Robotic Manipulators

UR5 Coffee maker

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Report/project guidelines For the UR5 report, the following are some guidelines on what to include, how it will be marked etc. While I won’t impose a strict page limit, the report should probably be less than 10 pages, not including code in Appendix (This isn’t a design report!) Your report should include

# Introduction

# Frame Assignment

# Determination of Transformation Matrices

# Path Planning

# Time-and-Motion Study Results

Time-and-motion study

This involves you making a comparison between the time it takes a human operator (Rodney) and the UR5 running your finalised code to perform each task, and the complete coffee-making process. This information can then be used to evaluate the financial viability of the robotic system – does it make sense to automate this task? If so, over what period does the robotic system pay itself off?

Some quantitative information that you may want to use:

* Cost to purchase UR5: $40k
* Cost of tooling: $5k
* Annual maintenance of UR5: $400 + shutdown for 3 hours
* Hourly wage of experienced barista: $27 /hour
* Human working conditions: 2x 15 min breaks + 30 min lunch per 8 hour shift
* Average cost of cup of coffee: $4.50

You should discuss other factors that may influence the decision to automate this task. Some examples include:

* Improvements that may increase the speed of the robotic system
* What times of the day people typically buy coffee
* Other costs not included above

Finally, make a recommendation on whether automating this task would be worthwhile.

You can find a video of Rodney making a coffee on Learn.

# Discussion

# Conclusion

# References

# Appendix

What you learned and what you suggest

Code in an Appendix

Within this framework, you need to describe your methodology, why you chose it, and maybe reflect on the outcome/performance. You should also briefly explain things like the frame assignment and why it is important and how it relates to this assignment and the software running the robot, etc.

As you are all just about ready to go off into the world as professional engineers who will need to write reports for clients, colleagues etc, quality of writing is also very important. Spend some time making sure your report is concise and well written as this will also impact your mark.

10: Report is exceptionally well written and presented, and demonstrates excellent insight and effort on aspects such as optimising paths or use of certain commands to achieve rapid/optimal/fancy behaviour. Code is clever/cunning/elegant and demonstrates excellent knowledge of the robot and its programming environment. Code is well commented and easy to understand. Basically, going above and beyond…

7: Report is well written. Covers all the basic elements and shows a good degree of understanding of how to use the techniques taught in class. Good use of figures to illustrate aspects of the report. Code is commented and its flow/function can be easily understood.

5: Poorly written report, coding is very basic.