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Training Introduction Mastering the basics of Machine Learning: a practical approach
2 days (14 hours)

Description

Machine learning has conquered the world. Today, it is the main driver of innovation, at the heart of virtually all advances, with spectacular results.

The aim of this course is to give engineers who already have a good command of IT tools (including basic software programming) and statistics, the foundations for understanding and using machine learning algorithms.

This course is designed to be practical. The concepts studied will be put directly into practice. We'll be using the Python language and its libraries (Numpy, Matplotlib, Pandas, Seaborne and Scikit-learn).

Objectives

- Mastery of the various components of artificial intelligence
- Illustration of newly acquired concepts on a typical project
- Understand the principles of model training
- Master the use of a Kernel for classification
- Learn how to reduce the dimensions of a dataset
- Understand machine learning and the evolution from Big Data to Machine Learning
- Understand the challenges of Machine Learning, its benefits and use cases
- Determine where Machine Learning fits in the data processing chain
- Identify tools and market leaders
- Discover the main algorithms and the project approach to be implemented in the company

Target audience

- Developers

- Architects
- Data Analyst
- Data Engineer
- Data Scientist

Prerequisites

- Knowledge of Python and mathematics

Further information

- As an introduction to Artificial Intelligence, we offer you the following training course
- Complementary technology
  - TensorFlow from Google
  - Pytorch from Facebook

Our training program Introduction Mastering the basics of Machine Learning: a practical approach

[Day 1]

1. What is machine learning?

- The paradigm shift from expert systems to machine learning
- Algorithm use cases and their limits
- The different categories of algorithms: Supervised / Unsupervised, Instances / Model
- The usual challenges: data quality, quantity, pre-existing biases

2. Illustration of concepts on a typical project

- Asking the right question
- Find data
- Exploring data: Visualization and statistics
- Preparing data: Outliers, Normalization, Categorical data
- Choosing and training the right model
- Evaluate model performance

3. Measuring algorithm performance, illustrated by classification

- Binary classification
- Performance measures: Accuracy and recall, F1, ROC curve
- Analyze classifier errors
- Multilabel classification

[Day 2]

4. Training models: the case of regressions

- Linear regression and its mathematical justification
- Gradient descent and its variants
- Overfit/Underfit: detecting and remedying them
- Regularization: Principle, Ridge, Lasso and ElasticNet
- Logistic regression for classification

5. SVM and decision trees

- Separate data as far as possible, the basic idea
- Projection into a higher-dimensional space, kernels
- Decision trees, classification and regression
- Ensemble learning: Forests, boosting and stacking

6. Dimension reduction

- Curse of dimensionality
- Projection vs Manifolds
- PCA, the canonical approach
- PCA with Kernels
- LLE, T-SNE, etc.

Companies concerned

This course is aimed at both individuals and companies, large or small, wishing to train their teams in a new advanced computer technology, or to acquire specific business knowledge or modern methods.

Positioning on entry to training

Positioning at the start of training complies with Qualiopi quality criteria. As soon as registration is finalized, the learner receives a self-assessment questionnaire which enables us to assess his or her estimated level of proficiency in different types of technology, as well as his or her expectations and personal objectives for the training to come, within the limits imposed by the selected format. This questionnaire also enables us to anticipate any connection or learning difficulties.

in-company security (intra-company or virtual classroom) which could be problematic for the follow-up and smooth running of the training session.

Teaching methods

Practical course: 60% Practical, 40% Theory. Training material distributed in digital format to all participants.

Organization

The course alternates theoretical input from the trainer, supported by examples, with brainstorming sessions and group work.

Validation

At the end of the session, a multiple-choice questionnaire verifies the correct acquisition of skills.

Sanction

A certificate will be issued to each trainee who completes the course.