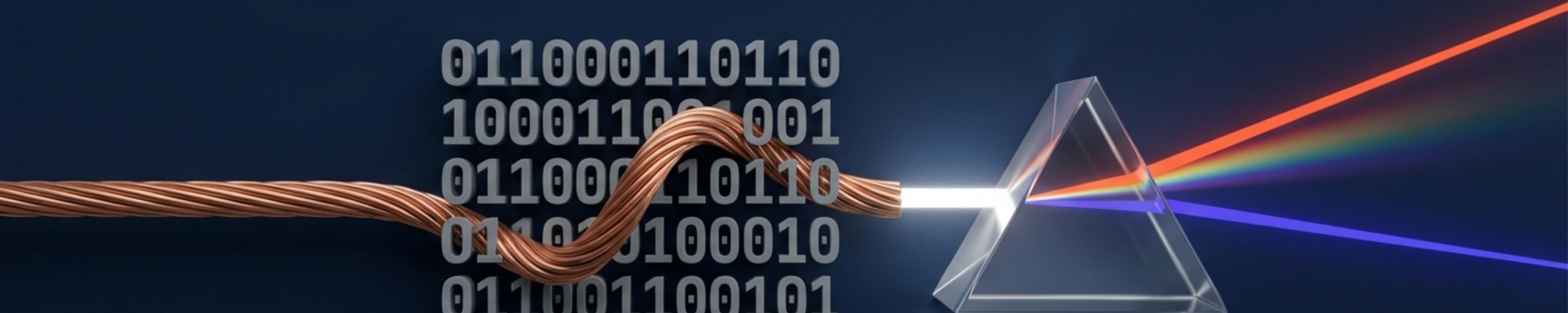


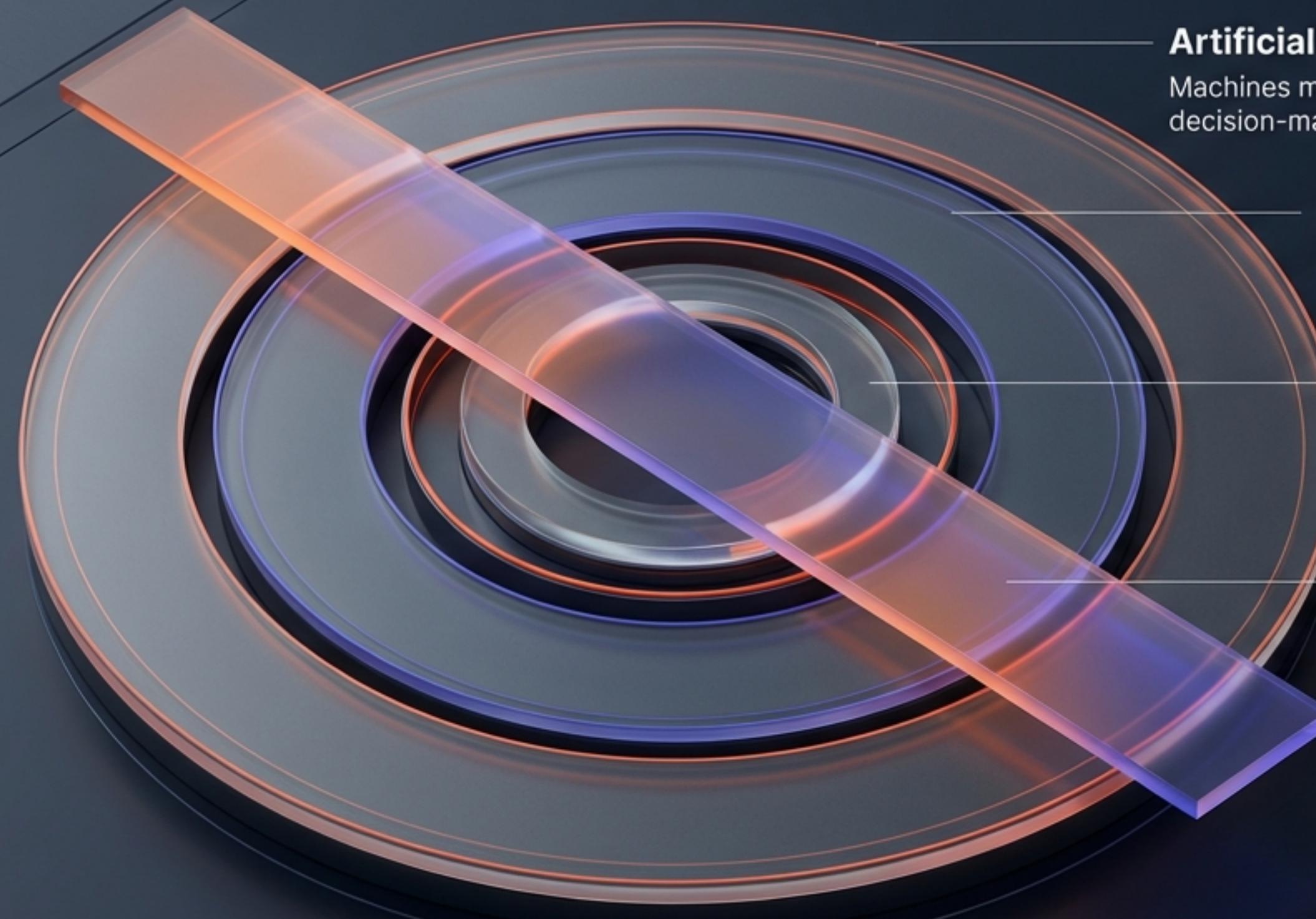
# The Intelligence Value Chain

From Data Science Fundamentals to Generative AI

**011000110110  
100011001001  
011000110110  
011000100010  
011001100101  
101100101010**



