

Familiarizing with AI

Session 2 : AI Tools, Technologies, and How to Leverage Them



AI Tools, Technologies, and How to Leverage Them

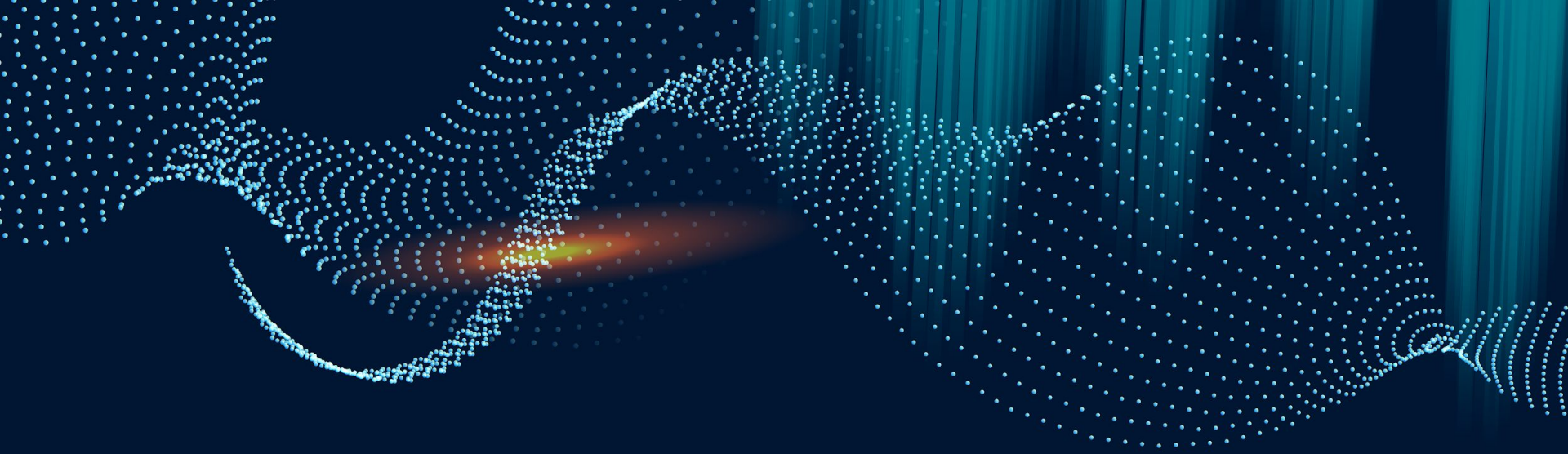
01 AI Development Tools and Frameworks

0 How AI Models Work

2
0 Building vs Using Pre-Trained Models

3





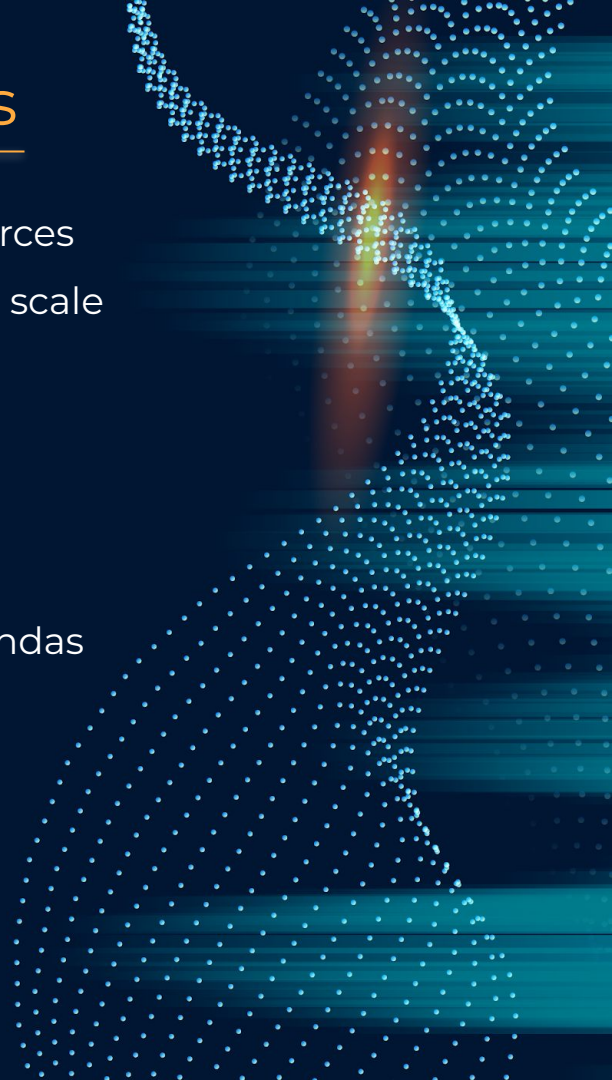
01

AI Development Tools and Frameworks

AI Development Tools and Frameworks

AI tools and frameworks provide essential infrastructure and resources for developers, researchers, and organizations to build, deploy, and scale AI models.

- **ML Frameworks:** TensorFlow, PyTorch, Keras
- **Deep Learning Frameworks:** Keras, MXNet, Caffe
- **NLP Tools:** spaCy, Transformers, NLTK
- **Data Processing and Management Tools:** Apache Spark, Pandas



Machine Learning Frameworks

TensorFlow

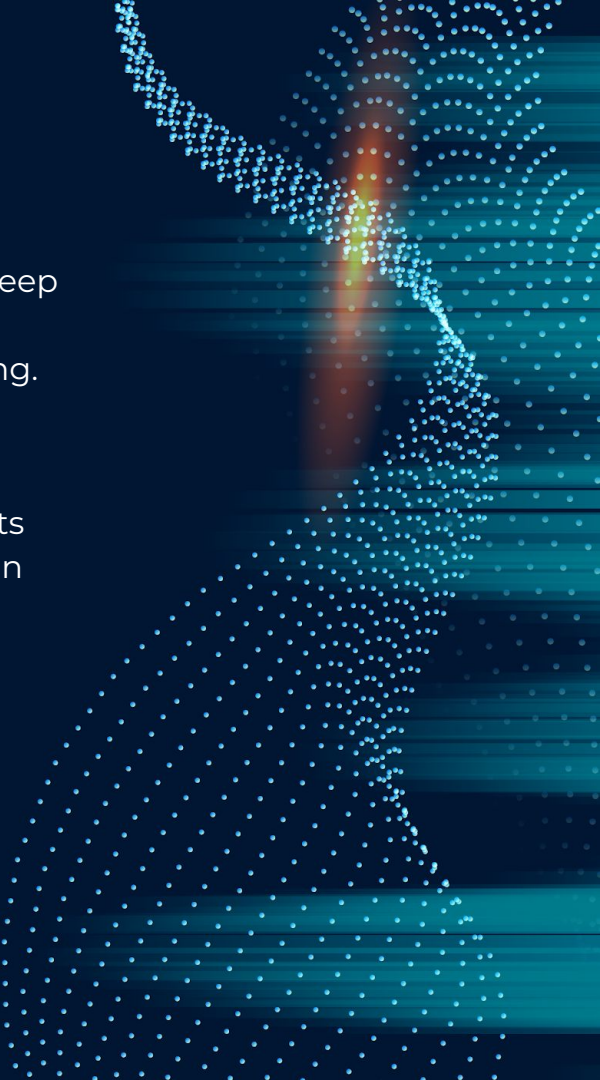
One of the most widely used open-source libraries for machine learning and deep learning. It supports a wide variety of machine learning algorithms and is commonly used for tasks like image classification, NLP, and predictive modeling.

PyTorch

PyTorch has become extremely popular in the AI research community due to its ease of use and dynamic computation graphs, which allow for more flexibility in model design. It's ideal for research purposes and also gaining ground in production environments.

Scikit-learn

A lightweight, easy-to-use machine learning library for Python, primarily for classical ML tasks like classification, regression, clustering, and dimensionality reduction. It is commonly used for non-deep learning tasks and data preprocessing.



Deep Learning Frameworks

Keras

A high-level neural networks API written in Python that runs on top of TensorFlow. It's known for its simplicity and ease of use, making it popular among beginners and for rapid prototyping.

MXNet

An open-source deep learning framework designed for efficiency and flexibility. It's known for its ability to scale and support distributed computing, making it ideal for large-scale applications like AWS cloud services.

Caffe

A deep learning framework focused on image processing tasks and is popular for its speed and efficiency. It is well-suited for Convolutional Neural Networks (CNNs) and image classification tasks.



