

UNO Computer Science Machine Learning & Artificial Intelligence

Machine Learning (ML) and Artificial Intelligence (AI) techniques allow computers to answer complex and hard-to-solve problems via automation. This need has come into prominence due to the emergence of big data where it's necessary to automate methods to identify patterns and train machines. Machine Learning covers probabilistic techniques used to predict future data or other outcomes. These concepts have vast applications in bioinformatics, computer vision, robotics, and business intelligence.

Accreditations

Computing Accreditation Commission of ABET

ABET is the recognized U.S. accreditor of college and university programs in applied science, computing, engineering, and technology.



Employment Opportunities and Internships

In Louisiana, the demand for experts in ML and AI is high. A large number of companies and federal agencies are seeking experts in ML and AI including: DXC, IBM Baton Rouge, GDIT, Radiance Technologies, Choices, Lucid, AWS, Sirius Computer Technologies, Danaher, Cynet Systems, Device Medical Products, Ochsner Health System, Acuity One LLC, Salient CRGT, U.S. Navy, Bennett Aerospace, Entergy and the U.S. Army Corps of Engineers - New Orleans District.

Areas of Research

Natural Language Processing:

Topics include foreign translations; classify documents; speech-to-text; chatbots and virtual assistants.

Computer Vision:

Topics include training autonomous vehicles; object detection, tracking, & recognition; generate higher resolution images, draw realistic pictures from an outline; morphing;

Timeseries:

Topics include weather prediction; sale prediction; modeling disease progression; cancer & DNA/protein binding prediction;

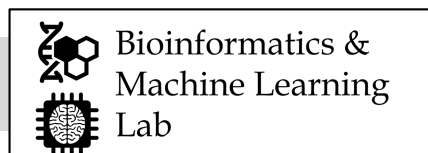
Anomaly Detection:

Topics include spam & malware filtering; identifying defects in additive manufacturing;

Recommender Systems:

Topics include targeting ads to users; optimizing shelfy organization; optimal business pipeline segmentation; .

Research Opportunities and Assistantships



Machine Learning & AI at UNO is overseen by recognized experts in the field who perform ongoing scientific research with industry support. There are many exciting research opportunities for our students to participate in with our Bioinformatics and Machine Learning (BML) lab, the Canizaro Livingston Gulf States Center for Environmental Informatics, & the Light Game Lab. Ongoing research topics at UNO involving AI/ML are listed above.

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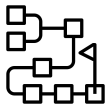


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Machine Learning & AI

Concentration in Computer Science

Machine Learning & AI is a concentration within Computer Science. Students enrolled within this concentration not only learn the necessary skills for a general Computer Science degree but also specialize in the following topics.



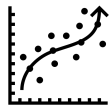
Artificial Intelligence

Topics include knowledge representation, search strategies, and surveys of principal subareas of artificial intelligence such as expert systems, natural language processing, reasoning systems, games, learning, and vision



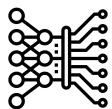
Natural Language Processing (NLP)

A branch of artificial intelligence that deals with the interaction between computers and humans using the natural language. The ultimate objective of NLP is to read, decipher, understand, and make sense of the human languages in a manner that is valuable



Machine Learning (Differential Approaches)

A probabilistic perspective of machine learning as well as the algorithms, in the real world, such as Dynamic Programming, Exhaustive Search, Combinatorial Pattern Matching, Clustering and Trees, Hidden Markov Models, Greedy and Randomized Algorithms, Graph Algorithms.



Machine Learning (Non-Differential Approaches)

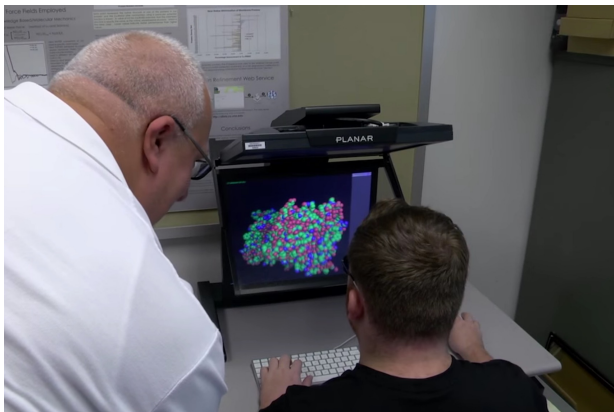
Topics include Machine Learning Models: Neural Networks, Support Vector Machines, Boosting, Genetic Algorithms, Decision Trees, Random Forests, and Deep Belief Nets. Emphasizing the programming aspects of these topics.

Undergraduate Courses

Python for Data Science & AI
Natural Language Processing
Artificial Intelligence
Machine Learning I & II
Statistics
Software Design I & II
Data Structures
Assembly Language
Systems Programming
Computer Networks
Operating Systems
Computer Organization
Theory of Computation
Analysis of Algorithms
Databases
Programming Language Structure

Graduate Courses

Advanced Machine Learning I & II
Parallel & Scientific Computing
Computer Vision
Pattern Recognition
Big Data Analytics
Data Visualization
Planning Algorithms in AI



Machine Learning & AI Concentration Objectives

- Understand the challenges of ML and AI, including large data collections, model selection, model complexity, standard algorithms and techniques.
- Acquire a conceptual understanding of the strengths and weaknesses of common Machine Learning approaches.
- Explore the mathematical relationships within Machine Learning and AI algorithms, including the paradigms of supervised and un-supervised learning.
- Design and implement various Machine Learning and AI algorithms in a range of real-world applications.



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