Predicting Financial Markets: New Modeling Horizons

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Data

- 2006 – Present
- Daily Price Change
  - US Treasury Yields
  - S&P 500
  - GLD
  - OIL
- Features:
  - 500 daily financial and macroeconomic time series from St. Louis Fed database

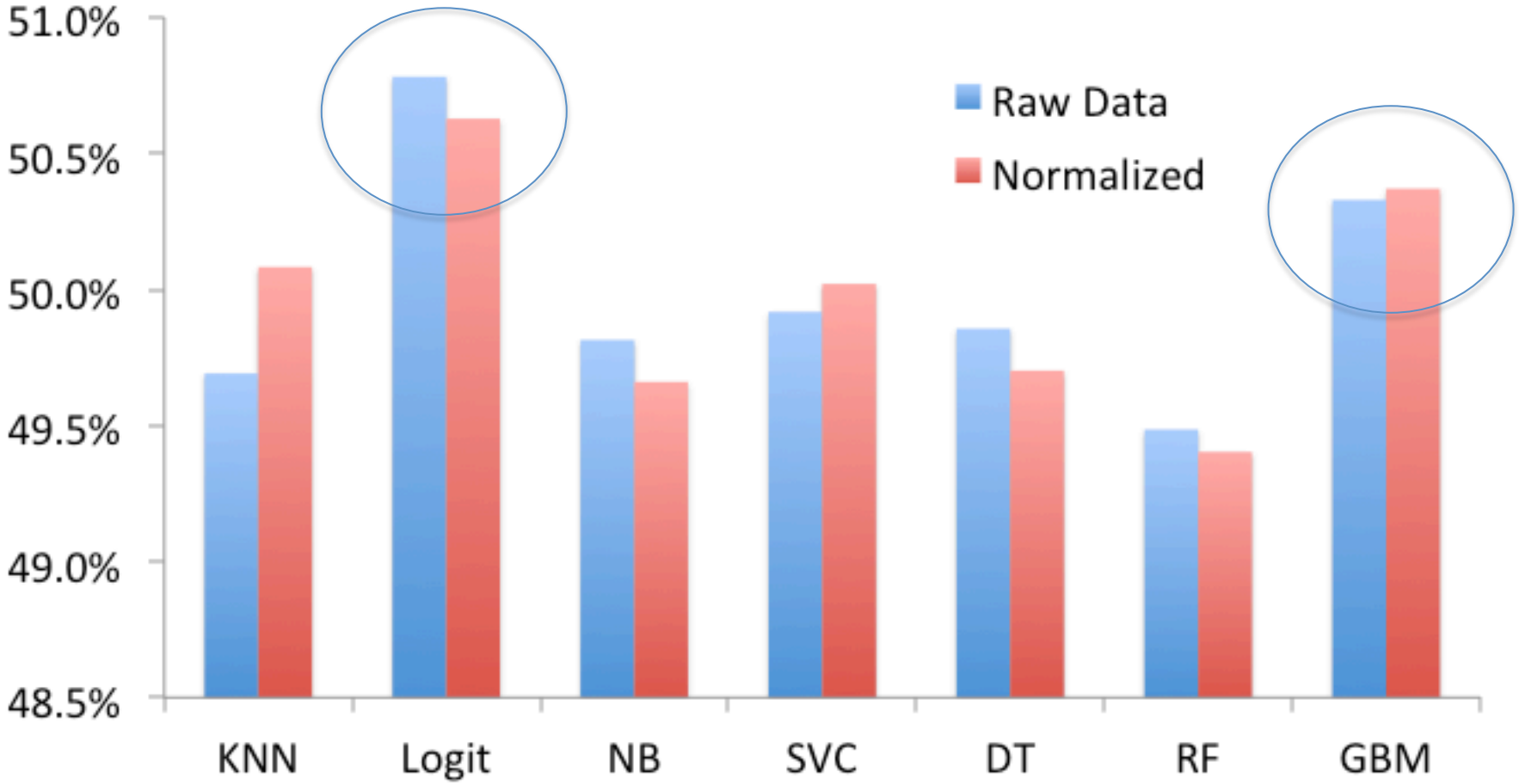
Data Issues and Preprocessing

- Avoid Look-Ahead Bias
- Trained on various rolling windows and predicted next day's market movement
- Normalized features

