uCertify

Course Outline

Machine Learning with Python

03 Jul 2024

1. Course Objective
2. Pre-Assessment
3. Exercises, Quizzes, Flashcards & Glossary

   Number of Questions
4. Expert Instructor-Led Training
5. ADA Compliant & JAWS Compatible Platform
6. State of the Art Educator Tools
7. Award Winning Learning Platform (LMS)
8. Chapter & Lessons

   Syllabus

   Chapter 1: Let’s Discuss Learning

   Chapter 2: Some Technical Background

   Chapter 3: Predicting Categories: Getting Started with Classification

   Chapter 4: Predicting Numerical Values: Getting Started with Regression

   Chapter 5: Evaluating and Comparing Learners

   Chapter 6: Evaluating Classifiers

   Chapter 7: Evaluating Regressors

   Chapter 8: More Classification Methods

   Chapter 9: More Regression Methods

   Chapter 10: Manual Feature Engineering: Manipulating Data for Fun and Profit

   Chapter 11: Tuning Hyperparameters and Pipelines

   Chapter 12: Combining Learners

   Chapter 13: Models That Engineer Features for Us

   Chapter 14: Feature Engineering for Domains: Domain-Specific Learning

   Chapter 15: Connections, Extensions, and Further Directions

   Chapter 16: Appendix A: mlwpy.py Listing

   Videos and How To
9. Practice Test

1. Course Objective

Enroll yourself in the Machine Learning Python course and lab to gain expertise on the processes, patterns, and strategies needed for building effective learning systems. The Machine learning course imparts skills that are required for understanding machine learning algorithms, models, and core machine learning concepts, evaluating classifiers and regressors, connections, extensions, and further directions. The study guide is equipped with learning resources to broaden your toolbox and explore some of the field's most sophisticated and exciting techniques.

2. Pre-Assessment

Pre-Assessment lets you identify the areas for improvement before you start your prep. It determines what students know about a topic before it is taught and identifies areas for improvement with question assessment before beginning the course.

3. Exercises

There is no limit to the number of times learners can attempt these. Exercises come with detailed remediation, which ensures that learners are confident on the topic before proceeding.

4. Quiz

Quizzes test your knowledge on the topics of the exam when you go through the course material. There is no limit to the number of times you can attempt it.

5. flashcards

Flashcards are effective memory-aiding tools that help you learn complex topics easily. The flashcard will help you in memorizing definitions, terminologies, key concepts, and more. There is no limit to the number of times learners can attempt these. Flashcards help master the key concepts.

6. Glossary of terms

uCertify provides detailed explanations of concepts relevant to the course through Glossary. It contains a list of frequently used terminologies along with its detailed explanation. Glossary defines the key terms.

7.  Expert Instructor-Led Training

uCertify uses the content from the finest publishers and only the IT industry's finest instructors. They have a minimum of 15 years real-world experience and are subject matter experts in their fields. Unlike a live class, you can study at your own pace. This creates a personal learning experience and gives you all the benefit of hands-on training with the flexibility of doing it around your schedule 24/7.

8.  ADA Compliant & JAWS Compatible Platform

uCertify course and labs are ADA (Americans with Disability Act) compliant. It is now more accessible to students with features such as:

- Change the font, size, and color of the content of the course
- Text-to-speech, reads the text into spoken words
- Interactive videos, how-tos videos come with transcripts and voice-over
- Interactive transcripts, each word is clickable. Students can clip a specific part of the video by clicking on a word or a portion of the text.

JAWS (Job Access with Speech) is a computer screen reader program for Microsoft Windows that reads the screen either with a text-to-speech output or by a Refreshable Braille display. Student can easily navigate uCertify course using JAWS shortcut keys.

9.  State of the Art Educator Tools

uCertify knows the importance of instructors and provide tools to help them do their job effectively. Instructors are able to clone and customize course. Do ability grouping. Create sections. Design grade scale and grade formula. Create and schedule assessments. Educators can also move a student from self-paced to mentor-guided to instructor-led mode in three clicks.

