



# FRONTIERS OF QUANT

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Director, Client Advisory

April 2023

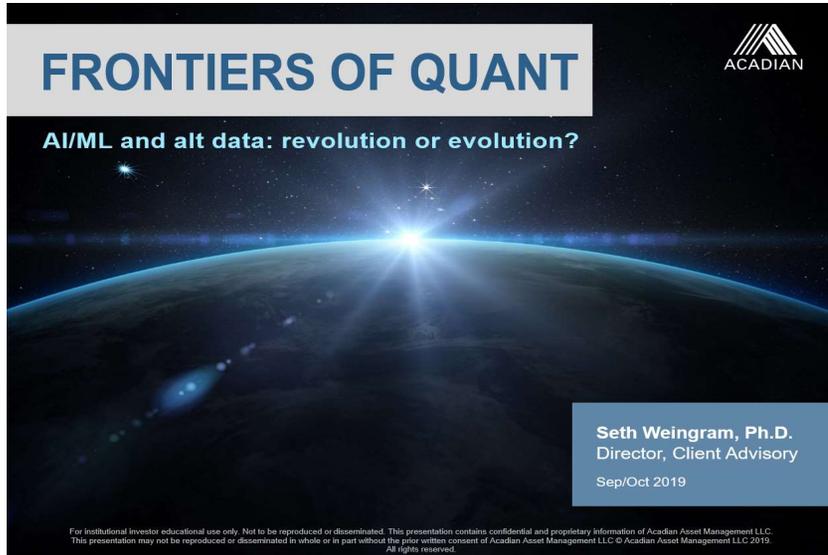
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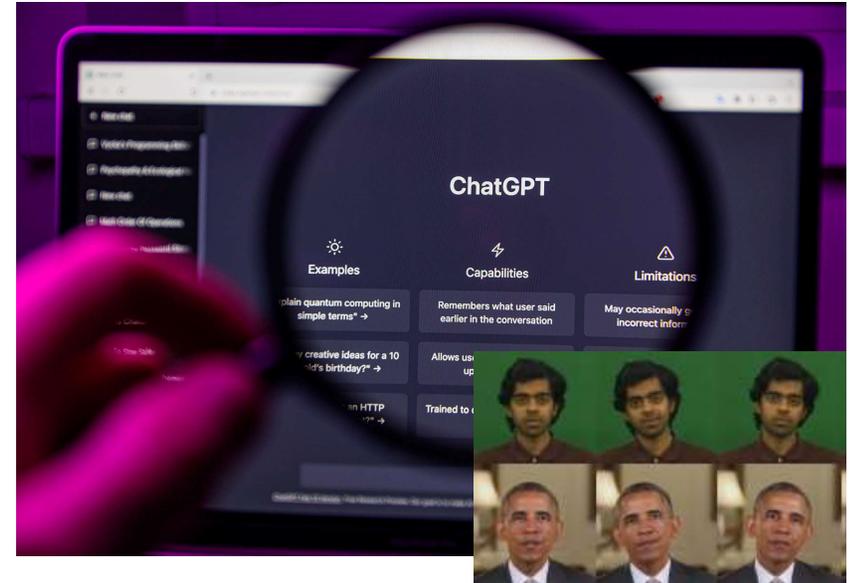
2019



