SJSU SAN JOSÉ STATE UNIVERSITY

College of Science · Computer Science

Introduction to Artificial Intelligence Section 04

CS 156

Fall 2024 3 Unit(s) 08/21/2024 to 12/09/2024 Modified 08/20/2024

Contact Information

Instructor: Dr. Amith Kamath Belman

Email: amith.kamathbelman@sjsu.edu
Office: DH 251

Office Hours

Monday, 9:00 AM to 11:00 AM, online via Zoom

(Requires zoom SJSU Login)

https://sjsu.zoom.us/j/85711967061?pwd=gvVgXsPej2YG8739kJe3oBCIDW2490.1
Password: 266658

Course Information

Lecture

Tuesday, Thursday, 9:00 AM to 10:15 AM, MH 222

Course Description and Requisites

Basic concepts and techniques of artificial intelligence: problem solving, search, deduction, intelligent agents, knowledge representation. Topics chosen from logic programming, game playing, planning, machine learning, natural language, neural nets, robotics.

Prerequisite(s):ï¿½CS 146ï¿½ï¿½(with a grade of "C-" or better); Allowed Majors: Computer Science, Data Science, Applied and Computational Mathematics or Software Engineering; or instructor consent.

Letter Graded

Classroom Protocols

Regular attendance is an integral part of the learning process. Please arrive to class on time and make sure your cell phones are silent during the lecture.

Class time will be spent in interactive lecture. You are required to bring your wireless laptop to class. Your laptop must remain closed except for designated activities.

We'll use iClicker to gather your feedback and check understanding during the lecture. iClicker helps me understand what you know, gives everyone a chance to participate, and allows you to review the material after class. You must be in the classroom to participate in the iClicker activity.

Recording and Privacy

Recording any class activities, including lectures, is only allowed with the instructor's permission. You are not permitted to share or distribute class recordings. Instructor-generated materials (like syllabi, lectures, and presentations) are protected by copyright. Violation may result in referral to Student Conduct and Ethical Development office.

Program Information

Diversity Statement - At SJSU, it is important to create a safe learning environment where we can explore, learn, and grow together. We strive to build a diverse, equitable, inclusive culture that values, encourages, and supports students from all backgrounds and experiences.

Course Goals

To give students a broad understanding of the basic principles and techniques in use today for building "intelligent" software systems. Understand fundamentals of AI and machine learning. Concentration will be on how-to, rather than mathematical proof. This class has a balance between the theory and practical demonstrations of how to solve AI tasks in python and AI applications in various fields.

Course Learning Outcomes (CLOs)

Upon successful completion of this course, students will be able to:

1. By code or by hand find solution nodes in a state space using the A* algorithm.
2. Explain the advantages and disadvantages of breadth-first search compared to depth-first search.
3. Explain the advantages and disadvantages of informed search, compared to uninformed search.
4. Explain the advantages and disadvantages of hill climbing.
5. Explain the advantages and disadvantages of forward checking in constraint satisfaction.
6. Explain the advantages and disadvantages of alpha-beta pruning.

7. By code or by hand translate sentences in first-order logic to conjunctive normal form (CNF).
8. By code or by hand find proofs by using resolution.
9. Explain the advantages and disadvantages of the PDDL/STRIPS representation for planning.
10. Describe the frame problem.
11. Describe and implement at least one learning algorithm.

Course Materials

Artificial Intelligence: A Modern Approach

Author: Stuart Russell and Peter Norvig
Publisher: Pearson
Edition: 4th
ISBN: 978-0134610993
Optional

Software

Python 3

PyCharm Professional or Community Edition - recommended IDE

Course Requirements and Assignments

Homework

Homework assignments will be posted and submitted on Canvas. For full credit, they must be submitted by the posted due date and time. A detailed grading rubric is provided for all programming assignments. Please make sure you read and follow the grading rubric to ensure full credit.

Some assignments will be individual work. Others will be team assignments. I will make it clear whether the assignment is an individual assignment or a team assignment. All work submitted on individual assignments must be your own. You may not share or copy code or answers from fellow students or from the web. Infractions will be detected and will lead to an automatic 0. If someone else copies your work, with or without your permission, you will be held responsible.

For team assignments, teams will consist of two students. The work must be done by both team members and both team members will receive the same grade. Teams may not share or copy code from other teams or from the web. Both team members will receive a zero if that happens regardless of who copied or shared the work. Both team members will also be reported to the Student Conduct and Ethical Development office.

Questions of the Week

We will have a single question every week to check your understanding of the previous week's material. I will count the 10 best scores out of the 13 total questions in the semester. You must be in the classroom and must use the LockDown browser to access and answer the question on Canvas.

Missed questions cannot be made up.

