Operational AI-ML Ops COURSE Contents (5 Days)

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Prerequisites

- Good understanding on Machine Learning and Deep Learning
- Coding experience on Python programming

Learning Objectives

- Understand the need for MLOps in the world of data science
- Familiarise yourself with Docker and the need for containerisation
- Become familiar with DVC and MLOPS and its various components
- Build data ingestion, validation pipelines
- Build orchestrated ML pipelines
- Gain a deep understanding of Kubernetes clusters and how they operate
- Deploy models in the cloud platforms

COURSE CONTENTS

Operational AI Introduction and Environment Setup
Model artifacts management using Git
Python & Flask
Strategy, Environment overview
Model Deployment Architectures Model Deployment Pipeline
Model & RESTful web services

PRACTICAL BASED CASESTUDY ON

GIT
DVC
GITHUB FLOW FLASK DEPLOYMENT FAST API
DATA CONTAINERS
MODEL DEPLOYMENT ARCHITECTURE PIPELINES
FEATURE ENGINEERING
FEATURE SELECTION
HYPER PARAMETER

HYPER PARAMETER TUNING CREATING PIPELINE BASED PROJECT DATA SELECTION
DATA VALIDATION
HYPER SEARCH
ML TO GITHUB RETAINING PHRASE
SERVICES
DATA INJESTION
DATA VALIDATION
DATA CONTAINERISATION
Introduction to MLFLOW MODEL VERSIONING MLFLOW PROJECT
HYPER PARAMETER TUNING NEURAL SEARCH
HYPER PARAM SEARCH
Model Performance Monitoring
Pre-Production
Post-Production
Pipeline Setup
Model Retraining
Automated and AutoML Techniques Model Versioning
Configuration Management

Introduction to MLOps and Basics of Machine Learning

1. **Introduction to MLOps**
    - Overview of MLOps concepts and importance.
    - Challenges in deploying and managing machine learning models.
2. **Introduction to Machine Learning**
    - Basics of machine learning algorithms.
    - Supervised and unsupervised learning.
    - Model evaluation metrics.
3. **Data Preparation for Machine Learning**
    - Data preprocessing and cleaning.
    - Feature engineering.
    - Handling missing data.

Building and Training Machine Learning Models

1. **Model Development Workflow**
    - End-to-end model development process.
    - Version control for machine learning models.
2. **Selecting and Training Models**
    - Choosing appropriate algorithms.
    - Hyperparameter tuning.
    - Cross-validation.
3. **Model Deployment Basics**
    - Introduction to model deployment concepts.
    - Serving models using frameworks like Flask or FastAPI.

Containerization and Orchestration

1. **Docker for MLOps**
    - Introduction to Docker.
    - Building and pushing Docker images for machine learning models.
2. **Kubernetes for Orchestration**
    - Basics of Kubernetes.
    - Deploying machine learning models on Kubernetes clusters.

Continuous Integration and Continuous Deployment (CI/CD) for MLOps

1. **Introduction to CI/CD**
    - Principles of CI/CD.
    - Building and testing machine learning models in CI/CD pipelines.
2. **Automated Model Deployment**
    - Integrating model deployment into CI/CD.
    - Automated testing of machine learning models.
3. **Monitoring and Logging for MLOps**
    - Monitoring model performance.
    - Logging and debugging in production.

Model Versioning, Governance, and Advanced Topics

1. **Model Versioning and Experiment Tracking**
    - Managing model versions.
    - Experiment tracking with tools like MLflow.
2. **Model Governance and Compliance**
    - Ethical considerations in machine learning.
    - Model governance and compliance requirements.
3. **Advanced Topics in MLOps**
    - Reinforcement learning in production.
    - Model explainability and interpretability.