UNT: CSE: Spring/2023

CSCE 3201 – Applied Artificial Intelligence

Class:

3201-001 (**12813**)
Online Class

Instructor:
Dr. Moawia Eldow
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Office hours: MoWe 1–2pm, 4-5pm

IAs/Graders:
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Course Description, Structure, and Objectives

Course Description

Core concepts and terminology in artificial intelligence will be introduced to understand the taxonomy of AI applications - the relationships between the tools and frameworks available for intelligent, data-driven decision making. This will include a demo-driven introduction to machine learning, with general principles of powerful predictive models discussed and the role of unsupervised and semi-supervised learning techniques in powering many state-of-the-art decision systems. This course is for non-CSE majors.

Course Prerequisites

- MATH 1650: Pre-Calculus, or permission of instructor.
- Experience with Python is helpful as it is used extensively in the course, but significant prior programming experience with any language will be sufficient

Course Objectives (Learning Outcomes)

By the end of the course, students will be able to:

1. Identify what artificial intelligence and machine learning are
2. Determine the most common artificial intelligence use cases and applications
3. Understand how to use Python programming for artificial intelligence applications
4. Identify how to build a machine learning pipeline
5. Identify the differences between supervised and unsupervised learning
6. Describe the most recent advances and tools offered for AI development in the cloud
7. Understand the ethical issues and impacts of artificial intelligence

Course Modules

1. Introduction to Artificial Intelligence
2. Fundamental Use Cases for Artificial Intelligence
3. Introduction of Python programming for Artificial Intelligence
4. Machine Learning Pipelines
5. Classification and Regression Using Supervised Learning
6. Detecting Patterns with Unsupervised Learning
7. Artificial Intelligence on the Cloud
8. Artificial Intelligence and Society: Social Issues & Impacts

Required/Recommended Materials

Textbook and other resources:

Artificial Intelligence with Python: Your complete guide to building intelligent apps using Python 3. Second Edition, by Alberto Artasanchez, Prateek Joshi, Packt Publishing, 2020, ISBN: 9781839219535 (https://www.packtpub.com/product/artificial-intelligence-with-python-second-edition/9781839219535)

Students also are encouraged to consult the following online sources which will be referenced throughout the course.

- The Python 3 tutorial documentation (https://docs.python.org/3/tutorial/)
- The scikit-learn documentation (https://scikit-learn.org/stable/documentation.html)

Other references and resources will be provided to cope with most of the topics of this class.

Course Assessment

Discussions:

Discussion are methods for the online forum between students and instructor. Topics will be assigned for students led discussions that will include relevant evidence-based literature or videos related to and in support of the assigned topic. Students are expected to post a response to the assigned discussion topic as well as respond to other students' postings. Rubrics will be provided for the evaluation of the discussions.

Quizzes:

Generally, quizzes will be given based on the readings and tutorial material. Quizzes will test students' knowledge on the most important aspects of the readings only.

Programming Assignments:

Assignments are designed to engage students in their learning, so students can begin to apply these principles in practice and tailor them to their needs. Assignments are to be turned in individually, although students are encouraged to work together extensively. Rubrics will be provided for the evaluation of the assignments.

Exams:

Generally, there are two exams to test students' knowledge on the most important aspects of the readings. Each exam will test different parts of topics as covered in the two halves of the term.

Grading

Grades are determined by a simple points system. The expected distribution of points is given below, with the exact scale determined by percent given for the discussions, assignments, quizzes, and exams.

Assessment Category	Points	Percent
Discussions (8 discussions – 5 points each)	**40**	**10%**
Quizzes (8 quizzes – 20 points each)	**160**	**40%**
Programming Assignments (4 assignments – 20 points each)	**80**	**20%**
Exams (2 exams - 60 points each)	**120**	**30%**

Grading Scale

Grading scale in this class will be as follows:

A = 900-1000
B = 800-899
C = 700-799
D = 600-699
F = 500-599

Course Requirements/Schedule

Module/Weeks	Reading/Learning Outcomes	Activities/Evaluation (Due dates)
Module 1: Introduction to Artificial Intelligence Jan 16 - 20	**Learning Outcome(s):** • Identify what artificial intelligence and machine learning are (CO #1) **Reading & Resources:** • Chapter 1: Introduction to Artificial Intelligence • Other related resources	**Activity:** • Module 1 Discussion: Understanding of AI (***5 pts***) – (Friday, 01/20/23) **Evaluation:** • Module 1 Quiz: Short questions on introduction to AI (***20 pts***) - (Friday, 01/20/23)
Module 2: Fundamental Use Cases for Artificial Intelligence Jan 23 – Feb 3	**Learning Outcome(s):** • Determine the most common artificial intelligence use cases. (CO #2) **Readings and Resources:** • Chapter 2: Fundamental Use Cases for Artificial Intelligence • Other related resource	**Activity:** • Module 2 Discussion: Use cases of AI (***5 pts***) - (Friday, 01/27/23) **Evaluation:** • Module 2 Quiz: Short questions on use cases of AI (***20 pts***) - (Tuesday, 01/31/23) • Module 2 Assignment: Working on short essay on application of AI (***20 pts***) - (Friday, 02/03/23)