10.  Award Winning Learning Platform (LMS)

uCertify has developed an award winning, highly interactive yet simple to use platform. The SIIA CODiE Awards is the only peer-reviewed program to showcase business and education technology's finest products and services. Since 1986, thousands of products, services and solutions have been

recognized for achieving excellence. uCertify has won CODiE awards consecutively for last 7 years:

- **2014**
    1. Best Postsecondary Learning Solution

- **2015**
    1. Best Education Solution
    2. Best Virtual Learning Solution
    3. Best Student Assessment Solution
    4. Best Postsecondary Learning Solution
    5. Best Career and Workforce Readiness Solution
    6. Best Instructional Solution in Other Curriculum Areas
    7. Best Corporate Learning/Workforce Development Solution

- **2016**
    1. Best Virtual Learning Solution
    2. Best Education Cloud-based Solution
    3. Best College and Career Readiness Solution
    4. Best Corporate / Workforce Learning Solution
    5. Best Postsecondary Learning Content Solution
    6. Best Postsecondary LMS or Learning Platform
    7. Best Learning Relationship Management Solution

- **2017**
    1. Best Overall Education Solution
    2. Best Student Assessment Solution
    3. Best Corporate/Workforce Learning Solution
    4. Best Higher Education LMS or Learning Platform

- **2018**
    1. Best Higher Education LMS or Learning Platform

2. Best Instructional Solution in Other Curriculum Areas
3. Best Learning Relationship Management Solution

- **2019**
  1. Best Virtual Learning Solution
  2. Best Content Authoring Development or Curation Solution
  3. Best Higher Education Learning Management Solution (LMS)

- **2020**
  1. Best College and Career Readiness Solution
  2. Best Cross-Curricular Solution
  3. Best Virtual Learning Solution

11. Chapter & Lessons

uCertify brings these textbooks to life. It is full of interactive activities that keeps the learner engaged. uCertify brings all available learning resources for a topic in one place so that the learner can efficiently learn without going to multiple places. Challenge questions are also embedded in the chapters so learners can attempt those while they are learning about that particular topic. This helps them grasp the concepts better because they can go over it again right away which improves learning.

Learners can do Flashcards, Exercises, Quizzes and Labs related to each chapter. At the end of every lesson, uCertify courses guide the learners on the path they should follow.

Syllabus

Chapter 1: Let’s Discuss Learning

- Welcome
- Scope, Terminology, Prediction, and Data
- Putting the Machine in Machine Learning

- Examples of Learning Systems
- Evaluating Learning Systems
- A Process for Building Learning Systems
- Assumptions and Reality of Learning
- End-of-Lesson Material

Chapter 2: Some Technical Background

- About Our Setup
- The Need for Mathematical Language
- Our Software for Tackling Machine Learning
- Probability
- Linear Combinations, Weighted Sums, and Dot Products
- A Geometric View: Points in Space
- Notation and the Plus-One Trick
- Getting Groovy, Breaking the Straight-Jacket, and Nonlinearity
- NumPy versus “All the Maths”
- Floating-Point Issues
- EOC

Chapter 3: Predicting Categories: Getting Started with Classification

- Classification Tasks
- A Simple Classification Dataset
- Training and Testing: Don’t Teach to the Test
- Evaluation: Grading the Exam
- Simple Classifier #1: Nearest Neighbors, Long Distance Relationships, and Assumptions
- Simple Classifier #2: Naive Bayes, Probability, and Broken Promises
- Simplistic Evaluation of Classifiers
- EOC

Chapter 4: Predicting Numerical Values: Getting Started with Regression

- A Simple Regression Dataset
- Nearest-Neighbors Regression and Summary Statistics
- Linear Regression and Errors
- Optimization: Picking the Best Answer
- Simple Evaluation and Comparison of Regressors
- EOC

Chapter 5: Evaluating and Comparing Learners

- Evaluation and Why Less Is More
- Terminology for Learning Phases
- Major Tom, There’s Something Wrong: Overfitting and Underfitting
- From Errors to Costs
- (Re)Sampling: Making More from Less
- Break-It-Down: Deconstructing Error into Bias and Variance
- Graphical Evaluation and Comparison
- Comparing Learners with Cross-Validation
- EOC

Chapter 6: Evaluating Classifiers

- Baseline Classifiers
- Beyond Accuracy: Metrics for Classification
- ROC Curves
- Another Take on Multiclass: One-versus-One
- Precision-Recall Curves
- Cumulative Response and Lift Curves

- More Sophisticated Evaluation of Classifiers: Take Two
- EOC

Chapter 7: Evaluating Regressors

- Baseline Regressors
- Additional Measures for Regression
- Residual Plots
- A First Look at Standardization
- Evaluating Regressors in a More Sophisticated Way: Take Two
- EOC