NLP Tools

spaCy

A powerful NLP library in Python designed for high-performance processing. It provides pre-trained models for tasks such as tokenization, part-of-speech tagging, named entity recognition (NER), and dependency parsing.

Transformers

Hugging Face's transformers library provides easy access to pre-trained transformer-based models such as BERT, GPT, and RoBERTa. It has simplified the adoption of state-of-the-art models for a wide range of NLP tasks, from sentiment analysis to text generation.

NLTK

The Natural Language Toolkit (NLTK) is a comprehensive library for building NLP applications. While it is less efficient than spaCy or Hugging Face's transformers, it's an excellent tool for academic purposes and for teaching NLP concepts.



Data Processing and Management Tools

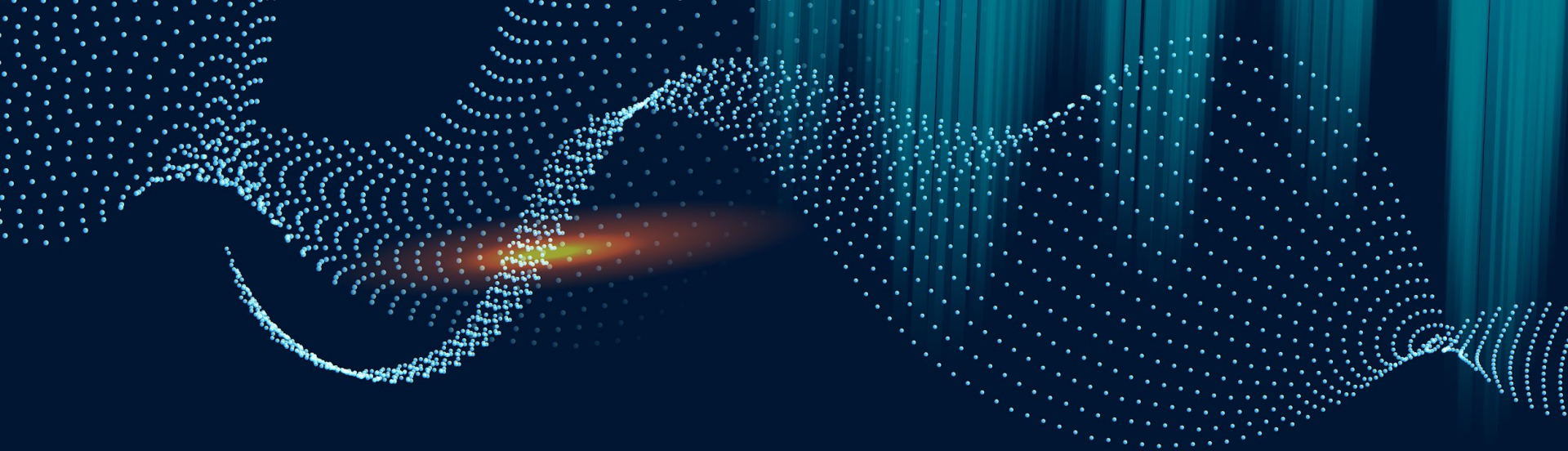
Apache Spark

A unified analytics engine for large-scale data processing. It provides in-memory computation, which makes it ideal for big data analytics and for preparing massive datasets for AI models.

Pandas

A data manipulation library for Python that provides easy-to-use data structures like DataFrames. It's particularly useful for data preprocessing in small to medium-sized datasets.

