# ML in Quantitative Equity Investing

Excavating Primary Trends for Longer-Term Portfolios

# Beyond the Hype

**High-Frequency Trading**

- Second-by-second time scale

- Market microstructure focus

- Complex ML models

**Long-Term Investing**

- Multi-month time horizons

- Fundamental patterns

- Interpretable ML models

**Our Focus:** ML as a tool to excavate durable trends, guided by human oversight

# ML's Core Role: The Trend Excavator

**ML uncovers patterns invisible to traditional analysis**

### The Excavator

Sifting signals from noise

### Key Example

**Tech sector's margin profiles → Detect long-term trend in sustainable FCF**

# Interpretability is Non-Negotiable

In investing, you **must know why** decisions are made

## Linear Models

✓ Clear & Transparent

$$y = \beta_1 x_1 + \beta_2 x_2 + \ldots$$

## Complex Models

ℹ Need SHAP Values

Explains predictions & shows feature importance

Higher-stakes decisions require higher transparency

# The Fundamental Backdrop: Context Matters

Markets are **non-stationary**

## Model Limitation

❌ **Models fail** across different regimes

❌ **Backtests mislead** during regime shifts

## ML Challenge

✅ **Strong at interpolation** (known patterns)

❌ **Weak at extrapolation** (new environments)

**Key Insight:** Models should explicitly account for changing market environments

# Modeling Regime Changes

**Hidden Markov Models detect market states**

| **Growth** | **Stability** | **Value** |
|:---:|:---:|:---:|
| Growth & Low Volatility | Safety & High Volatility | Recovery & Curve Steepening |

Switch models based on economic underpinnings for **robust performance** across market cycles

# The Edge: Alternative Data

**Alternative data provides pre-earnings signals.**

## 🛰 Satellite Imagery

- Retail parking lot activity
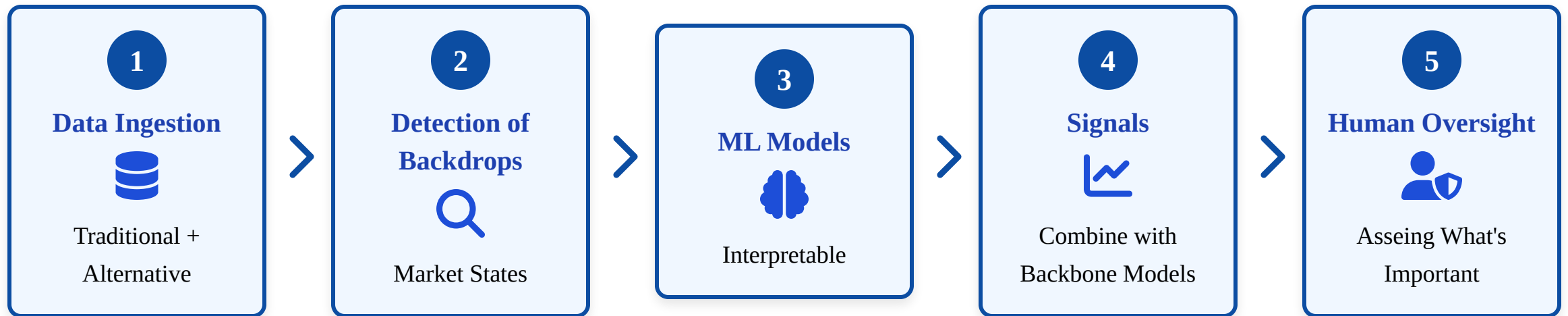- Agricultural yield forecasts

## 💳 Transaction Data

- Consumer spending patterns
- Changing brand preferences

## 🕷 Web-Scraped Data

- Job postings
- Product reviews sentiment
- Web traffic data

ML transforms unstructured data into **actionable signals**

# Investment Workflow

**1** · **Data Ingestion** · Traditional + Alternative

**2** · **Detection of Backdrops** · Market States

**3** · **ML Models** · Interpretable

**4** · **Signals** · Combine with Backbone Models

**5** · **Human Oversight** · Asseing What's Important

## Balance ML with Human Judgment

# Key Takeaways

**ML COMPLEMENTS** judgment — not replaces it

**INTERPRETABILITY** is non-negotiable for risk management

**CONTEXT MATTERS** — account for regime shifts

**ALTERNATIVE DATA** offers different perspectives