2020 年寒假 SAF-华盛顿大学人工智能项目课程详情

Introduction to Artificial Intelligence

Learning Outcomes

- SAF Scholars will be able to represent knowledge of the world using logic and infer new facts from that knowledge;
- SAF Scholars will be able to use a Bayesian network to make quantitative (probabilistic) and qualitative inferences;
- SAF Scholars will implement a Bayesian network that solves a simple version of a problem such as text categorization or object recognition;
- SAF Scholars will develop strategies for agents in games of perfect and imperfect information.

Course Description

Artificial intelligence is a broad field encompassing computational models of human cognition, formal systems for representing and processing symbolic information, expert systems technology, and a variety of techniques for learning, understanding signals, and solving problems. This course provides a basic introduction to key techniques: state-space search, game-playing, probabilistic reasoning, and learning. Over the last 50 years the field has grown tremendously, and this course can only scratch the surface within the field.

This course begins with a discussion of what "artificial intelligence" means and how it can be useful. Next is a grounding in state-space search, problem formulation and solving. We then consider state-space search in the context of game playing, which then leads to alpha-beta pruning, expectimax search and the modeling of uncertainty. After that, we focus primarily on machine learning, starting with methods for reasoning under uncertainty. We cover learning of decision trees from examples, reinforcement learning in Markov Decision Processes, perceptron learning, and deep learning. We touch briefly on the future of AI.

- **Module 1:** Foundations of Problem Solving
- **Module 2:** Knowledge Representation
- **Module 3:** Reasoning, Learning and Acting
- **Module 4:** Course Competition.

At the end of course, students will participate in a competition designed and led by the instructor to demonstrate their ability to synthesize the course content