

ROBOTIC COMPUTING

COURSE DESCRIPTION:

Robotic Computing addresses computing technologies, and their synergetic interactions, that enable and are enabled by human like robots. The scope of this course includes, but is not limited to, perception, semantic content understanding and delivery, reasoning, planning, problem solving, learning, human-robot interaction and domain specific applications in home, healthcare, business, entertainment, business, education, industry, etc. The recent success of AlphaGo and advances in artificial intelligence, cloud computing, mobile computing, cognitive computing, semantic computing and other related areas have demonstrated that the era of robots is emerging. The course will give an introduction to the relevant technologies so that students have required concepts to study further. Practical demonstrations and applications will trigger students' learning motivation.

PRE-REQUISITE:

Calculus, Linear algebra, probability and statistics

REQUIRED TEXTBOOK:

Lecture notes

REQUIRED EQUIPMENT:

No

TOPICS AND SCHEDULES:

Week	Course content	Type
1	Introduction	Lecture
2	Knowledge representation and reasoning	Lecture
3	Planning and Problem Solving (including path planning and task planning)	Lecture
4	Natural language understanding (SQL, NLP, LSA)	Lecture
5	Semantic Computing	Lecture
6	Biomedical Informatics	Lecture
7	Business Intelligence – OLAP, Data Mining	Lecture
8	IoT, Big Data and Decision Making (Hadoop, NoSQL)	Lecture
9	Midterm Exam Week	Paper Presentation
10	Learning	Lecture
11	Robot vision	Lecture
12	Robot vision	Lecture
13	Speech Features	Lecture
14	Speech Recognition	Lecture
15	Gesture Recognition	Lecture
16	Expression Recognition	Lecture
17	Affective Computing	Lecture
18	Final Exam Week	Paper Presentation

WORKLOAD:

There will be two paper presentations. Prior to each presentation, students should select at least two SCI journal papers related to the course topics and turn in to the instructor for final selection. Methodology is the most important part of your presentation.

GRADING:

Mid-term Presentation	35%
Final Presentation	35%
Class Participation	30%