**AI Isn't Ready to Take Fund Manager Jobs Yet**

Bloomberg, 2-Oct-2019

2023



**AI anxiety: The workers who fear losing their jobs to artificial intelligence**

BBC, 18-Apr-2023

# ML in Investing

- Foundations
- Examples
- Best Practices



# FOUNDATIONS

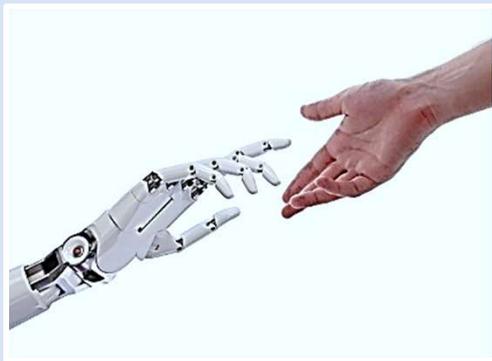


# Defining Terms



## ARTIFICIAL INTELLIGENCE (AI)

a goal



## MACHINE LEARNING (ML)

an approach



## DEEP LEARNING

complex, flexible ML

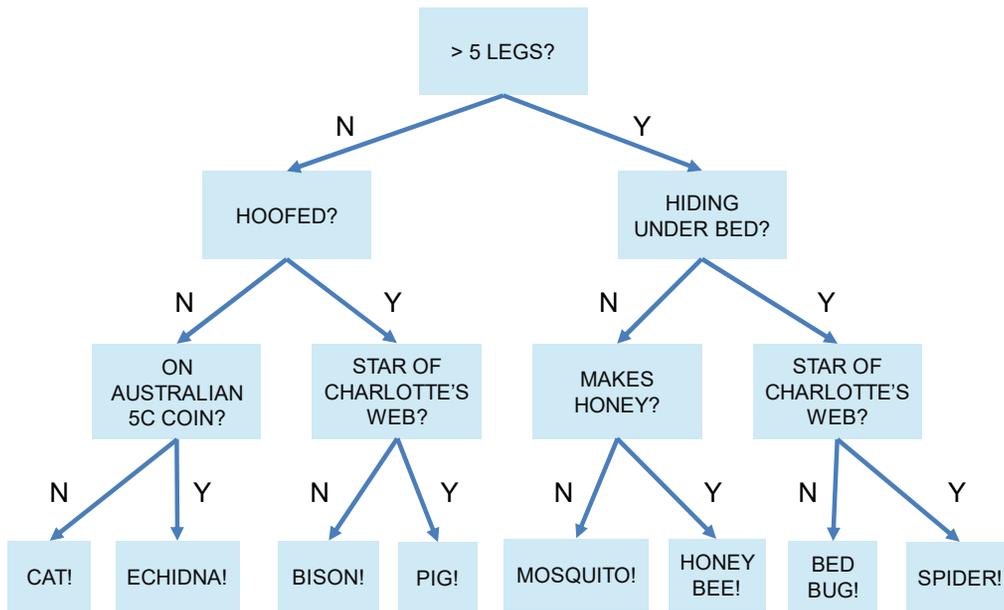


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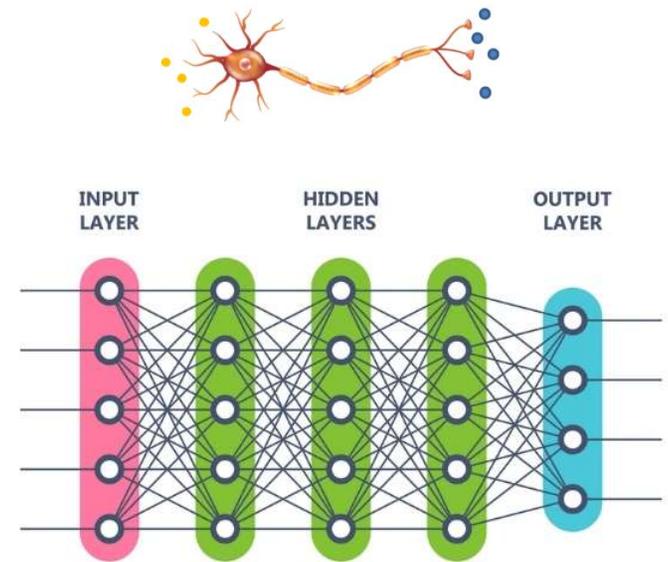
# ML Examples



## Decision Trees



## Neural Networks



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# ML in Investing

Neural Networks for Technical Analysis;  
Study on KLCI

1999

Using Neural Networks to Forecast  
S&P 100 Implied Volatility

1996

Forecasting Austrian IPOs:  
An Application of Neural Network  
Error Correction Models

