

Machine Learning with Python - Module 1: ML in Action

Overview

This document summarizes the key concepts and topics covered in Module 1 of the 'Machine Learning with Python' course. The module introduces fundamental ML concepts, lifecycle, roles in ML, and essential tools used in machine learning and AI applications.

Key Topics Covered

- Introduction to Machine Learning

- AI vs. Machine Learning: AI simulates human cognition, ML enables data-driven learning.
- Types of ML models: Supervised, Unsupervised, Semi-Supervised, Reinforcement Learning.

- Machine Learning Lifecycle

- ML model lifecycle includes problem definition, data collection & preparation, model development, evaluation, deployment, and monitoring.

- Day in the Life of an ML Engineer

- Understanding the workflow of ML engineers, including business problem identification, data collection, feature engineering, model selection, and deployment.

- Data Scientist vs. AI Engineer

- Differences and overlaps between Data Scientists and AI Engineers.
- AI Engineers specialize in generative AI, transformers, and LLM-based applications.

- ML Tools & Ecosystem

- Programming: Python, R, Julia, Scala, Java, JavaScript.
- Data Processing: Pandas, NumPy, PostgreSQL, Spark, Apache Kafka.
- Visualization: Matplotlib, Seaborn, ggplot2, Tableau.
- ML Frameworks: Scikit-learn, TensorFlow, Keras, PyTorch.

- Scikit-Learn Ecosystem

- Essential library for classical ML models: Classification, Regression, Clustering.
- Functions for preprocessing, model evaluation, and deployment.

Key Takeaways

- Machine Learning (ML) models learn from data to identify patterns and make predictions.
- Choosing an ML technique depends on the problem, data, and objectives.
- ML engineers and data scientists have distinct roles but overlap in some areas.
- Scikit-learn & Python offer powerful tools for classical ML models.
- The ML lifecycle is iterative, requiring monitoring & retraining over time.

Next Steps

- Module 2: Regression Analysis - Exploring supervised learning, regression techniques, and predictive modeling.