24-774: Special Topics in ACSI

Project Proposal

Assignment: The goal of this proposal is for you to give a thorough description of the problem you intend to solve in your semester project, making an effort to specifically touch on major design issues that you may encounter. Your proposal should be *1-2 pages* in length, and demonstrate to the reader that you have formulated an interesting and appropriate project to complete within the scope of the course.

\*\* Note: While I intend for each group to have reduced to their single **best** idea, if there are still two ideas you are considering equally then it is appropriate to write up two proposals. However, I will expect the level of both proposals to be consistent.

As a team, complete the project proposal using the format on the next page and upload to Canvas as a pdf.

PROJECT DESCRIPTION

TITLE

Briefly describe the project topic, the design challenge, and expected outcome. This should be the abstract of your document and should be only 4-5 sentences.

PROBLEM DEFINITION and DESIGN SPECIFICATIONS

Design Problem Definition: A brief description of the design problem. It should provide a clear statement of the design problem and define overall project goals. Make sure to elaborate on any specific real-world use cases that inspired you to attack this problem. Discuss:

* What specific capabilities will you demonstrate at the end of the project? How does this relate to existing demonstrations that you are aware of?
* What specific hardware will you be using? What will you add to the Crazyflie? What sensors will you use?
* What control algorithms / approaches are you considering?
* What portion of your work will be embedded (modifying Crazyflie firmware)? What portion will be ROS / other hardware-in-the-loop implementation?

One way to think about this is as follows: If there were a design competition in the context of your project, what information would be provided by the organizer so that the design teams could work towards addressing that challenge?

RESEARCH

Existing Approaches: Take a look at the available literature relevant to your project. Elaborate on the following features for these projects.

* Hardware for the plant, controller, sensors, and actuators
* Control approaches considered (e.g. sliding mode, dynamic programming, etc.)
* Limitations that you hope to overcome
* …

In both (a) and (b), use illustrative graphics, links to videos etc. to articulate the existing technology demos.

EVIDENCE THAT THE DESIGN PROBLEM CAN BE ADDRESSED BY THE TEAM

Comment on the feasibility of the design project in the context of this course. Particularly:

* What are the major challenges surrounding this project? Comment on technical complexity of the intended design relative to team expertise and course resources, fabrication challenges, testing challenges, portability challenges.
* Does the team have the expertise and skill set to address the technical challenges of the proposed project?