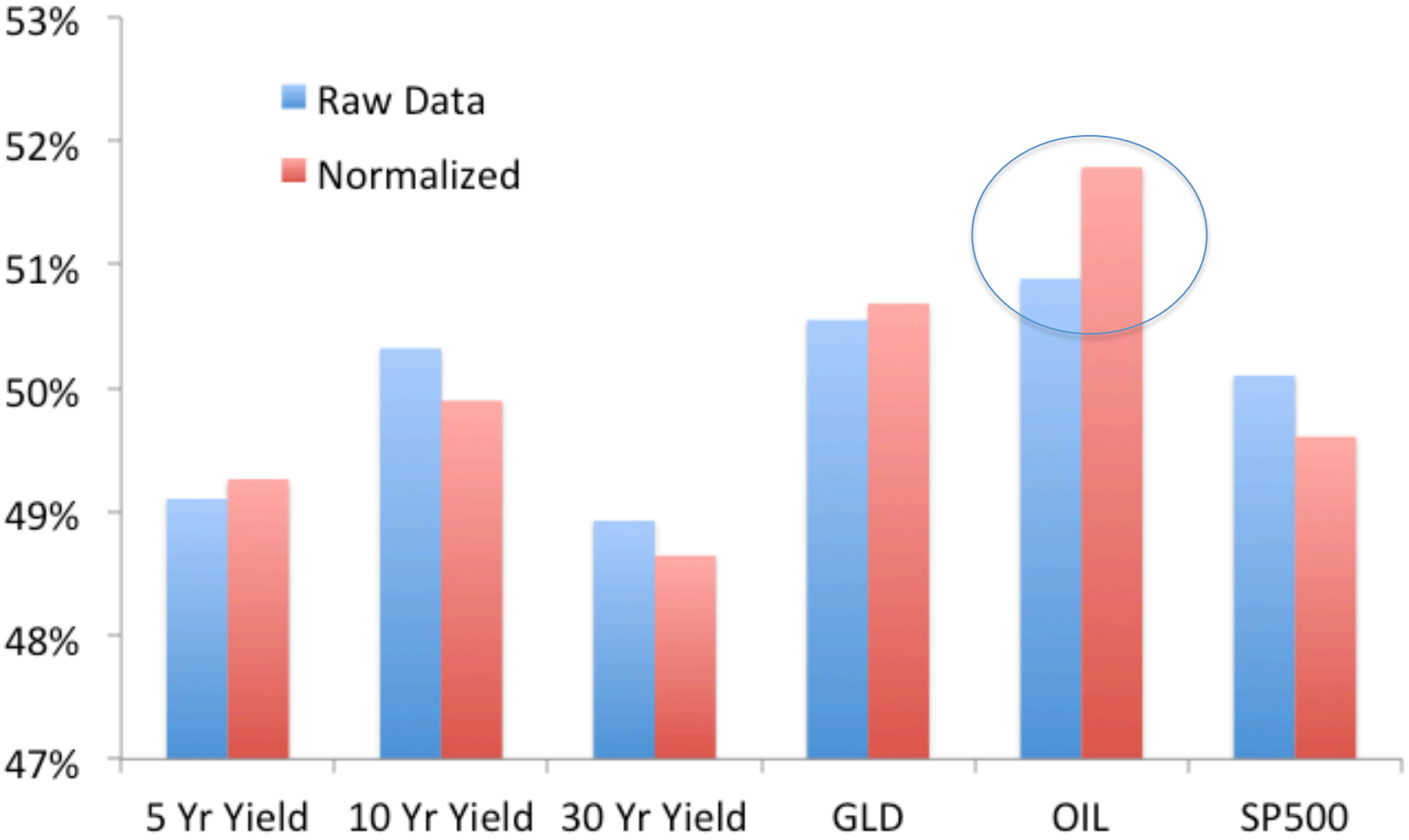
Methodology

- Using traditional classifiers:
  - Find the best-performing algorithm
  - Find the most predictable market
- Develop neural net architectures competitive with the state of the art

