

L06: Embeddings & RL

Text Representations and Sequential Decision Making

Methods and Algorithms – MSc Data Science

Learning Objectives

By the end of this lecture, you will be able to:

- 1 Explain word embeddings and their applications
- 2 Apply pre-trained embeddings for text analysis
- 3 Understand the reinforcement learning framework
- 4 Implement basic Q-learning for decision problems

Finance Applications: Sentiment analysis, algorithmic trading

From text to numbers, from decisions to optimal policies

Text Data Challenge

- Financial news, reports, social media contain valuable signals
- Text is unstructured—how to feed it to ML models?
- Need to capture semantic meaning (“bullish” similar to “positive”)

Sequential Decision Challenge

- Trading requires sequences of buy/sell/hold decisions
- Actions have delayed consequences (profit realized later)

Embeddings solve text, RL solves sequential decisions

01_word_embedding_space/chart.pdf

02_similarity_heatmap/chart.pdf

03_rl_loop/chart.pdf

04_q_learning_grid/chart.pdf

Q-values indicate expected future reward from each state-action

05_reward_curves/chart.pdf

06_policy_viz/chart.pdf

07_decision_flowchart/chart.pdf