Chapter 8: More Classification Methods

- Revisiting Classification
- Decision Trees
- Support Vector Classifiers
- Logistic Regression
- Discriminant Analysis
- Assumptions, Biases, and Classifiers

- Comparison of Classifiers: Take Three
- EOC

Chapter 9: More Regression Methods

- Linear Regression in the Penalty Box: Regularization
- Support Vector Regression
- Piecewise Constant Regression
- Regression Trees
- Comparison of Regressors: Take Three
- EOC

Chapter 10: Manual Feature Engineering: Manipulating Data for Fun and Profit

- Feature Engineering Terminology and Motivation
- Feature Selection and Data Reduction: Taking out the Trash
- Feature Scaling
- Discretization
- Categorical Coding
- Relationships and Interactions
- Target Manipulations

- EOC

Chapter 11: Tuning Hyperparameters and Pipelines

- Models, Parameters, Hyperparameters
- Tuning Hyperparameters
- Down the Recursive Rabbit Hole: Nested Cross-Validation
- Pipelines
- Pipelines and Tuning Together
- EOC

Chapter 12: Combining Learners

- Ensembles
- Voting Ensembles
- Bagging and Random Forests
- Boosting
- Comparing the Tree-Ensemble Methods
- EOC

Chapter 13: Models That Engineer Features for Us

- Feature Selection
- Feature Construction with Kernels
- Principal Components Analysis: An Unsupervised Technique
- EOC

Chapter 14: Feature Engineering for Domains: Domain-Specific Learning

- Working with Text
- Clustering
- Working with Images
- EOC

Chapter 15: Connections, Extensions, and Further Directions

- Optimization
- Linear Regression from Raw Materials
- Building Logistic Regression from Raw Materials
- SVM from Raw Materials
- Neural Networks
- Probabilistic Graphical Models

- EOC

Chapter 16: Appendix A: mlwpy.py Listing

12. Practice Test

Here's what you get

55	55
PRE-ASSESSMENTS QUESTIONS	POST-ASSESSMENTS QUESTIONS

Features

Each question comes with detailed remediation explaining not only why an answer option is correct but also why it is incorrect.

Unlimited Practice

Each test can be taken unlimited number of times until the learner feels they are prepared. Learner can review the test and read detailed remediation. Detailed test history is also available.

Each test set comes with learn, test and review modes. In learn mode, learners will attempt a question and will get immediate feedback and complete remediation as they move on to the next question. In test mode, learners can take a timed test simulating the actual exam conditions. In review mode, learners can read through one item at a time without attempting it.

13. Performance Based Labs

uCertify's performance-based labs are simulators that provides virtual environment. Labs deliver hands on experience with minimal risk and thus replace expensive physical labs. uCertify Labs are cloud-based, device-enabled and can be easily integrated with an LMS. Features of uCertify labs:

- Provide hands-on experience in a safe, online environment
- Labs simulate real world, hardware, software & CLI environment
- Flexible and inexpensive alternative to physical Labs
- Comes with well-organized component library for every task
- Highly interactive - learn by doing
- Explanations and remediation available
- Videos on how to perform

Lab Tasks

- Plotting a Probability Distribution Graph
- Using the zip Function
- Calculating the Sum of Squares
- Plotting a Line Graph
- Plotting a 3D Graph
- Plotting a Polynomial Graph
- Using the numpy.dot() Method
- Displaying Histograms
- Defining an Outlier
- Calculating the Median Value
- Estimating the Multiple Regression Equation
- Constructing a Swarm Plot
- Using the describe() Method
- Viewing Variance
- Creating a Confusion Matrix
- Creating an ROC Curve
- Recreating an ROC Curve
- Creating a Trendline Graph

- Viewing the Standard Deviation
- Constructing a Scatterplot
- Evaluating the Prediction Error Rates
- Evaluating a Logistic Model
- Creating a Covariance Matrix
- Using the load_digits() Function
- Illustrating a Less Consistent Relationship
- Illustrating a Piecewise Constant Regression
- Manipulating the Target
- Manipulating the Input Space
- Calculating the Mean Value
- Displaying a Correlation Matrix
- Creating a Nonlinear Model
- Performing a Principal Component Analysis
- Using the Manifold Method
- Encoding Text
- Building an Estimated Simple Linear Regression Equation

Here's what you get

35

PERFORMANCE BASED LAB

14. Post-Assessment

After completion of the uCertify course Post-Assessments are given to students and often used in conjunction with a Pre-Assessment to measure their achievement and the effectiveness of the exam.