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Sign up

MLOPS Training: Advanced Machine Learning

4 days (28 hours)

Presentation

Our MLOps training course will enable you to master all the essential components of MLOps methods for your machine learning workflows. MLOps methods aim to unify and simplify the process of developing and deploying machine learning models.

The course will familiarize you with the concepts of continuous integration, as well as workflow deployment and monitoring. You will learn how to use the Python language to create CI/CD pipelines in your production environments.

Our program will also cover the use of advanced tools like Docker and Kubernetes that will enable you to deploy containerized Python applications to optimize the deployment and scaling of your models.

Our training will run on the latest versions of Docker Desktop and Kubernetes, namely : [Docker Desktop 4.27](#) and [Kubernetes 1.29](#).

Objectives

- **Mastering MLOps concepts**
- How to use Python to produce ML models
- Use Docker and Kubernetes to deploy models

Target audience

- **Data scientist**
- Data engineer
- DevOps engineers

Prerequisites

- Mastery of Python
- Fundamentals of Docker and Kubernetes

Technical requirements

- Docker Desktop installed on your machine

OUR MLOPS TRAINING PROGRAM

Introduction to MLOPS

- Definition and objectives
- Differences between data pipelines and ML Workflow
- Importance of continuous integration
- Importance of continuous integration (CI/CD) for machine learning
- Challenges of model deployment in production
- The different MLOPS levels according to Microsoft and Google

Python for production

- Best practices in Python development
- Optimizing your working environment
- Environment and dependency management
- Creating the Python package
- Write clean, high-performance, robust, high-quality code
- Unit testing and continuous integration for ML models
- Understanding and building a CI/CD pipeline for MLOps

Practical work

- Python development exercises: Using virtualenv and creating packages
- Setting up unit tests and continuous integration in an ML model

Model lifecycle management

- Introduction to the model registry
- Monitoring model performance in production
- Model versioning strategy
- Metadata management and documentation
- Introducing Amazon S3 for model registry

Practical work

- Using MLFlow and a model registry to version and track models

Model Serving

- Choice of deployment frameworks (TensorFlow Serving, Flask, FastAPI, etc.).
- Configuring and deploying model services in production
- Monitoring deployed models

Practical work

- Deploy and configure a model service using a specific framework (TensorFlow Serving, Flask, FastAPI, etc.).
- Setting up a monitoring system for deployed models

Workflow orchestration tools for machine learning

- Presentation of existing tools
- Focus on Apache Airflow
- Create workflows to manage MLOps tasks
- Automating deployment and retraining pipelines

Practical work

- Create and run Airflow workflows to manage MLOps tasks

API containerization

- Introduction to Docker
- Creating containers for Python applications
- Docker compose for managing multiple containers
- Using Docker Desktop

Practical work

- Creating Docker containers for Python applications
- Using Docker Compose to manage multiple containers

Deployment on a Kubernetes cluster

- Kubernetes fundamentals

- Pod creation and deployment
- Container orchestration with Kubernetes
- Model deployment methods
- Scaling methods
- Managing your cluster with K9s
- Service and ingress configurator for models

Practical work

- Initializing a Kube cluster
- Deploying a complete application on Kube
- Deploying models on a Kubernetes cluster and managing scaling
- Configuring services and ingress for models

Conclusion and feedback

- MLOps deployment case study
- Discussion of best practices and lessons learned
- Sharing participants' experiences

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 enabling 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 with regard to the training to come, within the limits imposed by the selected format. This questionnaire also enables us to anticipate any connection or security difficulties within the company (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.