University of Arkansas – Fort Smith
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General Syllabus

CS 4333 Machine Learning

Credit Hours: 3 Lecture Hours: 3 Laboratory Hours: 0

Prerequisite: CS 1303 Introduction to Data Science or CS 2003 Data Structures

Effective Catalog: 2018-2019

I. Course Information

A. Catalog Description

Explores the topics of machine learning and statistical pattern recognition. Supervised, unsupervised and reinforcement machine learning algorithms are introduced. Modern applications of machine learning are reviewed.

B. Additional Course Information

This course is used to satisfy the requirements for the Data Analytics Concentration in the Information Technology degree. It may also be used as an upper level elective in all other concentrations of the IT degree.

II. Student Learning Outcomes

A. Subject Matter

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

1. Develop operational knowledge of machine learning techniques
2. Appraise situations in which to apply various machine learning techniques
3. Explain, design and apply supervised, unsupervised and reinforcement machine learning algorithms
4. Explain, design and apply statistical learning algorithms

B. University Learning Outcomes

This course enhances student abilities in the following areas:

Communication Skills (written and oral)
Students will apply programming documentation, demonstrations and technical explanations to concepts and code execution.

Analytical Skills

Critical Thinking Skills: Students will design algorithm requirements and properties to implement the appropriate programming code solution or application implementation to solve the given problem. Students will measure effective solutions and prepare accurate output in both programming and written solutions.

III. Major Course Topics

A. Fundamentals of Machine Learning
B. Statistics and Probability
C. Supervised Learning
D. Unsupervised Learning
E. Reinforcement Learning
F. Decision Trees
G. Random Forests
H. Clustering
I. Classification
J. Regression
K. Model Selection
L. Learning Theory