1996

Neural Networks and Empirical  
Research in Accounting

1996



Investing

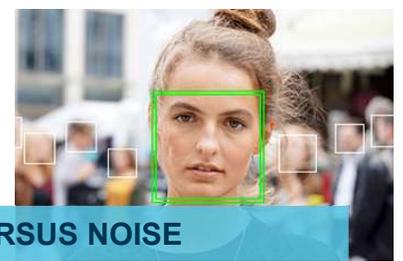
Other Contexts



DATA AVAILABILITY



STABILITY OF ENVIRONMENT



SIGNAL VERSUS NOISE

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# EXAMPLES



# ML in Context: Momentum Case Study

— GEN 1 —  
**FOUNDATIONS**  
 Simple, Robust

THE JOURNAL OF FINANCE • VOL. XLVIII, NO. 1 • MARCH 1993

**Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency**  
 NARADHARAN JEGADEESH and SHRIDHAN TITMAN\*

**ABSTRACT**  
 This paper documents that strategies which buy stocks that have performed well in the past and sell stocks that have performed poorly in the past generate significant positive returns over a 12-month holding period. We show that the profitability of these strategies are not due to their systematic risk or to market-wide price reactions to market-wide, industry, and firm announcements. We also show that the returns to these strategies are not due to the timing of the trades. A similar pattern of returns around the trading announcements of stock returns and issues is also documented.

A PARTICULAR view held by many journalists, psychologists, and economists is that individuals tend to overreact to information. A direct extension of this view, suggested by De Long and Shleifer (1985, 1987), is that stock prices also overreact to information, suggesting that contrarian strategies (buying past losers and selling past winners) generate abnormal returns. De Long and Shleifer (1985) show that over 5- to 5-year holding periods stocks that performed poorly over the previous 5- to 5-year intervals higher returns than stocks that performed well over the same period. However, the interpretation of the De Long and Shleifer results are still being debated. Some have argued that the De Long and Shleifer results can be explained by the systematic risk of their contrarian portfolios and the size effect. In addition, since the long-term return outperforms the long-term winners only in January, it is unclear whether their results can be attributed to overreaction.

\*Adjunct to Ben N. Anderson, Graduate School of Management, UCLA. Titman is from the Department of Finance and Economics at the Anderson Graduate School of Management, UCLA. We would like to thank the Bank of International Settlements, Boston State University, New York, and two referees. We also thank participants at the Finance Department, MIT, the University of Michigan at Ann Arbor, and various participants at Harvard, MIT, the University of California, Berkeley, University of Wisconsin, and MIT University for helpful comments, and also the staff of the Center for Applied Research on the Economics of Money, Banking, and Finance at the University of Wisconsin-Madison. We also thank the staff of the Center for Applied Research on the Economics of Money, Banking, and Finance at the University of Wisconsin-Madison.

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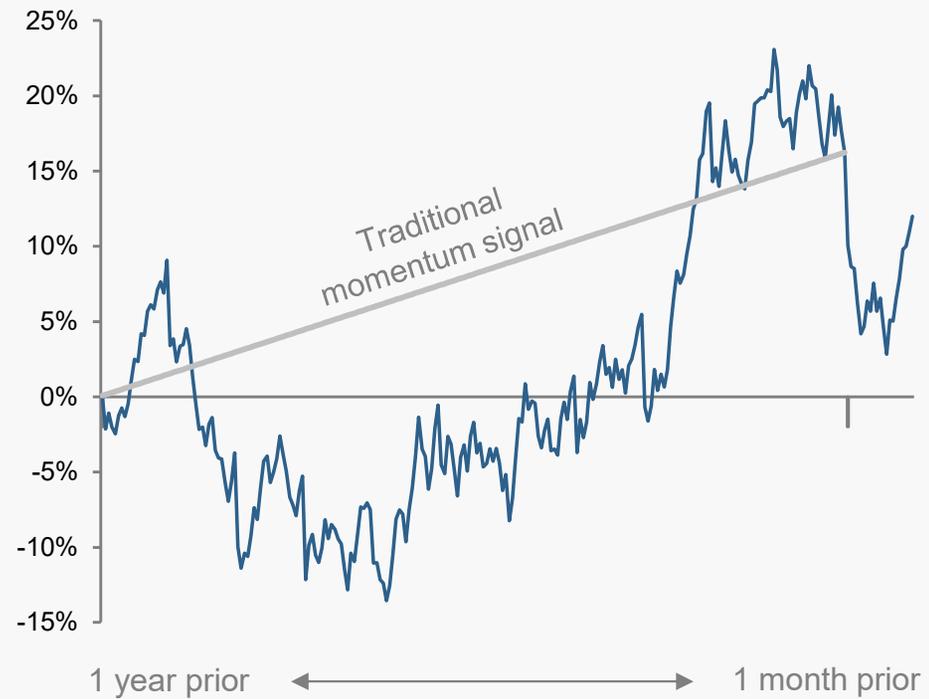


