

# L06: Embeddings & RL

## Text Representations and Sequential Decision Making

Methods and Algorithms – MSc Data Science

**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

# The Business Problem

## 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

# Word Embedding Space

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