

CSE 591 (Fall 2016): Human-aware Robotics

T Th 9:00AM – 10.15AM (CAVC359)

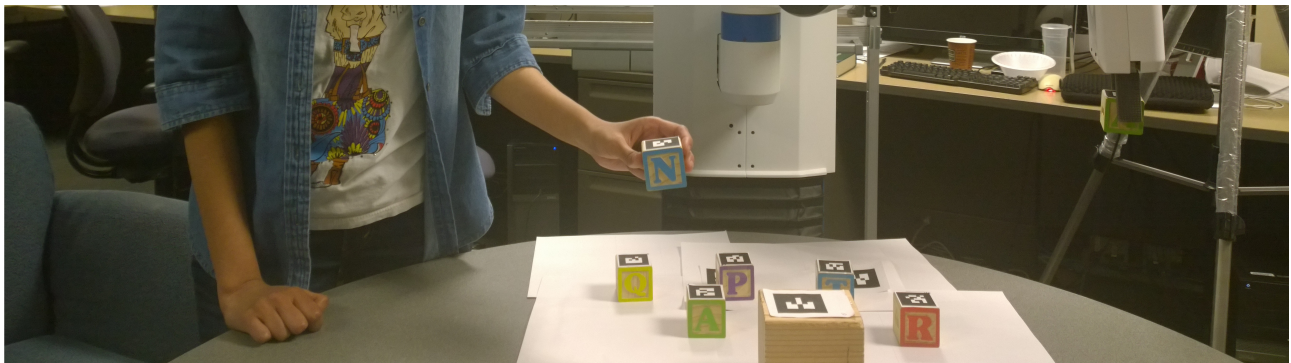
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Course website:

<http://www.public.asu.edu/~yzhan442/teaching/CSE591-HAR>



Course Description:

Despite the tremendous progress in the field of robotics made during the last decade, we are still experiencing robots' curious ambivalence to humans. At the same time, an increasing number of applications demand that humans and robots work together. Although a few of these applications can be handled through 'tele-operation', technologies that act in concert with the humans in a teaming relationship with increasing levels of autonomy are desirable. For such robots to be useful, it is important for them to be human-aware and behave in a nonintrusive fashion. In this class, we will cover several broad areas in human-aware robotics and discuss the state-of-the-art approaches in each of these areas. This is a graduate level seminar course in which we will introduce the development of recent approaches in AI and Robotics and their applications to human-aware robotics.

Broad Areas Covered:

1. Perception of humans
Potential topics: human tracking, human face recognition, and activity recognition
2. Human-robot interface
Potential topics: command recognition and gesture recognition
3. Modeling of humans
Potential topics: goal and intent recognition, human decision and behavioral models, model learning
4. Human-aware planning

Potential topics: human-aware planning, Markov decision process and reinforcement learning, and inverse reinforcement learning.

Course Structure:

The seminar consists of three activities: lectures (instructor), projects (students), paper presentations (students). After covering each topic, students will present relevant recent papers on the state-of-the-art approaches. There will be a mid-term project after covering the first two topics, and a final project. Each project will have a project report, a demonstration and a presentation. Both projects are group projects.

Prerequisites:

Familiarity with basic concepts of computer science (e.g., data structure and algorithms), and probability theory. The ability to program using C++ or Python in Linux is necessary. Knowledge of AI, machine learning, and robotics is a plus.

Required Textbook:

None. The course is project-based and research-oriented. We will be generally focusing on the cutting-edge concepts and techniques from recent research papers.

Schedule and Project Assignments:

Refer to the course website.

Evaluation:

Grading will be based on the following:

1. Mid-term project 35%
 - a. Project report 50%
 - b. Presentation 25%
 - c. Demo 25%
2. Final project 50%
 - a. Project report 50%
 - b. Presentation 25%
 - c. Demo 25%
3. Paper presentation 15%

Final grades* will be determined as follows:

A+: 95-100

A: 90 -94.9

B+: 85 - 89.9

B: 80-84.9

C+: 75 - 79.9

C: 70 - 74.9

D: 60-69.9

F: 0 - 59.9

*Class attendance will be taken. Decisions on borderline grades **will be influenced** by class attendance and participation.

Due dates and Late Assignments:

All assignments are due at the date and time stated. Any assignments turned in more than fifteen (15) minutes past the due date/time will receive a grade of zero.

Collaboration policy:

Discussing and exchanging ideas within group members are encouraged. However, except if specifically allowed by the instructor, copying or rephrasing from any outside sources (e.g., fellow students, Internet, etc.) on any material to be graded is not permitted, and will be considered plagiarism. Any kind of plagiarism or cheating attempt will be severely dealt with, **which would normally lead to an F in the class**. When using third party software, please make it clear how it is used in your project and how much it contributes overall to the project. More details on the Academic Integrity Policy can be found under the following link: <https://provost.asu.edu/academic-integrity/policy>.

Disclaimer:

Some of the information above is tentative and subject to change.