Chart Source: Acadian. For illustrative purposes only.

Jegadeesh, N., & Titman, S. (1993). Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. *The Journal of Finance*, Vol XLVIII, No. 1 March 1993.

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# ML in Context: Momentum Case Study

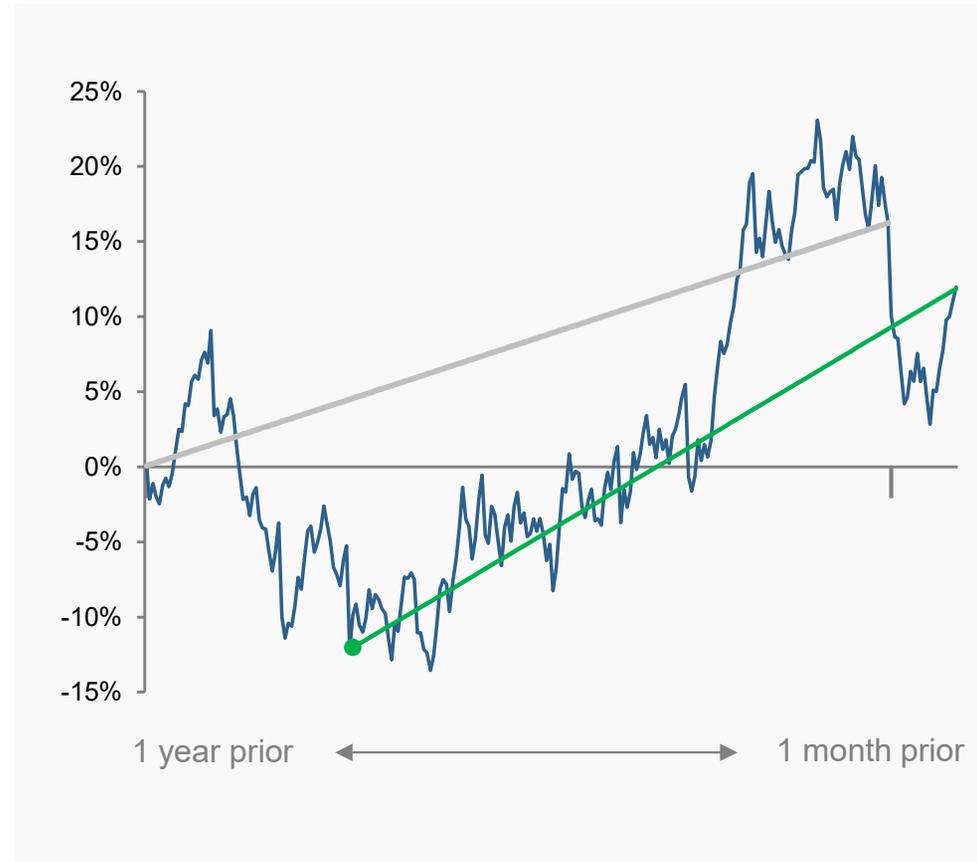
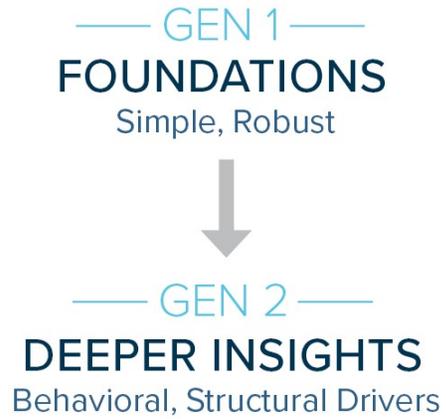