# Defining the Ecosystem



## Artificial Intelligence (AI)

Machines mimicking human intelligence and decision-making. Inter, JetBrains Mono

## Machine Learning (ML)

Learning from data to predict future values.

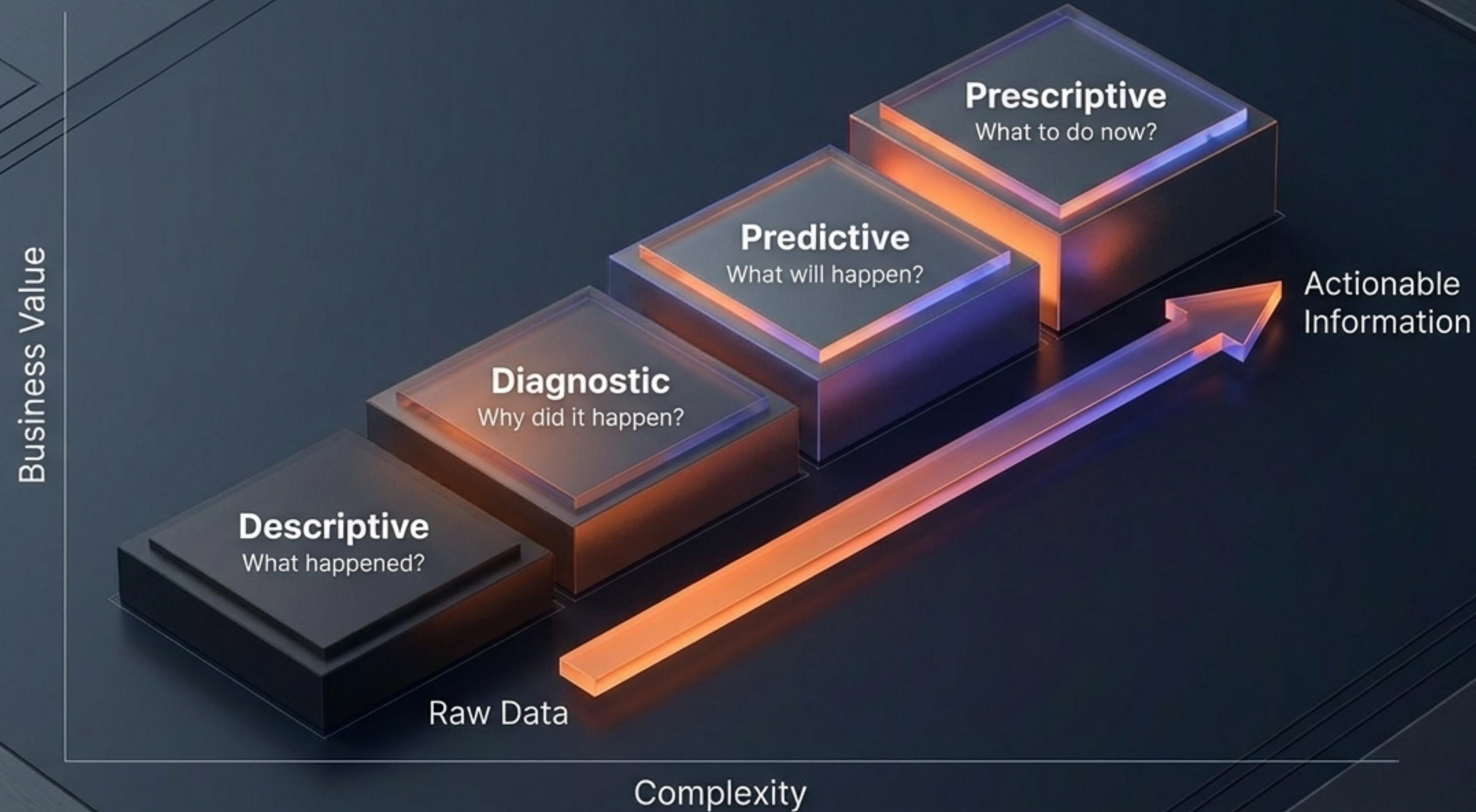
## Deep Learning (DL)

