MET CS664 A1 (Spring 2024) - Artificial Intelligence

Instructor

Suresh Kalathur, Ph.D.
Assistant Professor, Computer Science Dept.
Boston Univeristy Metropolitan College
1010 Commonwealth Ave, Room 304
Boston, MA 02215

Email: kalathur@bu.edu
URL: http://kalathur.com/bu
Phone: 617-358-0006
Fax: 617-353-2367

Course Description

Study of the ideas and techniques that enable computers to behave intelligently. Search, constraint propagations, and reasoning. Knowledge representation, natural language, learning, question answering, inference, visual perception, and/or problem solving. Laboratory course.

Course Prerequisites

Python programming experience equivalent to MET CS 521. Or instructor's consent.

Course Grading Policy

The course grade will be based on class participation (10%), assignments (20%), mid term exam (30%), technical paper or tool review and presentation (10%), and term project (30%).

Course Web Site

- **https://learn.bu.edu**

References

Reference Books

- *Artificial Intelligence: A Modern Approach, 4th ed.*, by Stuart Russell and Peter Norvig, Pearson, 2021. ISBN: 9780134610993.**(Reference book)**
  https://aima.cs.berkeley.edu
- "*Artificial Intelligence, 3rd ed.*", by David L. Poole and Alan K. Mackworth, Cambridge University Press, 2023. ISBN: 9781009258197.**(Reference book)**
  https://artint.info/3e/html/ArtInt3e.html

Student Conduct Code

Please review the academic conduct code

Tentative Course Schedule

- **Module 1 -- Introduction (1/24)**
  - Introduction to AI
  - Relevant Python Programming Review
- **Module 2 -- Search (1/31, 2/7)**
  - Uninformed Search: DFS, BFS, Uniform-Cost
  - Informed Search: Heuristics, Greedy techniques, A* Search
  - Games as Search
  - Adversial Search: Minimax rule, Alpha Beta Pruning
- **Module 3 -- Constraint Satisfaction Problems (2/14, 2/28)**
  - Examples (Sudoku, N-Queens, Golomb Rulers, Map Coloring, etc.)
  - Local Consistency, Arc Consistency
  - Backtracking Search, Forward Checking, Local Search
- **Module 4 -- Logical Agents, Knowledge Representation & Planning (3/6, 3/27)**
  - Propositional Logic, First-Order Logic
  - Inference, Forward Chaining, Backward Chaining
  - Classical Planning, Hierarchical Planning
- **Module 5 -- Uncertainty (4/3, 4/10)**
  - Reasoning (Belief networks, Markov models)
  - Learning (Bayesian)
  - Planning with Uncertainty
- **Module 6 -- Deep Learning & Reinforcement Learning (4/17, 4/24)**
  - Neural networks (Feedforward, Convolutional, Recurrent)
  - Unsupervised (Generative Adversarial Networks, Autoencoders)
  - Reinforcement Learning
  - NLP Applications
- **Module 7 -- Generative AI (5/1)**
  - Topics in Generative AI
  - Attention, Transformers
  - GPTs & LLMs
- **Mid Term Exam (March 20th)**
- **Project Submission (May 8th)**