

Session 1: Introduction to AI Models (2.5 hours)

<https://bristol-training.github.io/getting-started-ai-1>

Part 1: AI and Machine Learning Foundations (45 min)

- The AI landscape
- The machine learning paradigm: training with data
- Key concepts: datasets, features, labels, training vs. testing
- Three learning types: supervised, unsupervised, reinforcement learning
- Introduction to the datasets

Break (5 min)

Part 2: Supervised Learning - Prediction (30 min)

- **Regression:** predicting continuous values
 - Linear regression basics
 - Overfitting vs. underfitting: the bias-variance trade-off
- Hands-on example and visualization

Part 3: Supervised Learning - Classification (30 min)

- **Classification:** predicting categories
 - Decision trees
 - Overfitting and Model Pruning
 - Evaluation metrics: accuracy, precision, recall
- Hands-on example and visualization

Break (10 min)

Part 4: Large Language Models (25 min)

- Evolution from traditional NLP to modern LLMs
 - Key innovation: transformer architecture and attention mechanisms
 - Training process: pre-training on massive data, then fine-tuning
- Limitations: hallucinations, bias, context windows, computational costs
- Responsible use and prompt engineering

Wrap-up (5 min)

Session 2: AI for Research - Hands-on with Python (2 hours)

<https://bristol-training.github.io/getting-started-ai-2>

Part 1: Data Exploration (20 min)

- Environment setup
- Loading and exploring a research dataset (Pandas library)
- Visualization: plotting distributions and relationships

Part 2: Building a Classification Model with scikit-learn (30 min)

- Framing a classification problem (predicting categories)
- Training a model: random forest
- Interpreting results for research insights

Break (10 min)

Part 3: Building a Classification Model with PyTorch (40 min)

- Revisiting neural networks and PyTorch basics
- Building a simple feedforward network for classification
- Training loop: backpropagation
- Evaluating the classifier: accuracy, confusion matrix

Part 4: Using APIs to query LLMs (15 min)

Wrap-up (5 min)