Neural networks mimicking the human brain structure.

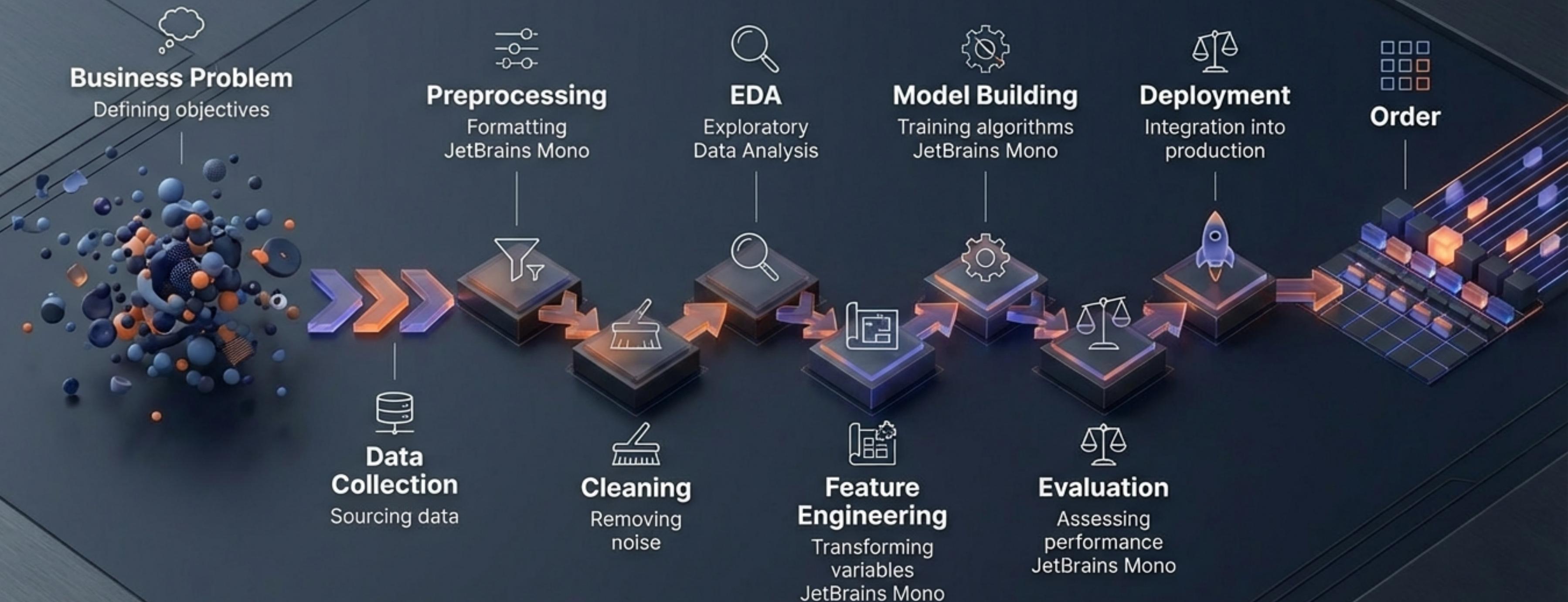
## Data Science

Extracting insights via math, stats, and domain expertise.

