CS7633 Human-Robot Interaction   Fall 2016

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Course Description:

This course focuses on human-robot interaction and social robot learning, exploring the leading research, design principles and technical challenges we face in developing robots capable of operating in real-world human environments. The course will cover a range of multidisciplinary topics, including physical embodiment, mixed-initiative interaction, multi-modal interfaces, human-robot teamwork, learning algorithms, statistical methods for HRI research, aspects of social cognition, as well as ethical and societal considerations. These topics will be pursued through independent reading, class discussion, case studies and a final project.

Learning Outcomes:

To understand the challenges that embodied computing and robotics pose, and identify the advantages and disadvantages of different design, development and algorithmic techniques to address those issues.

Textbook:

There is no established textbook for the field of Human-Robot Interaction, selected conference and journal articles will be assigned as reading throughout the course.

Lectures:

Students are expected to attend all classes; unexcused absences will affect your final grade. A significant aspect of class will be group discussion and participation, thus it is essential that you carefully review the required reading before each class and be prepared to share your perspective.

Assignments and Grading:

The course grade breakdown is as follows: 15% per written case study (3 total), 20% participation, 35% final project. The participation grade will be determined based on active participation in class discussions and presentation of reading summaries, when assigned. Projects will be determined on an individual basis in October and will include a written report, in-class presentation and demo.

Prerequisites:

This is a graduate course meant for students interested in HRI research. It will be assumed that students have some background in AI, Robotics, or HCI and an interest in all three. This is a foundation class for the Robotics PhD, and an approved elective for the HCC and CS PhD programs.

Tentative Schedule and Assigned Readings:

Date	Topics
Tue, Aug 23, 2016	Overview
Thu, Aug 25, 2016	Case Studies of Autonomous Interactive Robots [PDF] HERB: a home exploring robotic butler [PDF] The Autonomous City Explorer (ACE) Project [PDF] Classifying human-robot interaction: an updated taxonomy
Tue, Aug 30, 2016	Telepresence [PDF] Exploring Use Cases for Telepresence Robots [PDF] Bodies in Motion: Mobility, Presence, and Task Awareness in Telepresence
Thu, Sept 1, 2016	Extreme environments [PDF] Analysis of Human-Robot Interaction at the DRC Trials
Tue, Sept 6, 2016	Assistive Technologies [PDF] Robots for Humanity [PDF] Enabling Building Service Robots to Guide Blind People
Thu, Sept 8, 2016	Metrics and Evaluation Methods [PDF] Robot Learning from Human Teachers (Chapter 7) [PDF] The R Book (Chapters 9-11)
Tue, Sept 13, 2016	Metrics and Evaluation Methods [PDF] Common Metrics for Human-Robot Interaction [PDF] The Oz of Wizard Optional Resource: [PDF] Running Behavioral Studies with Human Participants: a practical guide
Thu, Sept 15, 2016	Anthropomorphism
Tue, Sept 20, 2016	Modeling Engagement
Thu, Sept 22, 2016	Speech and Conversation
Tue, Sept 27, 2016	Emotion Recognition and Generation
Thu, Sept 29, 2016	Autism and Robots
Tue, Oct 4, 2016	Collaborative Task Execution

Date	Topics
Thu, Oct 6, 2016	**Written Case Study #1**
Tue, Oct 11, 2016	Human-Robot Teaming
Thu, Oct 13, 2016	Multi-Robot Systems
Tue, Oct 18, 2016	Learning from Demonstration
Thu, Oct 20, 2016	**Project Proposals**
Tue, Oct 25, 2016	Behavior Architectures
Thu, Oct 27, 2016	Errors & Trust
Tue, Nov 1, 2016	**Written Case Study #2**
Thu, Nov 3, 2016	Deceit
Tue, Nov 8, 2016	Ethical Considerations
Thu, Nov 10, 2016	Impact of Robotics on Society
Tue, Nov 15, 2016	**Project Checkpoint**
Thu, Nov 17, 2016	**Written Case Study #3**
Tue, Nov 22, 2016	TBD
Thu, Nov 24, 2016	Thanksgiving
Tue, Nov 29, 2016	TBD
Thu, Dec 1, 2016	**Final Project Presentations**
Tue, Dec 6, 2016	**Final Project Presentations**