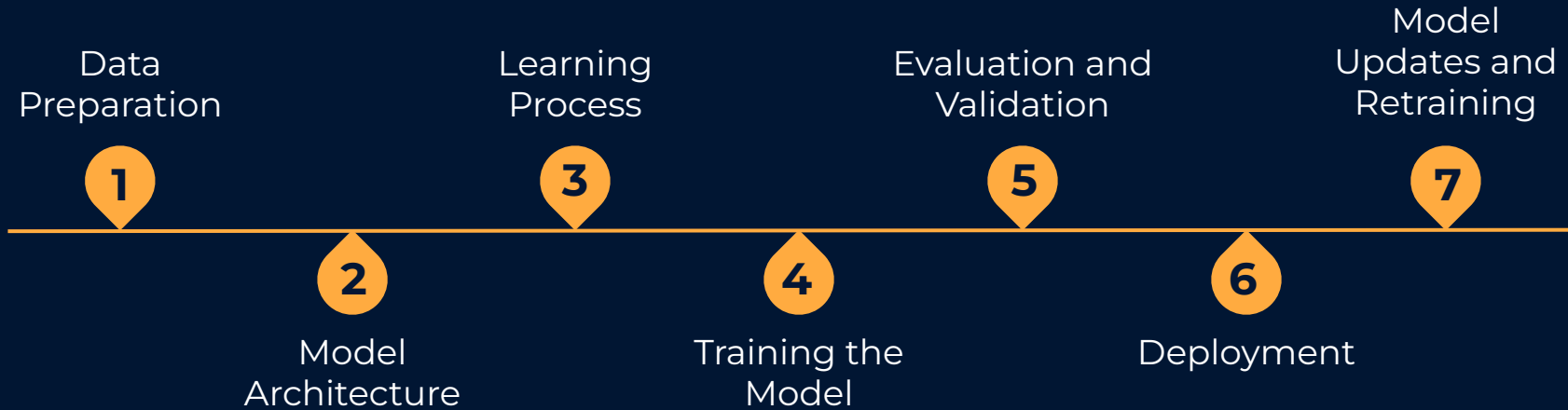


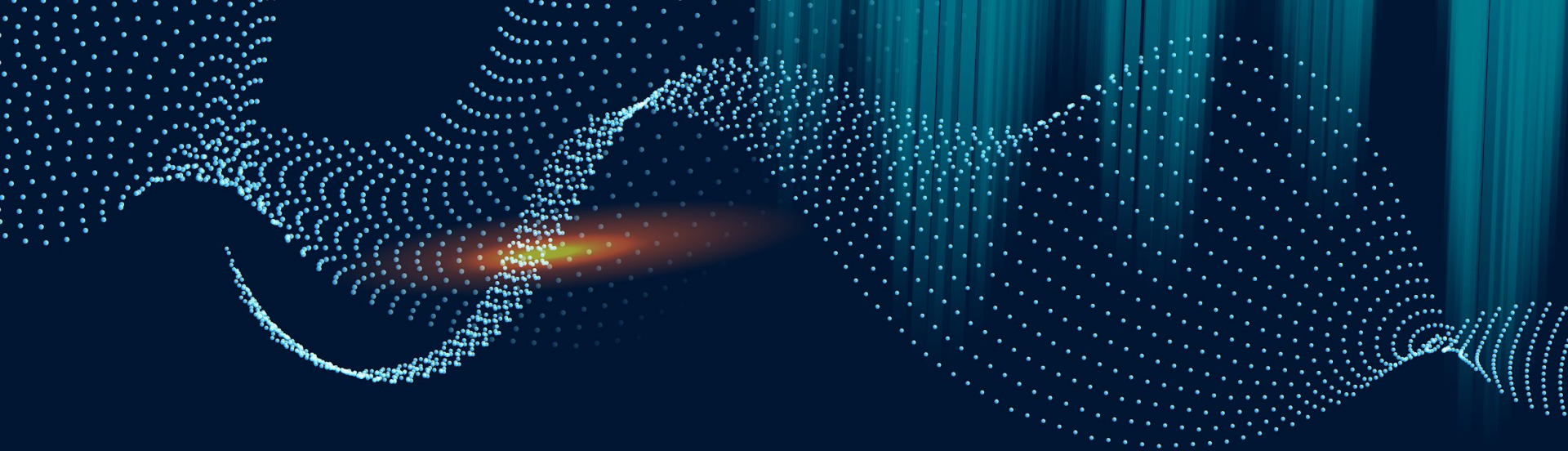


02

How AI Models Work

How AI Models Work





03

Building vs Using Pre-trained Models

Building Models from Scratch

Advantages

- Customization for specific problems
- Learning from proprietary data
- Innovation
- No pre-existing bias

Challenges

- Data requirements
- Computational Cost
- Time-consuming
- Expertise



Using Pre-Trained Models

Advantages

- Faster development
- Lower data requirements
- Reduced computational cost
- Performance

Challenges

- Limited customization
- Data and task mismatch
- Biases in pre-trained models
- Adaptation limitations



An abstract background featuring a dark blue field. On the left, a bright orange and yellow light streak curves upwards, surrounded by a dense pattern of small white dots that form a semi-circular shape. Diagonal blue lines are visible in the background.

Q&A