# The Four Stages of Analytics



# The Data Science Project Lifecycle



# The Engine: Python Programming

**Interpreted**, high-level language for application building and analysis.

**Variables**, Data Types, Operators, Control Flow (**Loops/Conditionals**).

**Streamlit**: Building web apps for data science.

**Functions**, Lambda, OOP, Exception Handling.



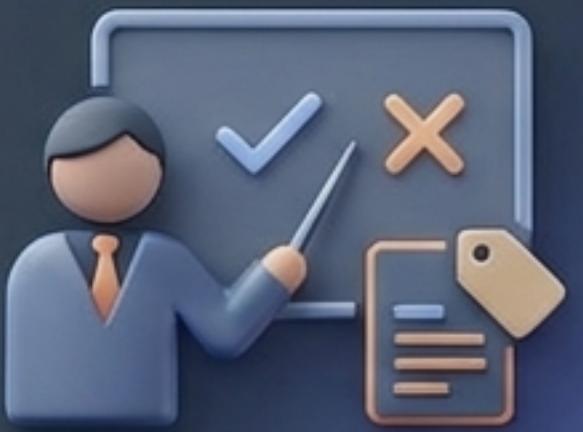
# The Toolkit: Libraries & Frameworks



# Machine Learning Paradigms

## Supervised Learning

Learning from labeled training data.



## Unsupervised Learning

Discovering hidden patterns in unlabeled data.



## Semi-supervised Learning

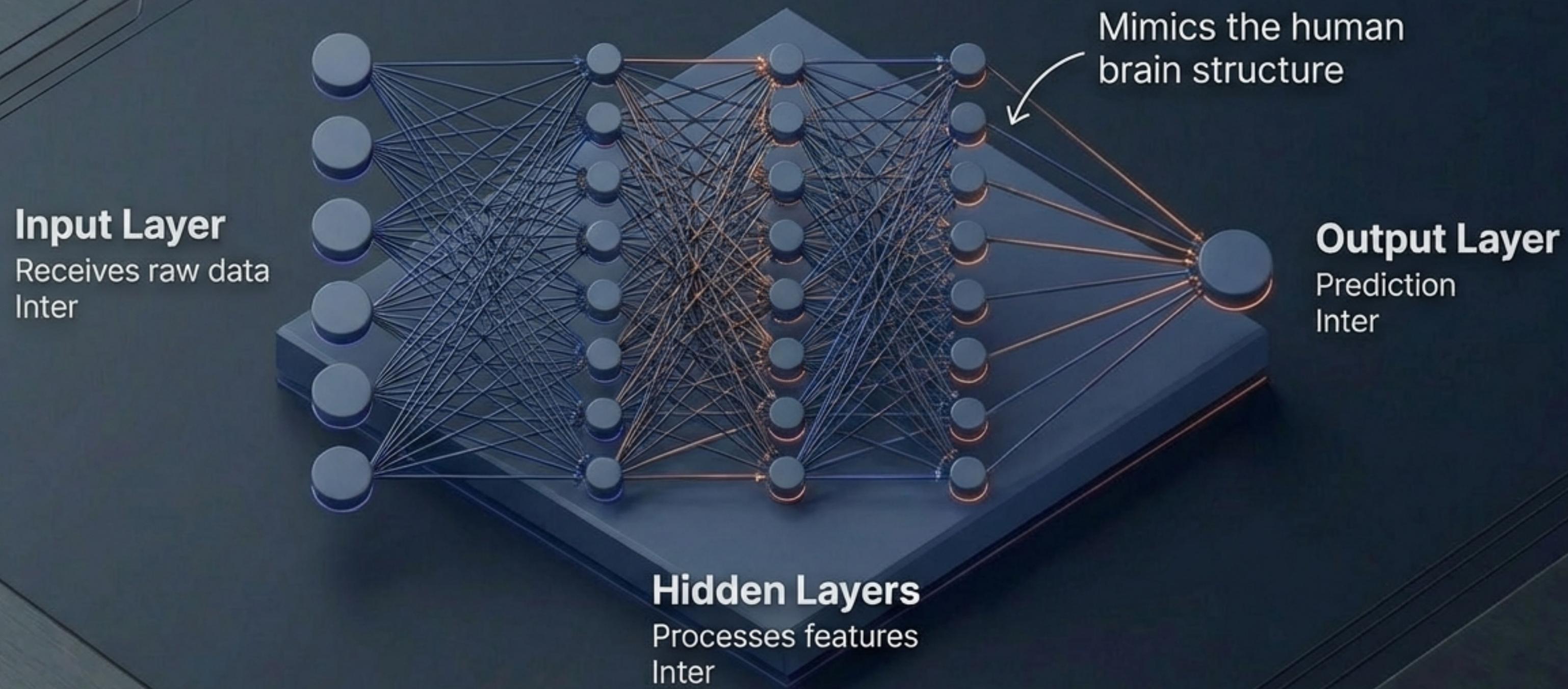
Hybrid approach using small labeled & large unlabeled datasets.



