutes of presentation that will cover the whole project and will have about the same structure as the technical report. All members of the team should speak during the presentation. Be prepared for 3-5 minutes of Q&A at the end of the presentation. Your grade in the project will be determined by the work conducted, quality of the presentation and the quality of the term paper.

GOOD LUCK!