Artificial Intelligence with Machine Learning in Java – Course Objectives

Overview

This course of study builds on the skills gained by students in Java Foundations and Java Programming. Students are introduced to Machine Learning concepts within Artificial Intelligence and will learn terminology, syntax, and the steps required to create a Machine Learning solution in Java using hands-on, engaging activities.

Available Curriculum Languages:

- English

Duration

- Recommended total course time: 40 hours*
- Professional education credit hours for educators who complete Oracle Academy training: 16

** Course time includes instruction, self-study/homework, practices, projects and assessment*

Target Audiences

Educators

- Technical, vocational, and 2- and 4-year college and university faculty members who teach computer programming

Students

- Students with fundamental knowledge of object-oriented concepts, data structures, recursion, terminology, and syntax in Java who wish learn the concepts of Machine Learning within Artificial Intelligence using Java

Prerequisites

Required

- Fundamental knowledge of object-oriented concepts, data structures, recursion, terminology, and syntax in Java

Suggested

- Oracle Academy Curriculum - Java Foundations
- Oracle Academy Curriculum - Java Programming

Suggested Next Courses

- Advanced computer programming courses

Lesson-by-Lesson Topics and Objectives

Section 1 – Introduction

- 1-1 Course Overview
  - Understand the nature of the course
  - Understand the delivery mechanism

- 1-2 Introduction to AI
  - Define artificial intelligence
  - Define machine learning
  - Give examples of using artificial intelligence
  - Define data exhaust

- 1-3 Data and Information
  - Define data
  - Define information
  - Differentiate between data and information

- 1-4 Categorizing Data
  - Define supervised learning
  - Define unsupervised learning
  - Define classification
  - Define regression
  - Define structured and unstructured data

Section 2 – Machine Learning

- 2-1 Why Now?
  - State the reasons behind the growth in AI
  - Understand the growth in processing power

- 2-2 Machine Learning Workflow
  - Understand the use of models within machine learning
  - Understand the CRISP-DM Model

Section 3 – Trees and Recursion

- 3-1 Binary Trees
  - Understand a node
  - Understand a binary tree
  - Create a Node class

- 3-2 Recursion
  - Define recursion
  - Understand recursive methods
  - State the advantages and disadvantages of recursion

- 3-3 Tree Traversal
  - Describe tree traversal
  - Define pre-order traversal
  - Define post-order traversal
  - Define in-order traversal
  - Create methods for BTree

- 3-4 Yes/No Game
  - Describe the use of decision trees
  - Create a yes/no game
  - State the problems of creating a manual decision tree

Section 4 – Entropy and the ID3 Algorithm

- 4-1 Decision Tree Algorithms
  - State a number of decision tree algorithms
  - Identify the ID3 algorithm
  - Supply arguments to a method
  - Return values from a method

- 4-2 Information Entropy
  - Define information entropy
  - Understand variance
  - Calculate information entropy
  - Understand information entropy

- 4-3 ID3 Worked Example
  - Calculate entropy
  - Calculate gain
  - Manually work through the ID3 algorithm

- 4-4 Create an ID3 Tree
  - Understand non binary tree structure
  - Create a non-binary tree structure