## Reinforcement Learning

Learning through trial and error (rewards/penalties).

# Deep Learning & Neural Networks



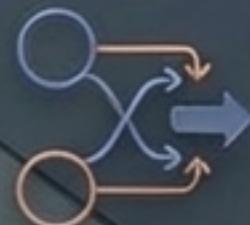
# The Frontier: NLP and Generative AI



**NLP:** Interpreting  
human language.

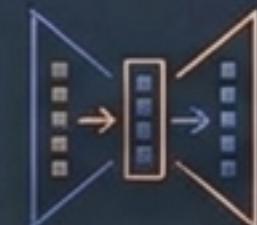


**GenAI:** Creating new content  
(Text, Image, Audio).



## Core Algorithms

GANs (Generative  
Adversarial Networks)  
Inter, JetBrains Mono



## Core Algorithms

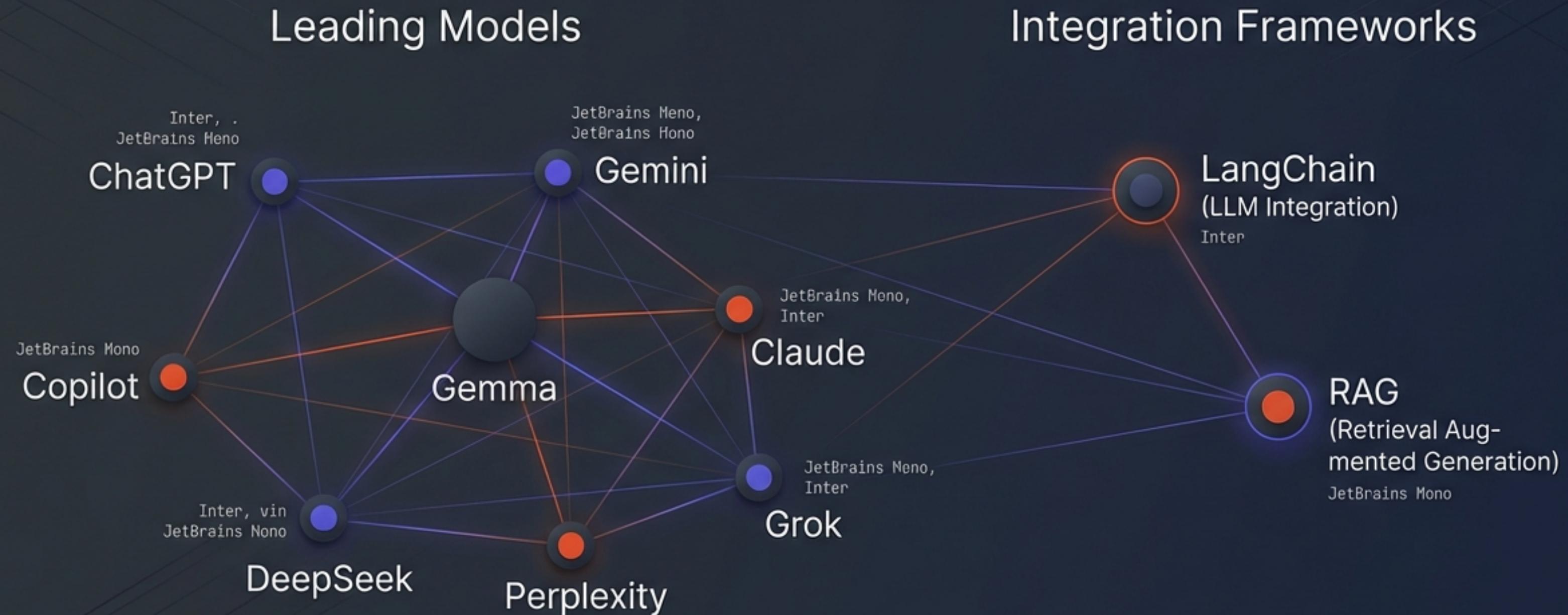
VAEs (Variational  
Auto Encoders)  
Inter, JetBrains Mono