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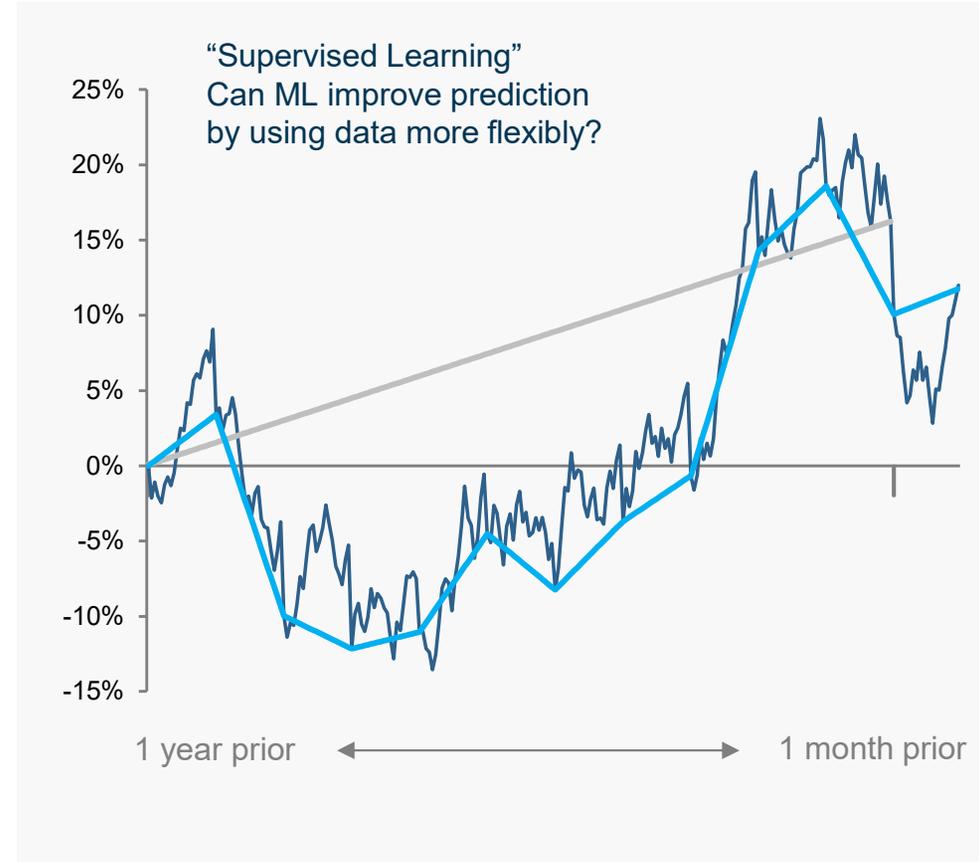
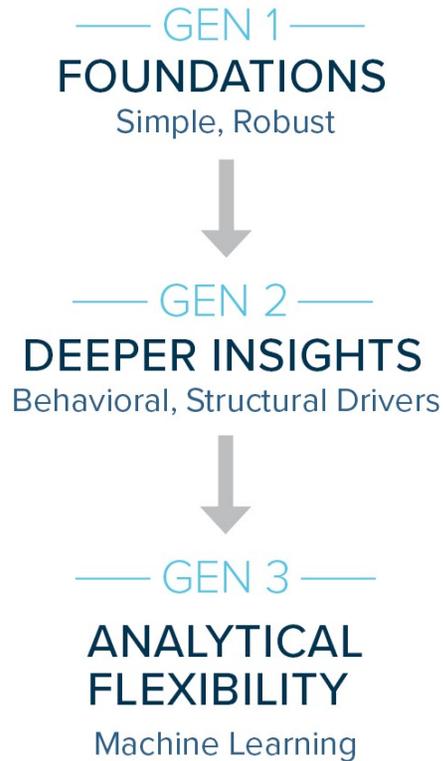
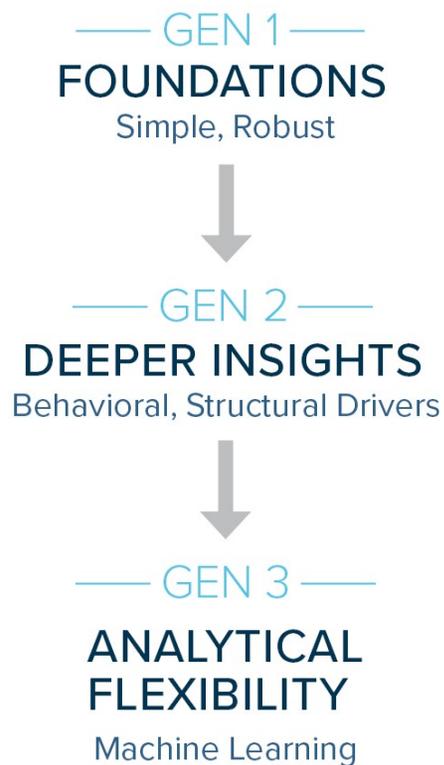


