

MLOps Basics

Duration – 16 Hours

Program Description

This training program equips participants with foundational Python skills for MLOps, covering functions, data manipulation, and testing. It introduces essential machine learning concepts, including supervised and unsupervised learning, through hands-on classification and regression tasks.

Participants will learn to manage reproducibility using tools like Conda and venv, systematically version datasets, and perform exploratory data analysis (EDA) with DVC.

The program concludes with a capstone project that integrates all MLOps concepts to build a comprehensive pipeline, effectiveness analysis and deployment

Learning Goals

- ❖ Equip learners with the skills to build and deploy end-to-end machine learning pipelines tailored to the respective domain.
- ❖ Integrate Python programming, machine learning, data versioning, CI/CD workflows and environment management.
- ❖ Provide practical experience in solving real-world data analysis and deployment challenges

Course Topics

- ❖ Python Essentials for MLOps - Introduction to Python, Functions, Classes, Testing, Pandas, NumPy, and Applied Python for MLOps
- ❖ Basics of Machine Learning - Supervised and Unsupervised Learning, Key Algorithms
- ❖ Environment Management - Managing Reproducibility with Conda and venv
- ❖ Data Versioning and EDA - Dataset Versioning and Exploratory Data Analysis (EDA)
- ❖ Capstone Project - Integrate all MLOps concepts to build a complete pipeline for drug effectiveness analysis and deployment

MLOps Intermediate

Duration – 16 Hours

Program Description

This training program focuses on deploying machine learning models in production environments. It covers key topics like REST API deployment, containerization, and scalable deployments using Kubernetes.

Participants will learn to integrate CI/CD pipelines for automation and implement monitoring and logging with the ELK stack to ensure model performance.

The program concludes with a capstone project to design a real-time scenario, integrating all learned concepts for end-to-end deployment and monitoring in a production-ready pipeline.

Learning Goals

- ❖ Equip learners with the ability to deploy production-ready machine learning models using REST APIs and serving frameworks.
- ❖ Enable participants to design scalable and distributed deployment solutions using Kubernetes.
- ❖ Provide expertise in automating CI/CD workflows for seamless model deployment and delivery.
- ❖ Develop skills to monitor and log machine learning models using enterprise tools like the ELK Stack.
- ❖ Integrate all concepts into a comprehensive capstone project for real-world application in the respective domain

Course Topics

- ❖ Overview of Deployment Techniques: REST APIs, Containers, and Serving Frameworks
- ❖ Deploying ML Models on Kubernetes with Horizontal Scaling
- ❖ GitHub/GitLab Integration, Actions, Docker, Jenkins/GitHub Images
- ❖ Model Monitoring and Logging with ELK Stack
- ❖ Capstone Project - Deploy production-ready ML models with REST APIs and frameworks like Flask and TensorFlow Serving. Hands-on experience with scalable deployments using Kubernetes. Automate CI/CD workflows to enable continuous delivery. Monitor and analyze model performance with enterprise

MLOps Advanced

Duration – 24 Hours

Program Description

This training program covers advanced MLOps concepts focusing on automated retraining workflows and experiment tracking to enhance model management.

Participants will gain hands-on experience with Azure Feature Store for managing real-time and batch features, emphasizing feature engineering and real-time data integration. It delves into Azure cloud deployment models, exploring public, private, and hybrid environments for ML pipeline deployment. Practical sessions will help participants choose and implement scalable and efficient deployment strategies.

The capstone project integrates these concepts to automate workflows, track experiments, engineer features, and deploy models in Azure environments, providing a comprehensive understanding of scalable MLOps practices.

Learning Goals

- ❖ Equip learners with the skills to automate model retraining workflows and track experiments using Azure Machine Learning tools.
- ❖ Provide hands-on experience with real-time and batch data integration through Azure Feature Store.
- ❖ Enable participants to deploy scalable ML workflows in Azure environments using public, private, and hybrid cloud deployment models.
- ❖ Prepare learners to implement an end-to-end MLOps pipeline tailored to the respective domain

Course Topics

- ❖ Advanced MLOps Concepts - Automated Retraining Workflows and Experiment Tracking
- ❖ Azure Feature Store Integration - Managing Real-Time and Batch Features with Azure Feature Store
- ❖ Azure Cloud Deployment Models - Public, Private, Hybrid Cloud Deployment for ML Pipelines in Azure
- ❖ Capstone Project - Automate model retraining workflows and track experiments for better model management. Implement feature engineering and real-time data integration using Azure Feature Store. Deploy ML workflows in scalable Azure environments and choose appropriate cloud deployment models.

Note: All modules are enriched with real-world contextualization, using data and challenges from UPS's own operations to ensure immediate relevance and application.