Module 3: **Introduction of Python programming for Artificial Intelligence** Feb 6 - 17	**Learning Outcome(s):** • Understand how to use Python programming for artificial intelligence applications. (CO #3) **Readings and Resources:** • Some resources on Python programming language	**Activity:** • Module 3 Discussion: Using Python for AI applications (***5 pts***) - (Friday, 02/10/23) **Evaluation:** • Module 3 Quiz: Short questions on Python programming language (***20 pts***) - (Tuesday, 02/14/23) • Module 3 Assignment: Working on given codes of Python (***20 pts***) – (Friday, 02/17/23)
Module 4: **Machine Learning Pipelines** Feb 20 – Mar 3	**Learning Outcome(s):** • Identify how to build a machine learning pipeline (CO #4) **Readings and Resources:** • Chapter 3: Machine Learning Pipelines • Other related resources	**Activity:** • Module 4 Discussion: Building machine learning pipeline (***5 pts***) – (Friday, 02/24/23) **Evaluation:** • Module 4 Quiz: Short questions on pipeline of machine learning (***20 pts***) - (Friday, 03/03/23)
Mar 6-10	**Mid-Term Exam (Exam #2)**: Exam on modules 1, 2, 3 & 4 (***60 pts***) - (Tuesday, 03/07/23)	
Mar 13-17	**Spring Break – No Classes**	
Module 5: **Classification and Regression Using Supervised Learning** Mar 20 - 31	**Learning Outcome(s):** • Identify the differences between supervised and unsupervised learning (CO #5) **Readings and Resources:** • Chapter 5: Classification and Regression Using Supervised Learning • Other related resources	**Activity:** • Module 5 Discussion: Supervised learning in AI (***5 pts***) - (Friday, 03/24/23) **Evaluation:** • Module 5 Quiz: Short questions on classification and regression (***20 pts***) - (Tuesday, 03/28/23) • Module 5 Assignment: Working on one given simple case on classification or regression (***20 pts***) - (Friday, 03/31/23)

Module 6: Detecting Patterns with Unsupervised Learning Apr 3-14	**Learning Outcome(s):** • Identify the differences between supervised and unsupervised learning (CO #5) **Readings and Resources:** • Chapter 7: Detecting Patterns with Unsupervised Learning • Other related resources	**Activity:** • Module 6 Discussion: Unsupervised learning in AI (***5 pts***) - (Friday, 04/07/23) **Evaluation:** • Module 6 Quiz: Short questions on unsupervised learning (***20 pts***) (Tuesday, 04/11/23) • Module 6 Assignment: Working on one given simple case on unsupervised learning (***20 pts***) - (Friday, 04/14/23)
Module 7: Artificial Intelligence on the Cloud Apr 17-21	**Learning Outcome(s):** • Describe the most recent advances and tools offered for AI development in the cloud (CO #6) **Readings and Resources:** • Chapter 12: Artificial Intelligence on the Cloud • Other related resources	**Activity:** • Module 7 Discussion: AI on the cloud (***5 pts***) - (Friday, 04/21/23) **Evaluation:** • Module 7 Quiz: Short questions on working on some tools for AI development in the cloud (***20 pts***) - (Friday, 04/21/23)
Module 8: Artificial Intelligence and Society Apr 24-28	**Learning Outcome(s):** • Understand the ethical issues and impacts of artificial intelligence (CO #7) **Readings and Resources:** • Selected resources about AI and society	**Activity:** • Module 8 Discussion: Ethical issues and impacts of AI (***5 pts***) - (Friday, 04/28/23) **Evaluation:** • Module 8 Quiz: Short questions on AI and society (***20 pts***) - (Friday, 04/28/23)
May 1-5	**Review Week**	
May 8-12	**Final Exam (Exam #2)**: Exam on modules 5, 6, 7 & 8 (***60 pts***) - (Tuesday, 05/09/23)	

Laboratory Safety Procedures and Guidelines policy

Students can access this policy at: Laboratory Safety Procedures and Guidelines policy (PDF) (https://policy.unt.edu/sites/default/files/06.049_Standard%20Syllabus%20Policy%20Statements_supplement.pdf).

Attendance and Participation

Research has shown that students who attend class are more likely to be successful. You should attend every class unless you have a university excused absence such as active military service, a religious holy day, or an official university function as stated in the Student Attendance and Authorized Absences Policy (PDF) (https://policy.unt.edu/sites/default/files/06.039_StudAttnandAuthAbsence.Pub2_.19.pdf). If you cannot attend a class due to an emergency, please let me know. Your safety and well-being are important to me.

How to Succeed in this Course

Connect with me through email and/or by attending office hours. During busy times, my inbox becomes rather full, so if you contact me and do not receive a response within two business days, please send a follow up email. A gentle nudge is always appreciated.

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time; however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website (http://www.unt.edu/oda). You may also contact ODA by phone at (940) 565-4323.

Supporting Your Success and Creating an Inclusive Learning Environment

Every student in this class should have the right to learn and engage within an environment of respect and courtesy from others. We will discuss our classroom's habits of engagement and I also encourage you to review UNT's student code of conduct so that we can all start with the same baseline civility understanding (Code of Student Conduct) (https://deanofstudents.unt.edu/conduct)

Other University Polices

Students will be aware about Eagle Alert if there is a campus closing that will impact a class and describe that the calendar is subject to change, citing the Emergency Notifications and Procedures Policy (PDF) (https://policy.unt.edu/sites/default/files/06.049_Standard%20Syllabus%20Policy%20Statements_supplement.pdf). Also describe the standards for academic integrity in the course, citing the Academic Integrity Policy (PDF) (https://policy.unt.edu/sites/default/files/06.049_Standard%20Syllabus%20Policy%20Statements_supplement.pdf).

Students can access these policies in Navigate (Navigate.unt.edu), in Canvas under the Help menu, in EIS, and on the Student Support Services & Policies page.