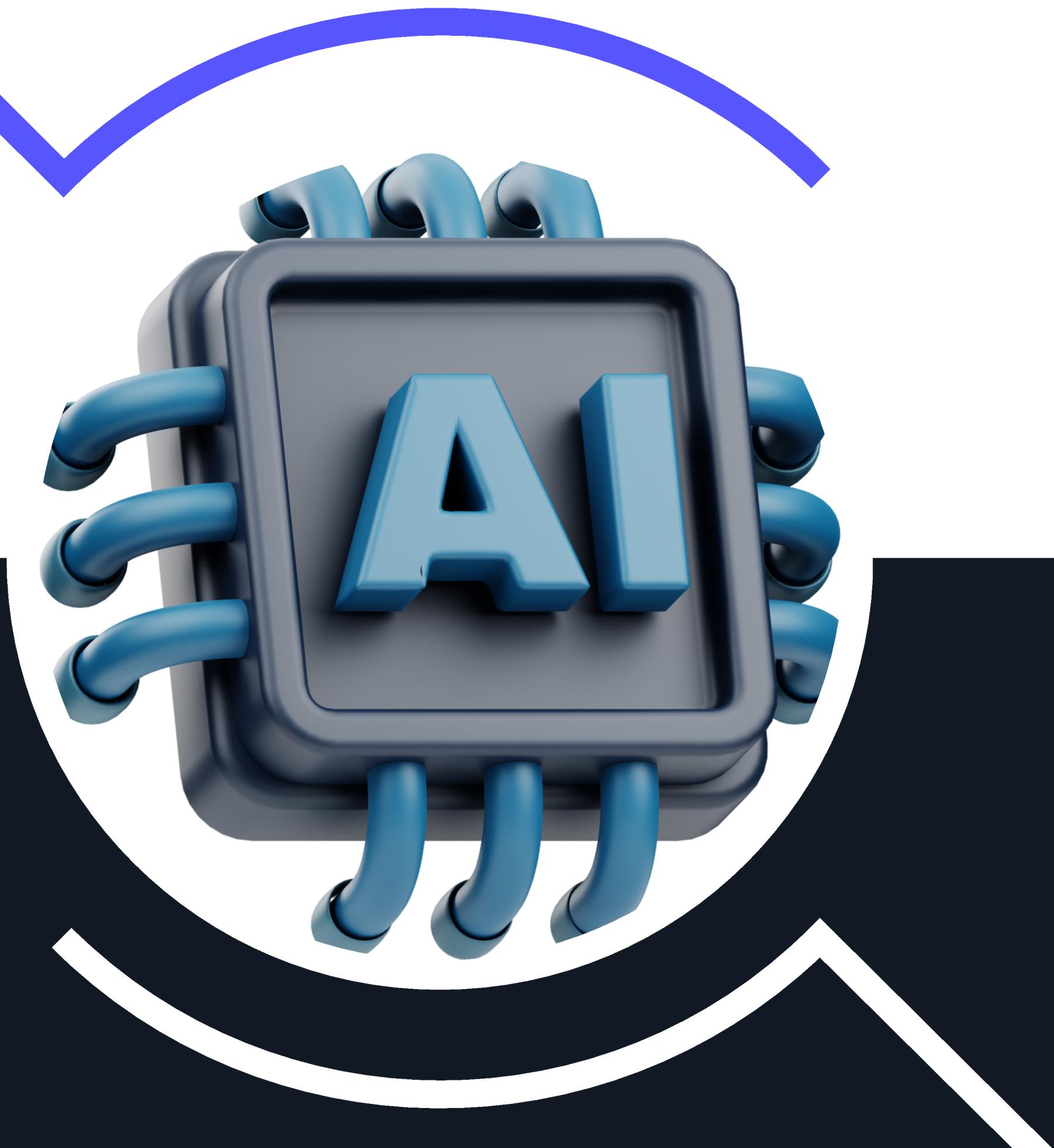




**TecTerminal**  
Learn. Connect. Succeed

# INTRODUCTION TO AI & MACHINE LEARNING

Beginners and intermediate learners with basic  
programming knowledge (preferably Python)





### What is Artificial Intelligence?

- **Definition of AI:** Systems mimicking human intelligence
- **Brief history:** Turing Test, Deep Blue, modern deep learning
- **Types of AI:** Narrow, General, Superintelligent



### Introduction to Machine Learning

- **Definition:** Learning from data without explicit programming
- **Types:** Supervised, Unsupervised, Reinforcement Learning
- **Key terms:** Data, features, models, training
- **Demo:** Simple dataset exploration with Pandas



### Tools and Setup

- **Overview:** Python, Scikit-learn, TensorFlow, Jupyter Notebook
- **Setup:** Install software and test a simple script
- **Best practices:** Organizing code and data