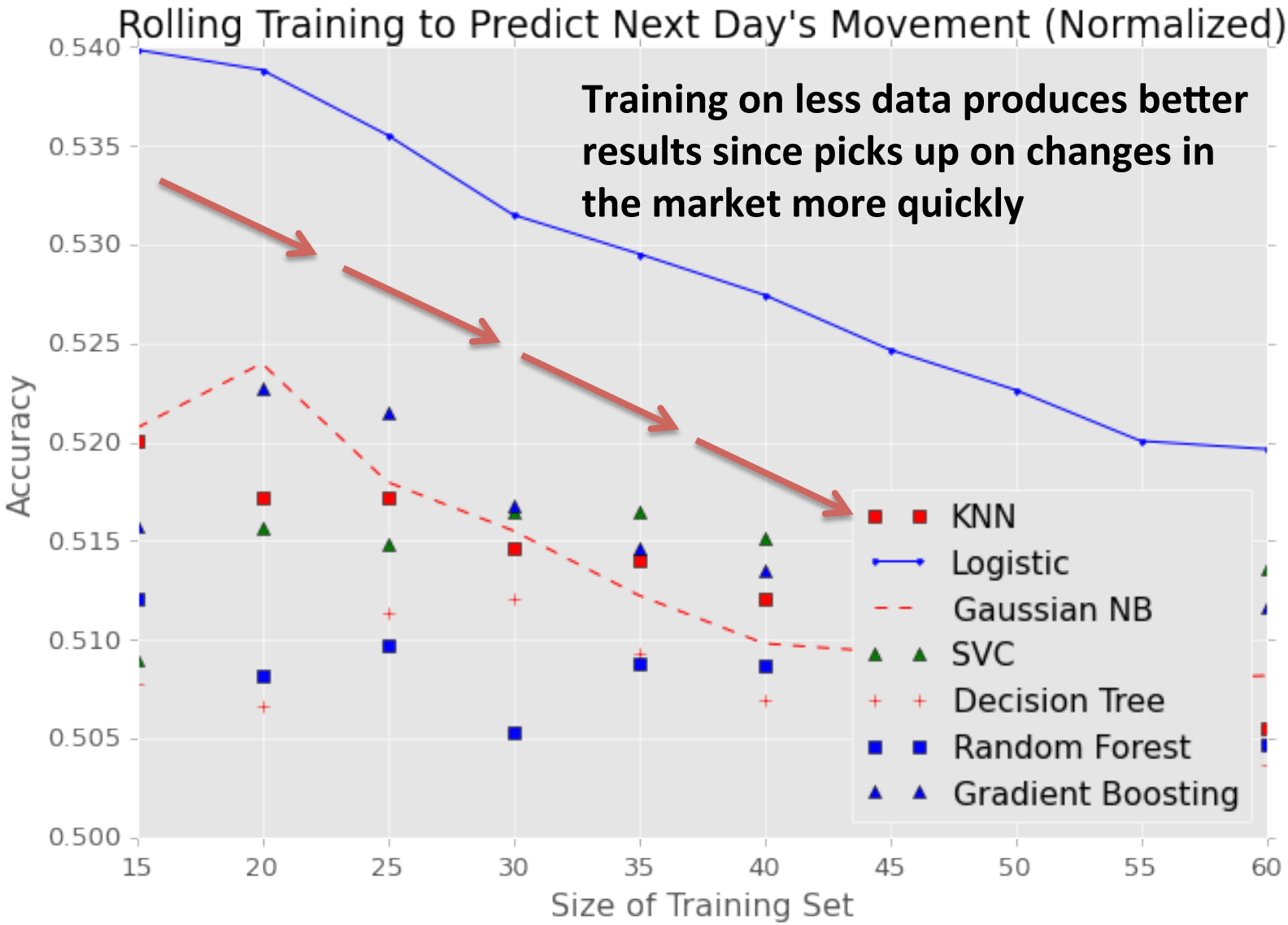
Average Accuracy By Algorithm Across All Markets



Average Accuracy By Market Across All Algorithms



Prediction Accuracy for OIL ETF



Can We Do Better with Neural Networks?

