CS 8803: AI for Robotics
Syllabus for Spring 2016

Instructors: Sebastian Thrun, Chris Pryby
TAs: Jon Keller, Aaron Yip

Logistics

All class communication will take place on Piazza. You can find our class forum page at
https://piazza.com/class/ij3fwtx7f9j1vu.

Grades for the Problem Sets and Projects will be posted to the Gradebook on the course T-Square page.

All course lectures will be made available through Udacity. You must login to Udacity using Georgia Tech credentials in order to view the lectures and submit quizzes (choose "Sign In with Georgia Tech" from the Udacity sign-in page).

Problem Sets and Runaway Robot project are available through Udacity. These need to be submitted through Udacity and *not* on T-Square.

Grading

The assessments given in this class will consist of:

- 6 Problem Sets: (*24 points, 4 points each*). Problem Sets are graded for completion: you will receive full credit if you complete them on-time and zero credit if you do not. Please confirm that all the white dots in the appropriate Problem Set are filled in by the deadline. ***Partial credit will not be given for Problem Sets.***

- Runaway Robot Project, Parts 1-4: (*36 points*) Each part is graded for completion. Parts 1 and 3 are worth 6 points each. Parts 2 and 4 are worth 12 points each. Completing Part 5 is worth up to 9 points extra credit.

- Final Project (*40 points*) The final project will involve predicting the motion of a small robot based on data obtained from video footage of the robot's motion. More details will be given later in the semester.

  - You should form your project group (up to four people per group) by Monday, March 7.
  - If you have a proposal for a different project you would like to complete, please send it to the TAs by Monday, March 7. The proposal should be detailed and contain a schedule for completing deliverables to be graded by the instructor and TAs. More details on this will be made available separately.

- Extra credit can be earned by:

    - Exceptional performance and helpfulness on Piazza
    - Participating in the optional Hardware Challenges. (More information will be posted separately on Piazza.)

    While extra credit will not be directly added to your overall score, it will be taken into consideration at the end of the semester if you are near the border for a grade.

The thresholds for course grades will be:

- A: 90 and above
- B: 78-89
- C: 60-77
- D: 40-59
- F: 39 and below

Assignment Submission and Late Policy

With the exception of the Final Project, all assignments will be submitted through the Udacity site. You may submit your solutions as many times as you wish prior to the due date/time. A quiz will be counted correct if you submit a correct response (as judged by the autograding script) before the deadline. If you wish to change your response after the fact, that is fine: you only need a single "Correct!" from the autograder per quiz. (The dot in the progress bar corresponding to the quiz should fill in when you answer it correctly.)

Only quizzes in the Problem Sets and Runaway Robot Project will count for a grade. Quizzes in the Lessons may be skipped (though you are certainly encouraged to attempt them all!).

Except in extraordinary circumstances, no late submissions will count for credit. Please see the course schedule (below) for the due dates and mark them on your calendars.

Note: Even if you have already completed the Problem Sets using a personal Udacity account, you will have to (re)submit the Problem Sets using your Georgia Tech account.

Course Schedule

Assignments will be due at midnight AOE on Sunday nights (Eastern Time equivalents given below). Please note that Daylight Savings Time starts on March 13. **No late work will be accepted** except in extraordinary circumstances, so please plan ahead in order to submit the assignments on time.

- Monday, January 25, at 7:00 a.m. ET - Problem Set 1 due
- Monday, February 1, at 7:00 a.m. ET - Problem Set 2 due
- Monday, February 8, at 7:00 a.m. ET - Problem Set 3 due
- Monday, February 22, at 7:00 a.m. ET - Problem Set 4 due
- Monday, March 7, at 7:00 a.m. ET - Problem Set 5 due

- Monday, March 7, at 7:00 a.m. ET - Final Project group formation / Alternate Final Project proposal deadline
- Monday, March 21, at 8:00 a.m. ET - Problem Set 6 due
- Monday, April 11, at 8:00 a.m. ET - Runaway Robot Project due
- Monday, May 2, at 8:00 a.m. ET - Final Project due

You can find the calendar online here:

HTML version

You can also import it into any calendar product that supports the iCal format, such as Google or Apple calendars, using the following URL:

ICAL version

We recommend you make use of the above iCal link as it will contain the most up-to-date version of the schedule including Office Hour times and other deadlines, such as those for Peer Feedback and Hardware Challenge activities.