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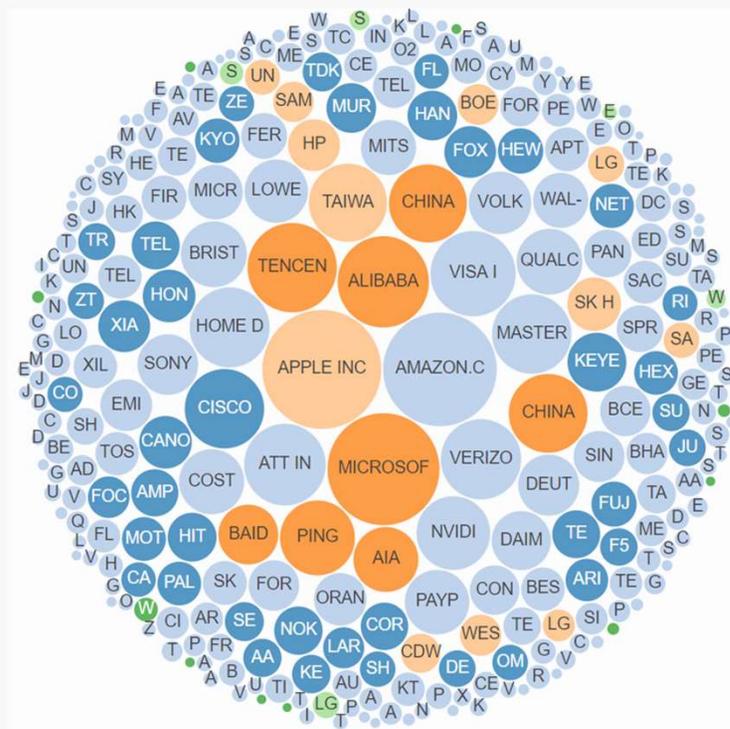
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# ML in Context: Momentum Case Study