Class Participation

You are expected to attend all class meetings as you are responsible for all the material discussed. Since active participation is essential to ensure maximum benefit, we'll use iClicker to give everyone a chance to participate. The iClicker participation points may be used to give your final grade in the course a slight boost.

Midterm Exam

The midterm exam will take place in the classroom during class time on October 10.

Final Exam

The final exam is scheduled according to the SJSU Final Exam Schedule, on Monday, December 16th, 7:15 AM - 9:30 AM

✔ Grading Information

The final grade in the course will be calculated based on the homework assignments, questions of the week, midterm and final exam.

The iClicker points may be used to give your final grade a slight boost. Students with the highest iClicker scores will get up to 1 bonus point. Students who violate the academic integrity policy are not eligible.

No extra credit options will be given

Late Work

No submissions will be accepted more than 2 days late.

Late assignments will be evaluated with a 1-point penalty for each day or partial day late. Late days include weekend days. For example, an assignment due on Tuesday by 5 PM will incur a penalty of 1 point if submitted at 8 AM on Wednesday.

Everyone gets two free 'late days' for the semester.

Academic Dishonesty

Students who are suspected of cheating will be referred to the Student Conduct and Ethical Development office and depending on the severity of the conduct, will receive a zero on the assignment or a grade of F in the course. Grade Forgiveness does not apply to courses for which the original grade was the result of a finding of academic dishonesty.

Criteria

Type	Weight	Topic	Notes
Homework Assignments	30%		
Questions of the week	10%		
Midterm Exam	30%		
Final Exam	30%		

Breakdown

Grade	Range	Notes
A +	98 to 100%	
A	93 to 97.99%	
A -	90 to 92.99%	
B +	87 to 89.99%	
B	83 to 86.99%	
B -	80 to 82.99%	
C +	77 to 79.99%	
C	73 to 76.99%	
C -	70 to 72.99%	
D	60 to 69.99%	
F	below 60%	

University Policies

Per University Policy S16-9 (PDF) (http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on the Syllabus Information (https://www.sjsu.edu/curriculum/courses/syllabus-info.php) web page. Make sure to visit this page to review and be aware of these university policies and resources.

Course Schedule

Tentative Course Schedule

When	Topic	Notes
Week 1, Aug 22	Course Logistics	Form a team buy Aug 27th Pre-course survey and Take-home syllabus quiz.
Week 2, Aug 27, 29	What is AI?, Intelligent Agents	Readings AIMA: Chapter 1, 2 HW 1 due Sept 2
Week 3, Sept 3, 5	Python Essentials, Problem Solving and Search	Q1 on Sep 5 Readings AIMA: Sections 3.1-3.3 Homework 2 due Sep 11
Week 4, Sept 10, 12	Uninformed Search, Informed Search (greedy, A*)	Q2 on Sep 12 Readings AIMA: Sections 3.4-3.5 Homework 3 due Sep 19
Week 5, Sept 17, 19	Heuristics, Local Search	Q3 on Sep 19 Readings AIMA: Sections 3.6, 4.1 Homework 4 due on Sep 26
Week 6, Sept 24, 26	Constraint Satisfaction Problems	Q4 on Sep 26 Readings AIMA: Chapter 6 Homework 5 due on Oct 3

When	Topic	Notes
Week 7, Oct 1, 3	Adversarial Search	Q5 on Oct 3 Readings AIMA: Chapter 5 Homework 6 due on Oct 10
Week 8, Oct 8, 10	Review, Midterm	Q6 on Oct 8 Midterm on Oct 10
Week 9, Oct 15, 17	Logical Agents	Homework 7 due Oct 31 Readings AIMA: Chapter 7, 8, Section 9.5
Week 10, Oct 22, 24	Automated Planning	Q7 on Oct 24 Readings AIMA: Chapter 11
Week 11, Oct 29, 31	Uncertainty, Bayes Nets	Q8 on Oct 31 Readings AIMA: Chapter 12, Sections 13.1-13.3, 14.1-14.3 Homework 8 due Nov 7
Week 12, Nov 5, 7	Machine Learning, Naive Bayes	Q9 on Nov 7 Readings AIMA: Sections 19.1-19.2, 20.1-20.2
Week 13, Nov 12, 14	Perceptron, Neural Nets, Nearest Neighbor	Q10 on Nov 14 Readings AIMA: Sections 21.1-21.2, 19.7 Homework 9 due Nov 30
Week 14, Nov 19, 21	Unsupervised Learning, Reinforcement Learning	Q11 on Nov 21
Week 15, Nov 26	Applications	Q12 on Nov 26 Readings AIMA: Chapter 27
Week 16, Dec 3, 5	The Ethics of AI, Final Review	Q13 on Dec 5 Readings AIMA: Chapter 27
Final Exam	Dec 16th, 7:15 AM - 9:30 AM	