

CSCE 496/896: Robotics: UAS, Fall 2020 Project

Deadline Overview:

Week 8: Started: Monday, Oct 5

Week 9: Meet with Instructor: Week of Oct 12th

Week 9: Proposal: Friday, Oct 16th

Week 10: Dedicated Work Week

Week 11: Project Status Report: Friday, Oct 30th

Week 11: Project Status Presentation Video: Friday, Oct 30th

Week 12: Review of Assigned Reports and all Videos (individual): Tuesday, Nov 3rd

Week 12: Meet with Instructor: Week of Nov 2nd

Week 13: Dedicated Work Week

Week 14: Project Collaboration Completed: Monday, Nov 16th

Week 14: Project Presentation: Wednesday, Nov 18th

Week 14: Final Report Due: Wednesday, Nov 18th

Week 14: Review of Assigned Reports and all Presentations (individual): Friday, Nov 20th

Pay attention to weekly Canvas announcements for when we will be holding class and lab. Most weeks we will continue to have Monday classes, but some of the Wednesday Lab times will be open to allow more work time on the project.

1 Overview

The goal of the project will be to take steps towards the creation of an autonomous drone “Quidditch” league. Each group can decide if they would like to act as a chaser, beater, keeper, or seeker. Each group is required to do a significant portion of the project in simulation. If your group would like to develop a physical system (e.g. grippers/etc), you can propose that as well, but you must have a plan in place in case the University goes remote or if members of your team get Covid. You will need to “compete” in simulation against at least one other team. Your specific approach to this project is up to your team, but you will work with the instructor throughout the project period to properly scope and refine your project.

Specific **requirements** for each project are:

- Operate in the simulated environment.
- Use computer vision to identify and track objects (balls, other drones, etc).
- Run fully autonomous (e.g. no input allowed once the game starts).
- Collaborate with other teams to “compete” against each other. Your teams must define the ground rules. Instead of competing you can also choose to collaborate (e.g. two chasers passing the ball together).
- You must demonstrate the core skills of the role you select. This may involve setting up other components. For instance, if you are a beater, you might show hitting a ball coming towards you. Or if you are a keeper, then you would need to show intercepting a ball coming towards you.

Optionally, you can:

- Demonstrate operation on an actual drone. This will likely require integration of onboard computation.
- Develop and build an electro-mechanical system that can be integrated in with the drone.
- Create a Quidditch environment in Gazebo.
- Lots of other things that you could propose and discuss with the instructor.

2 Meet with Instructor

Your team should bring an outline of your proposed approach, a breakout of who will work on what, and a timeline. Book a 30 minute time to meet with me on Monday, Tuesday, or Wednesday to discuss this at carrick.youcanbook.me.

3 Proposal 5% of course grade

The proposal should be 3-4 pages and should describe your proposed project. It should consist of:

- Overview (include which role on the Quidditch team you will play).
- Algorithmic approach.
- Hardware needed, if any.
- Plan for team coordination and how to collaborate on or divide tasks.
- Timeline to meet all the deadlines and objectives.
- Covid plan in case we go fully remote or your team ends up with covid.

In addition to technical approach and correctness, it will be graded on grammar, writing style, and clarity. So make sure to edit it carefully and use supporting figures and tables where appropriate.

4 Project Collaboration

You must collaborate or compete with at least one other team in a simulated Quidditch match. You can either be on the same team or you can be opponents. Regardless, you must demonstrate some interactions between each other. In the project status report you must say which group(s) you will work with. This will be part of your project presentation and report.

5 Project Status Report 5% of course grade

The project status report should be 4-5 pages. It should consist of:

- Identify which other team(s) you will be collaborating with for the collaborative part of the project.
- Overview of your progress to date.
- Analysis of the sub-tasks you have made progress on or completed, including a presentation of results to date.
- A reflection on the proposed timeline, where you are on it, and any revisions you need to make.
- A discussion of any other changes you need to make.
- A discussion of how your team has collaborated and/or split up tasks.

In addition to technical approach and correctness, it will be graded on grammar, writing style, and clarity. So make sure to edit it carefully and use supporting figures and tables where appropriate.

6 Project Status Presentation Video

5% of course grade

The video should be 120-180 seconds (points will be deducted if it is outside this range) and it should summarize your approach and results to date.

7 Review of Assigned Reports and all Videos (individual)

5% of course grade

You will be assigned another project group and you will need to provide feedback on their *status update* video and report. These can either be in the form of a 2-3 page paper or a 3-5 minute video. You should comment on the approach, results, and content.

This will be given to the group you are reviewing and it will also be graded. A video that wanders and is not clear will not get a good grade. The paper feedback can be anonymous if you would prefer.

8 Meet with Instructor

Book a 30 minute time to meet with me to discuss your status and any challenges you are facing at carrick.youcanbook.me.

9 Project Presentation

5% of course grade

The video should be 200-300 seconds (points will be deducted if it is outside this range) and it should summarize your approach and results.

10 Final Report Due

10% of course grade

The report should be 4-6 pages. It should consist of:

- Overview of your approach.
- A characterization and analysis of the major parts of your approach.
- A characterization and analysis of the overall performance.
- A discussion of what went well and what did not go well.
- A discussion of how your team has collaborated and/or split up tasks.
- A conclusion.

In addition to technical approach and correctness, it will be graded on grammar, writing style, and clarity. So make sure to edit it carefully and use supporting figures and tables where appropriate.

11 Review of Assigned Reports and all Presentations (individual)

5% of course grade

You will be assigned another project group and you will need to provide feedback on their *final* video and report. These can either be in the form of a 2-3 page paper or a 3-5 minute video. You should comment on the approach, results, and content.

This will be given to the group you are reviewing and it will also be graded. A video that wanders and is not clear will not get a good grade. The paper feedback can be anonymous if you would prefer.