Miami Dade College

Course Description

CAP4633C | Machine Learning for Data Analytics II | 4.00 credits

This upper division course is for students majoring in data analytics. In this second-level course, students will use the Python programming language to create additional machine learning models for classification. In addition, students will explore various applications of multi-layer neural networks. Prerequisites: CAP4631C**.**

Course Competencies:

Competency 1: The student will demonstrate an understanding of additional terminology and software used in machine learning by:

1. Describing the fundamentals of building machine learning systems for classification
2. Installing additional Python packages used for machine learning
3. Partitioning a dataset into separate training and test sets

Competency 2: The student will use Python to build machine learning algorithms for classification by:

1. Describing and implementing artificial neurons
2. Implementing and training a perceptron learning algorithm
3. Implementing adaptive linear neurons
4. Implementing Adaline in Python
5. Improving gradient descent through feature scaling
6. Implementing large-scale machine learning
7. Using stochastic gradient descent

Competency 3: The student will compare and use existing machine-learning algorithms for classification by:

1. Choosing a classification algorithm
2. Modeling class probabilities via logistic regression
3. Implementing maximum margin classification with support vector machines
4. Solving nonlinear problems using a kernel SVM
5. Building a decision tree and combining multiple decision trees via random forests
6. Implementing K-nearest neighbors

Competency 4: The student will use Python to implement a multi-layer neural network by:

1. Describing the multi-layer neural network architecture
2. Describing the difference between forward propagation and backpropagation
3. Implementing a multilayer perceptron to classify image data
4. Training neural networks via backpropagation

Learning Outcomes

- Use quantitative analytical skills to evaluate and process numerical data
- Solve problems using critical and creative thinking and scientific reasoning
- Use computer and emerging technologies effectively