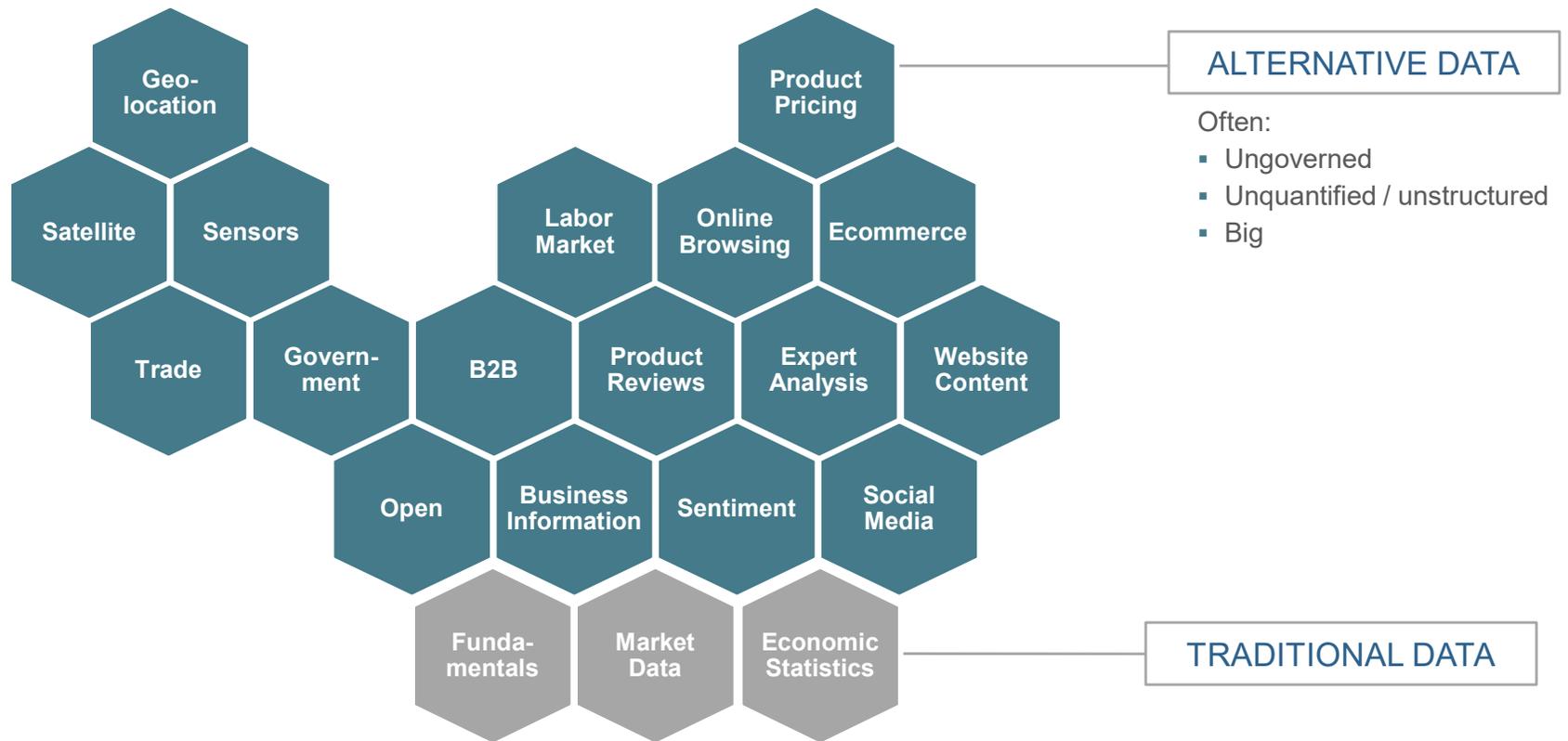
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“Unsupervised Learning”  
Can ML identify subtle structure in complex data?



