

MTRX4700: Experimental Robotics

Major Assignment

Note: This assignment contributes 40% towards your final mark for this Unit of Study. The presentation component of this assignment will take place on Friday, June 9th during **Week 13** in the Mechatronics Lab. You are to submit a report, in the format stipulated in this handout, before the completion of the exam period. Submit your report via the eLearning TurnItIn submission on the course website. Late assignments will not be marked unless accompanied by a valid special consideration form. Plagiarism will be dealt with in accordance with the University of Sydney plagiarism policy. The objective of this assignment is to undertake a thorough investigation and development of a robotic system of your choosing. You may work in groups of 2 or 3 in completing this assignment. A single report will be expected from each group. **This assignment should take an average student 50+ hours to complete.**

Total Marks: 100

The front page of your report should include the name and SID of the members of your group

Introduction

The objective of this assignment is to undertake a thorough investigation and development of a robotic system of your choosing. We hope that you will draw inspiration from the material covered in the lectures and previous assignments however you are free to investigate any aspect of robotics or related disciplines (vision, sensing, estimation, etc.). We expect that you will undertake background research to assess the state of the art in your area of interest. You should also prepare a brief proposal detailing the goals of your work and outlining the tasks and resources which will allow you to complete your project. This can be sent to your instructors via e-mail or discussed with them prior to the first lab session scheduled for the major assignment.

Assessment for this lab will consist of the evaluation of a presentation to your instructors and peers as well as a report describing your system. You are to prepare a presentation, hopefully including a demonstration of your system, and submit a brief report detailing the work you have undertaken as part of this lab. We are particularly interested in seeing a discussion of the principles covered by your work in the report. Your report should cite and discuss relevant background material you have drawn on from the robotics literature as well as describing your implementation or the design of your system. Results and outcomes of the work should also be described.

Presentation

Your presentation should highlight the design and demonstrate the current state of your system. Describe the problem you are addressing and how it might be of practical use. While we realize you may not have achieved everything you set out to achieve (hopefully you will have, but we are aware that you are working on a fairly tight schedule) we would like to see how far you got and what you would have liked to accomplish given more time. Some discussion of the relevant literature will also be expected.

The Report

Your report should be written in the style of a conference or journal paper. We will assess the quality of your report and will consider assisting you to submit papers based on your reports to the Australasian Conference on Robotics and Automation (ACRA) that will take place in December 2016. Students interested in publishing their work should speak with the instructors who will help to refine your paper in preparation for publication. The final submission deadline for ACRA is usually in September so there will be time to polish the paper following the semester. This may also be an opportunity to further develop the system if required however this will not alter your marks for this

Unit of Study. If you are considering postgraduate work, this would be an excellent way to get a publication on your resume. Your report should consist of the following sections

1. **Introduction:** Provide an introduction to the problem you are investigating. Why is it an important or interesting problem? What are potential applications of the techniques you are developing? The introduction should also contain an outline of the remainder of the paper
2. **Background:** Describe related work that has been published in the literature. What papers, books and other resources have you consulted and how does their work relate to yours? What outcomes and possible innovation are you hoping to achieve?
3. **Experimental Setup or Design:** Describe your experiment or the design of the system you are developing.
4. **Results:** Show the results you have achieved. Consider how you might present these results in a clear and concise manner. Although you will understand the significance of the results, make sure it is clear to the reader as well.
5. **Discussion:** What are the implications of your results? What are the limitations of what you have done and how might the experiment/design be improved in the future?
6. **Conclusions and Future Work:** Discuss the implications of the results in a broader context, drawing conclusions and providing directions for future research in the area.

Report marks will be assigned according to the following breakdown:

| | |
|---------------------------|----------|
| Introduction | 5 |
| Background | 5 |
| Experimental Setup/Design | 10 |
| Results | 10 |
| Discussion | 10 |
| Conclusions | 5 |
| Style | <u>5</u> |
| TOTAL | 50 |

Assessment

The grading will be based 50% on the presentation, including a discussion of the system design and a demonstration, and 50% on the report. The grading will fall roughly into the following divisions:

Pass: a reasonable attempt at generating a working system. Limited results and a poorly presented report.

Credit: a system in which some components are shown to work but the overall system has not been integrated. The report would include some preliminary results.

Distinction: same as above plus more system integration. The report should be clear and concise and describe the results of the work within some literature context.

High Distinction: a fully integrated system with significant results. A report that clearly presents the results, puts the work into the proper literature context and would be seriously considered as a potential candidate for publication.