FinTech

Lecture 3. Harnessing data with artificial intelligence and machine learning

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Learning outcomes

▶ Explain how data can be used in the financial services industry

▶ Discuss some of the problems in trying to monetize data for financial services

Overview

Introduction I

- ▶ How data processing works?
    - ▶ In this digital age, electronic devices and software applications process trillions of bytes of data every minute of every day
    - ▶ Information processing: transformation of data into **usable** information
    - ▶ This information is used in prediction and decision-making by companies
        - ▶ to gain a competitive edge over their rivals
        - ▶ to solve problems and improve processes
- ▶ Interactive Infographic [link]
    - ▶ Visual representation of data processing

Introduction II

▶ FinTech revolution has disrupted:
  ▶ Ways in which data is gathered and used in financial systems

▶ Collective human behavior is stored on the **world wide web**
  ▶ Applications of information processing in financial services:
    ▶ e.g. the volume and tone of messages posted on social media platforms such as Facebook and Twitter have been shown to have some value in informing trading strategies and investment decisions
    ▶ e.g. statements released by publicly traded companies can also be a source of insight into the financial health of those firms, and can help investors decide whether or not to invest in these companies

▶ This module explores ways in which web-based data can be harnessed to help investors make better decisions and secure higher returns
  ▶ Methods and tools to create new trading and investment strategies
  ▶ Challenges associated with attempting to monetize data

Data and the search for alpha

- **Information** $\rightarrow$ Investment strategies $\rightarrow$ Positive alpha

- Recorded Future and BIA (Business Intelligence Advisors)
  - Both firms have ties to the CIA (Central Intelligence Agency)
    - Employ methods and tools originally developed for national security
  - They offer a range of products and services that help investors leverage information on different stocks and companies in financial markets

Overview

Recorded Future I

▶ Founded in 2009 as a predictive analytic software company [link]
▶ Business model: Extract and aggregate information from multiple internet resources and make predictions about future events
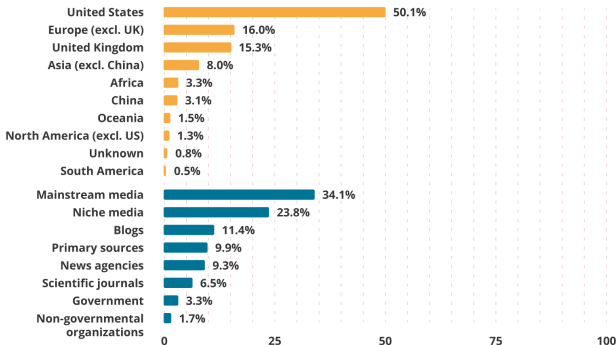

Fig. Data sources used by Recorded Future

Recorded Future II

- ► Video 3-1
  - ► How Recorded Future uses data to create new trading strategies
    - ► How Recorded Future established itself in the defense industry through its ability to predict terrorist attacks using data from the internet
    - ► How it branched out into the finance industry by using the same approach and technology to create new trading strategies
  - ► Challenges associated with commoditizing data for financial services

Overview

BIA I

- ▶ Business Intelligence Advisors, founded in 2001 [link]
  - ▶ Create a tool based on techniques originally developed by the CIA
    - ▶ Detect deception in high-stakes communication settings
    - ▶ Better inform future investment decisions
  - ▶ TBA (Tactical Behavior Assessment): Interpret information communicated in earnings calls, TV interviews, and other corporate disclosures
    - ▶ Analysis of verbal and nonverbal cues, which can indicate the level of honesty and risk in unscripted statements
    - ▶ These behavioral cues in corporate communications serve as a valuable source of insight into the future of particular firms

BIA II

- Video 3-2
    - How data can be used to make intelligent business and investment
        - The evolution of and the outlook for BIA
        - BIA's TBA methodology in action
    - Assist investors to make informed decisions
        - The potential advantages offered by useful and predictive data analysis are highly sought after in the financial services industry

Overview

AI, ML, and the boundaries of FinTech

▶ Recorded Future and BIA use AI and ML to process and decode information that could be used to assist their clients' decision-making

▶ How data can be applied to guide trading strategies and improve ROI?
  ▶ How can gathering data be useful for investment management?
  ▶ How can computational systems be applied to financial services? What are the benefits of applying them in this sector? Are there any limitations to their application?
  ▶ What business model is most scalable for a startup company that aims to specialize in data extraction or processing in the financial services space?

Takeaway

- Video 3-3
    - Risks and ramifications of applying machine learning to financial services
    - Potential of improved quantitative techniques for creating new strategies
        - How collecting large amounts of data on peoples' financial behavior can help make predictions about their decisions in the future
    - Drawbacks of using artificial intelligence and machine learning in finance

Related Literature

- ▶ Twitter → Earnings and stock returns
  - ▶ Bartov, E., Faurel, L., & Mohanram, P. S. (2018). Can Twitter help predict firm-level earnings and stock returns?. The Accounting Review

- ▶ Google search → Stock returns
  - ▶ Da, Z., Engelberg, J., & Gao, P. (2011). In search of attention. Journal of Finance

- ▶ Yahoo message boards → Stock return volatility
  - ▶ Antweiler, W., & Frank, M. Z. (2004). Is all that talk just noise? The information content of internet stock message boards. Journal of Finance

- ▶ Tone and knowledge → Stock returns
  - ▶ Larcker, D. F., & Zakolyukina, A. A. (2012). Detecting deceptive discussions in conference calls. Journal of Accounting Research

- ▶ Voice → Firm performance
  - ▶ Mayew, W. J., & Venkatachalam, M. (2012). The power of voice: Managerial affective states and future firm performance. Journal of Finance