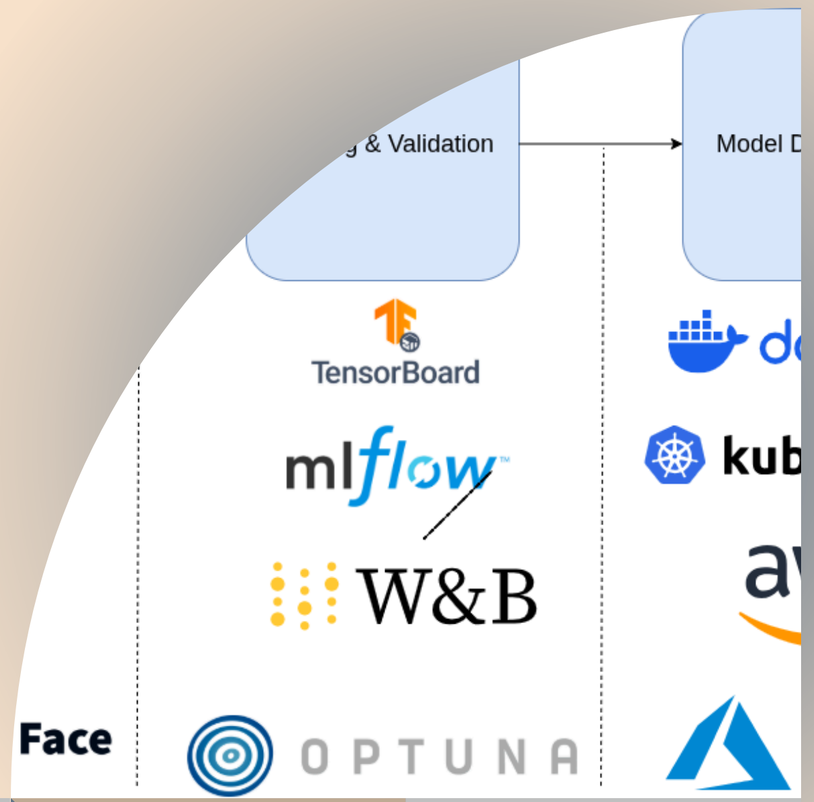
Deep Learning Pipelines

Introduction to Deep Learning - Recitation 0

Peter Wauyo & delphine nyaboke



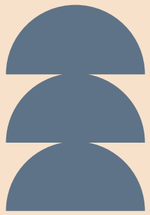
Deep Learning Pipeline

Definition

A structured framework for building, training, validating, deploying, and monitoring deep learning models.

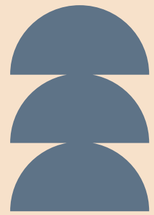
The Importance of Deep Learning Pipelines

Reproducibility and consistency



Efficiency through automation

Experimentation and rapid iteration



Scalability for large-scale models

Collaboration among teams

Key Components

Data Management

(collection, preprocessing, augmentation)

Model Development

(architecture, hyperparameter tuning)

Training & Validation

(metrics, evaluation methods)

Deployment

(model serving, infrastructure)

Monitoring and maintenance

(performance metrics, retraining)

Common Challenges

Data Quality

Ensuring data is accurate, consistent, and reliable.

Scalability

Ability to handle increasing amounts of data efficiently.

Integration

Combining different systems and processes seamlessly together.

Monitoring

Continuous observation of performance and system behavior.

MLOps: Integrating DevOps and Machine Learning

CI

Continuous Integration ensures code changes are tested regularly.

CD

Continuous Delivery automates deployment for easy software updates.

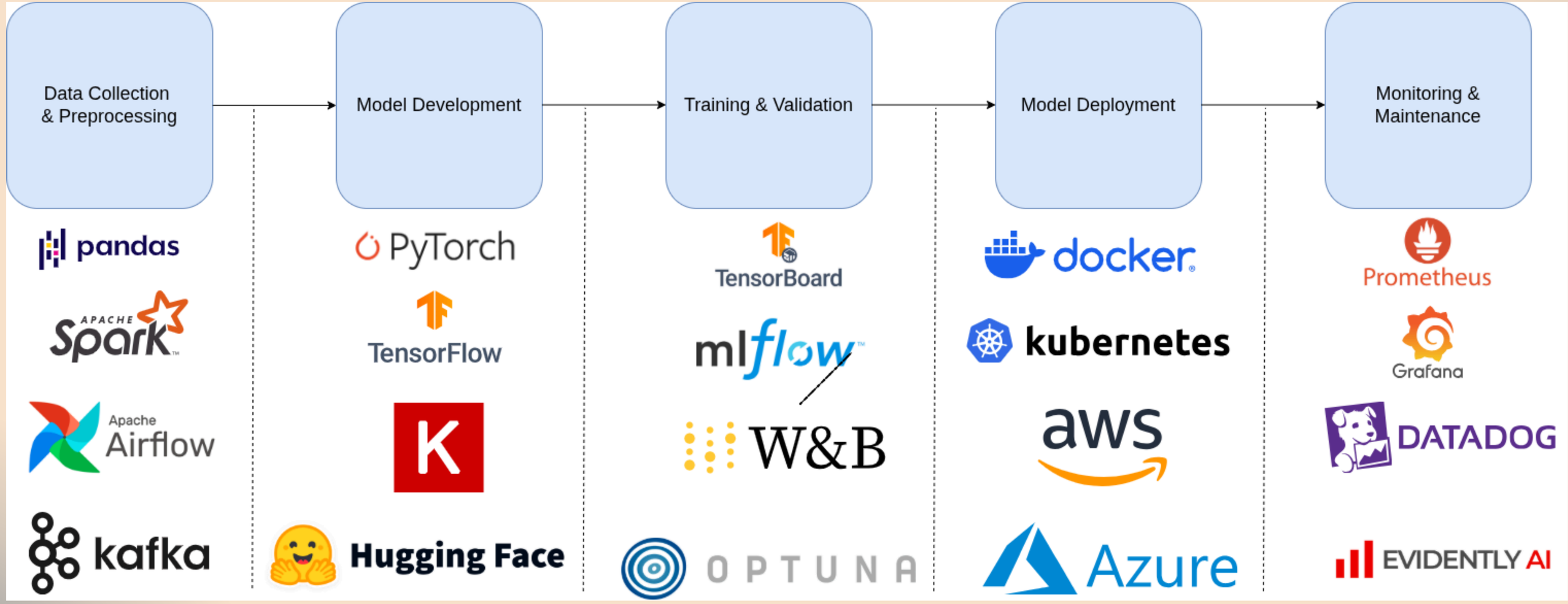
Monitoring

Tracking system performance and model effectiveness over time.

Automation

Streamlining processes to enhance efficiency and reduce errors.

Deep Learning Pipeline



Further Learning

Designing Machine Learning Systems: An Iterative Process for Production-Ready Applications

Chip Huyen

Machine Learning System Design: With End-to-end Examples

Arseny Kravchenko and Valeri Babushkin

Key Takeaways from Deep Learning Pipelines

Pipelines enable structured, reliable, and scalable deep learning workflows

Automation and reproducibility are vital

Collaboration, documentation, and version control are essential for success