**Resources:** Jupyter Notebook, sample CSV dataset

**Activity:** Run a Python script to print "Hello, AI World!" (30 min)



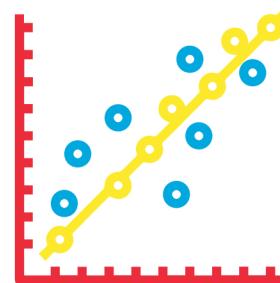


### Understanding Supervised Learning

- **Definition:** Learning from labeled data
- **Tasks:** Classification (e.g., spam detection), Regression (e.g., price prediction)
- **Examples:** Real estate price prediction

**Activity:** Quiz: Identify classification vs. regression tasks

**Resources:** Slides, case study: "Use Case"



### Building a Linear Regression Model

- **Concept:** Predicting numerical values
- **Steps:** Load data, train model, make predictions
- **Code:** Build a model with Scikit-learn
- **Sample:** Predict house prices based on size



### Model Evaluation and Improvement

- Metrics: Mean Squared Error, Accuracy
- Overfitting vs. underfitting
- Improving models: Data cleaning, feature selection



- **Activity:** Evaluate your model, tweak inputs
- **Resources:** Code template, evaluation guide



## Introduction to Unsupervised Learning



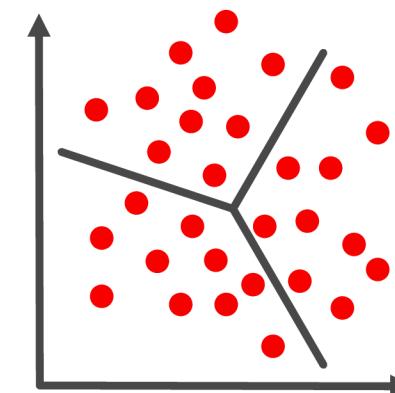
- **Definition:** Finding patterns in unlabeled data
- **Tasks:** Clustering, dimensionality reduction
- **Use case:** Segmenting real estate markets

- **Activity:** Brainstorm: “What patterns could AI find in data?” (15 min)
- **Resources:** Slides, example: “Clustering Customers”

## K-Means Clustering

- **Concept:** Grouping data into k clusters
- **Steps:** Choose k, assign points, refine clusters
- **Code:** Cluster a dataset with Scikit-learn

- **Activity:** Cluster a sample dataset (e.g., property features) (45 min)
- **Resources:** Jupyter Notebook, dataset



## Applications and Visualization

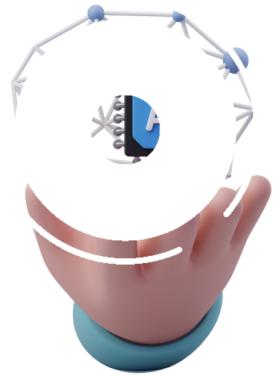


- Visualize clusters with Matplotlib
- **Real-world uses:** Market analysis, customer segmentation
- **Limitations:** Choosing k, interpreting results

- **Activity:** Plot and interpret your clusters (30 min)
- **Resources:** Code template, visualization guide



## Reinforcement Learning and Deep Learning



- **Reinforcement Learning:** Learning via rewards
- **Deep Learning:** Neural networks, layers, applications
- **Examples:** Game AI, image recognition

- **Activity: Discussion:** "How could RL help real estate?"
- **Resources:** Slides, video: "Neural Networks Explained"

## Ethics in AI and ML

- **Bias:** Unfair predictions in models
- **Privacy:** Data collection concerns
- **Accountability:** Who's responsible for AI decisions?

- **Activity: Debate:** "Should AI decide property values?" (30 min)
- **Resources:** Case study: "Bias in AI", ethics checklists



## Project Kickoff and Q&A



- **Project:** Build an ML model (e.g., predict rents, cluster properties)
- **Steps:** Choose data, train model, present results
- **Q&A:** Address learner questions

- **Activity:** Start project, explore datasets (45 min)
- **Resources:** Project guide, dataset links (Kaggle, UCI)





## Project Work and Support

- Work on capstone project
- **Troubleshoot:** Data issues, model tuning
- **Tips:** Presenting results effectively



## Course Wrap-Up

- **Recap:** Key learnings from all modules
- **Next steps:** Advanced courses, Kaggle, research
- Certificates and closing remarks

- **Activity:** Build and test your model (60 min)
- **Resources:** Code templates, troubleshooting guide

- **Activity:** Self-reflection: "What's your AI goal?"
- **Resources:** Resource list, certificate

## Project Presentations and Review

- Present capstone projects to peers
  - Feedback: Strengths, areas to improve
  - Review key concepts: AI, ML types, ethics
- 
- **Activity:** Share your project (30 min)
  - **Resources:** Presentation tips, rubric