## Core Algorithms

Transformers (Modern  
NLP Architecture)  
Inter, JetBrains Mono

# The Generative AI Ecosystem



# Real-World Applications



## Finance & Banking

- Fraud Detection
- Credit Risk



## Healthcare

- Drug Discovery
- Disease Prediction



## E-Commerce

- Churn Prediction
- Customer Segmentation



## General

- Weather Forecasting
- SMM Analysis

# The Human Element: Roles & Skills

Business Analyst /  
BI Analyst

**Data Scientist**  
(The Bridge)

ML Engineer/  
AI Architect/  
NLP Engineer

Business Oriented

Tech Oriented

Skill Stack

Python

SQL

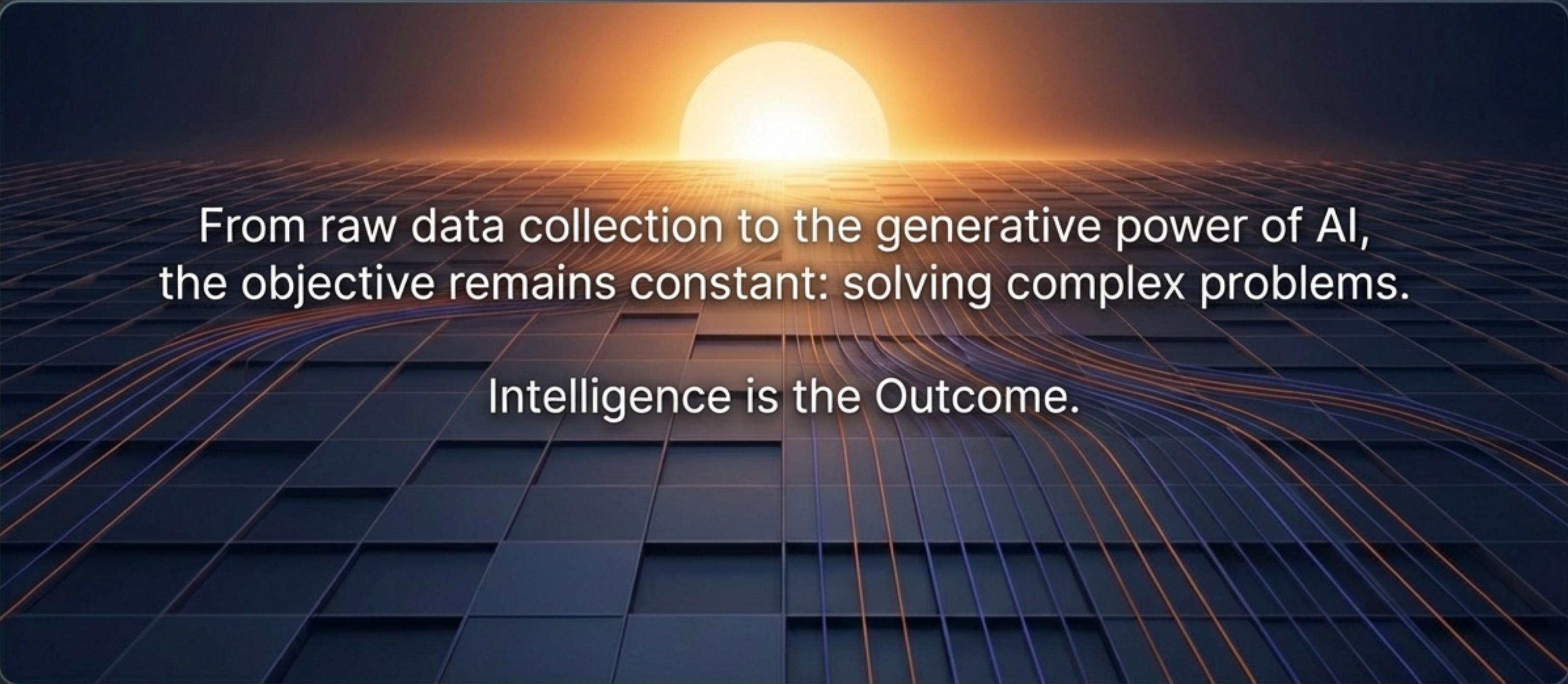
Statistics

Tableau/PowerBI

Problem Solving

Data Management

# The Future of Intelligence

A large rectangular frame containing a sunset scene. The sun is low on the horizon, casting a warm orange glow across the sky. Below the horizon is a grid of numerous solar panels, stretching towards the viewer. The panels are dark blue and reflect the warm light of the setting sun. The overall atmosphere is futuristic and optimistic.

From raw data collection to the generative power of AI,  
the objective remains constant: solving complex problems.

Intelligence is the Outcome.