uCertify

Course Outline

Machine Learning for Beginners

04 Aug 2025

1. Exercises, Quizzes, Flashcards & Glossary

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

   Syllabus

   Chapter 1: Preface

   Chapter 2: An Introduction to Machine Learning

   Chapter 3: The Beginning: Pre-Processing and Feature Selection

   Chapter 4: Regression

   Chapter 5: Classification

   Chapter 6: Neural Network I – The Perceptron

   Chapter 7: Neural Network II – The Multi-Layer Perceptron

   Chapter 8: Support Vector Machines

   Chapter 9: Decision Trees

   Chapter 10: Clustering

   Chapter 11: Feature Extraction

   Chapter 12: Appendix 1: Cheat Sheet – Pandas

   Chapter 13: Appendix 2: Face Classification

   Videos and How To

1. 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.

2.  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.

3.  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.

4.  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

5. 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 3: The Beginning: Pre-Processing and Feature Selection

- Introduction
- Dealing with missing values and ‘NaN’
- Converting a continuous variable to categorical variable
- Feature selection
- Chi-Squared test
- Pearson correlation
- Variance threshold
- Conclusion

Chapter 4: Regression

- Introduction
- The line of best fit
- Gradient descent method
- Implementation
- Linear regression using SKLearn
- Experiments
- Finding weights without iteration

- Regression using K-nearest neighbors
- Conclusion

Chapter 5: Classification

- Introduction
- Basics
- Classification using K-nearest neighbors
- Implementation of K-nearest neighbors
- The KNeighborsClassifier in SKLearn
- Experiments – K-nearest neighbors
- Logistic regression
- Logistic regression using SKLearn
- Experiments – Logistic regression
- Naïve Bayes classifier
- The GaussianNB Classifier of SKLearn
- Implementation of Gaussian Naïve Bayes
- Conclusion

Chapter 6: Neural Network I – The Perceptron

- Introduction
- The brain
- The neuron
- The McCulloch Pitts model
- The Rosenblatt perceptron model
- Activation functions
- Implementation
- Learning
- Perceptron using sklearn
- Experiments
- Conclusion

Chapter 7: Neural Network II – The Multi-Layer Perceptron

- Introduction
- History
- Introduction to multi-layer perceptrons
- Architecture
- Backpropagation algorithm
- Learning

- Implementation
- Multilayer perceptron using sklearn
- Experiments
- Conclusion
- Practical/Coding

Chapter 8: Support Vector Machines

- Introduction
- The Maximum Margin Classifier
- Maximizing the margins
- The non-separable patterns and the cost parameter
- The kernel trick
- SKLEARN.SVM.SVC
- Conclusion

Chapter 9: Decision Trees

- Introduction
- Basics
- Discretization

- Coming back
- Containing the depth of a tree
- Implementation of a decision tree using sklearn
- Experiments
- Conclusion

Chapter 10: Clustering

- Introduction
- K-means
- Spectral clustering
- Hierarchical clustering
- Implementation
- Conclusion

Chapter 11: Feature Extraction

- Introduction
- Fourier Transform
- Patches
- sklearn.feature_extraction.image.extract_patches_2d

- Histogram of oriented gradients
- Principal component analysis
- Conclusion
- Preface

Chapter 12: Appendix 1: Cheat Sheet – Pandas

- Creating a Pandas series
- Indexing
- Slicing
- Common methods
- Boolean index
- DataFrame
- Adding a Column in a Data Frame
- Deleting column
- Addition of Rows
- Deletion of Rows
- unique
- Iterating a Pandas Data Frame

Chapter 13: Appendix 2: Face Classification

- Introduction
- Data
- Methods
- Observation and Conclusion

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