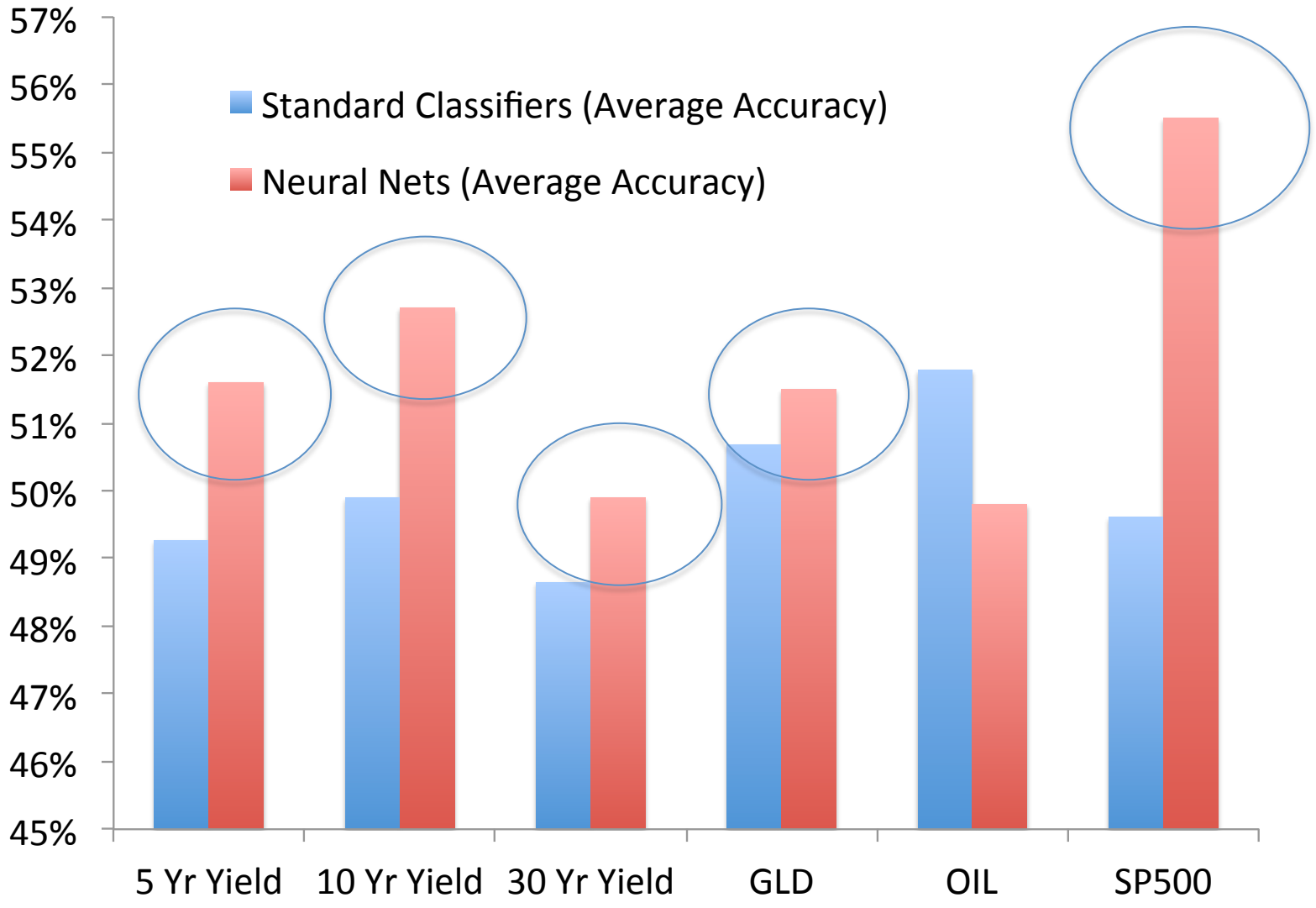
Feed Forward Neural Networks for OIL prediction

- Used Nolearn to implement Feed Forward Neural Networks
- 84 different architectures
- Results:
  - Highest accuracy was 54.48% vs. 54% for Logistic

Recurrent Neural Networks for OIL prediction

- Used PyBrain to implement Recurrent Neural Networks
- 28 different architectures
- Results:
  - Highest accuracy was 54.28% vs. 54.48% for Feed Forward Neural Networks

Average Accuracy By Market Across All Algorithms



Average Accuracy By Algorithm Across All Markets