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# Alt Data & ML: A Symbiotic Relationship



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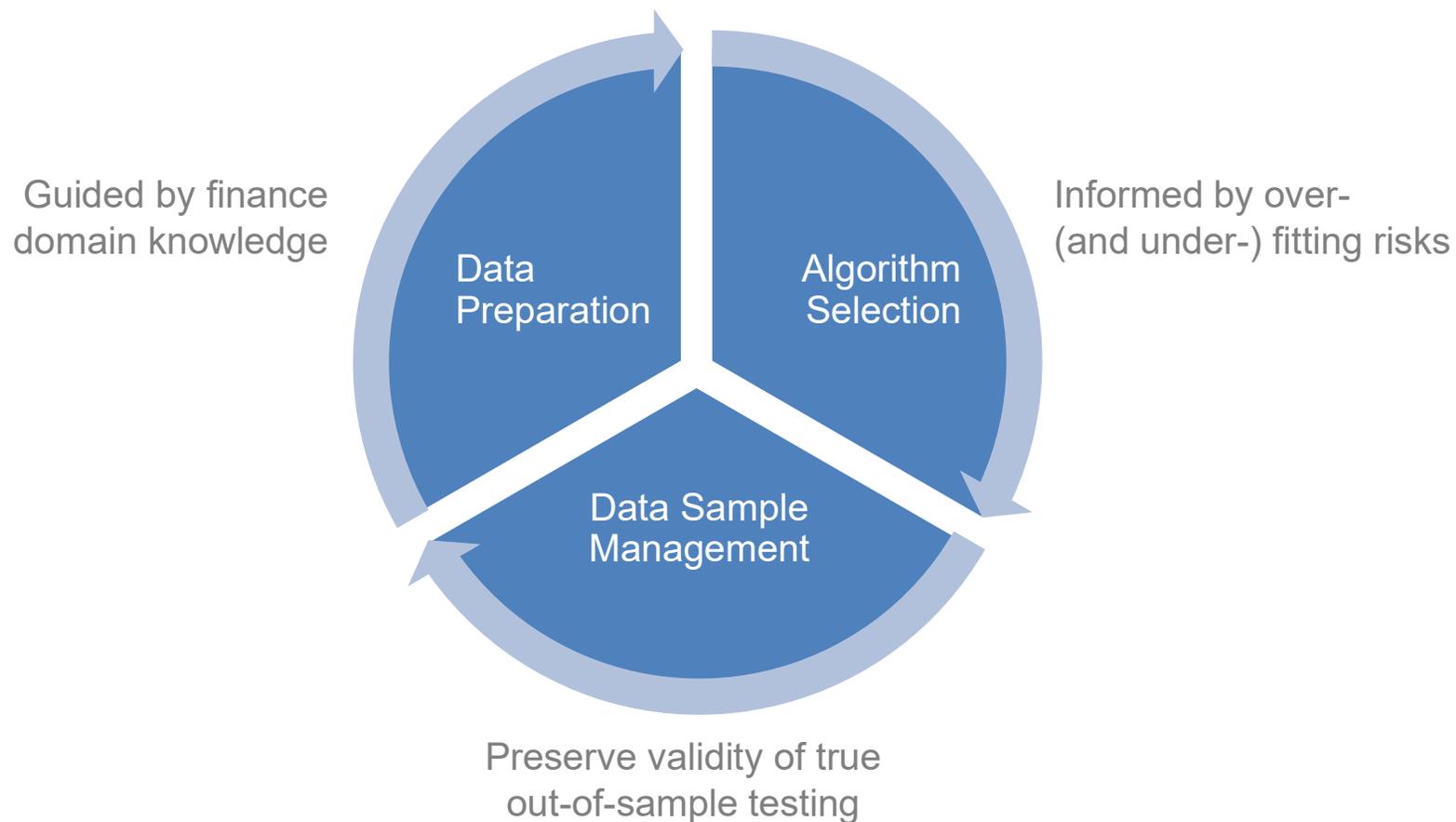






# BEST PRACTICES

## How Should We Approach ML Research?



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## ML: Substantial new opportunities for quants

- Unfettered analytical flexibility
- Broadened information set

## Evolution rather than revolution

- Investment process: Still recognizable
- Domain knowledge: Still crucial

## With great *flexibility* power comes great responsibility

- Demands process discipline
- Exacerbates selection challenges for asset owners



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