Optional Textbook

Probabilistic Robotics. Sebastian Thrun, Wolfram Burgard, and Dieter Fox. MIT Press. 2005.

You can purchase the hardcover version at Amazon.com for $56. The book is not required reading, but it provides a lot of the math and the derivation that is omitted in the online course. It will enhance your learning experience (especially if you skip the chapters on POMDPs and the more esoteric SLAM algorithms).

The course is fine without it, and there is plenty of material on the Web that fills in the gaps in terms of math. I'll point some of them out as we go.

Background Material on Statistics

We teach a free introductory course on Udacity called Statistics 101. This covers some of the earlier material in the course. For example, Lessons 8-9 cover probability and Lessons 10-11 cover Bayes' Rule.

Note that in order to view Statistics 101, you need to sign in with a separate (free) Udacity account: you can't access it from your GT OMS log-in. (For security reasons, we have to keep the GT course experience completely separate from the rest of the Udacity site.)

If you prefer written material, Think Bayes is available online. It has some great examples and seems very approachable.

Office Hours

We will hold office hours sessions through Google Hangouts on Air. You will be notified of the office hours schedule through Piazza. Office hours will be streamed live and automatically uploaded afterward to YouTube for anyone to access.

If you are unable to participate in the Hangout, you may submit your questions in advance by posting them to the Hangout using the Q&A app before the Hangout begins. We will then answer them during the Hangout, and you can view the answers at your leisure afterward.

Privacy notice: Students' voices and images will not appear in the office hours - only the instructor and TAs will be on camera. However, the names of students who choose to ask questions will appear in the Hangout. If this is unappealing to you, please feel free to ask your question from an account that uses an alias.

Academic Honesty

All Georgia Tech students are expected to uphold the Georgia Tech Academic Honor Code. In particular, in this class you should not publicly share any graded project code --- that is, code to be submitted for Runaway Robot or Final Projects --- with other students or online code sharing sites such as Github. Of course, if you are working on the final project as part of a group, you may use a private GitHub repository to facilitate this. Questions about project code should be addressed directly to the instructors by a private message on Piazza.

Questions about code for ungraded quizzes (i.e., the programming quizzes in the Lessons) may be discussed on Piazza any time, but please put the word [Spoiler] in the title of the post to alert other students who may not wish to see the answer. Problem Set code may only be discussed after the submission deadline for that Problem Set has passed.

Minimum Technical Requirements

Browser: An up-to-date version of Chrome, Firefox or Safari is strongly recommended. We also support Internet Explorer 9 and above.

Internet Connectivity: Download: 2+ Mbps recommended; minimum 1 Mbps. Upload: 0.5 Mbps.

Operating System:
- PC: Windows XP or higher with latest updates installed (note: Internet Explorer 8 is not supported).
- Mac: OS X 10.6 or higher with latest updates installed.
- Linux: Any recent distribution that has the supported browsers installed.

YouTube: The ability to watch YouTube videos is required. If YouTube is blocked on your network, please contact your IT support or internet provider. If you do not use the HTML5 player, or are using Internet Explorer, you will need Adobe Flash Player v11 or above. You can find YouTube's system requirements here.

Georgia Tech's Office of Student Computer Ownership issues the following Minimum Hardware Requirements to incoming undergraduates. We recommend that you meet or exceed these guidelines to ensure you have sufficient computing power to complete all coursework and assignments.