

Callaghan Investments

2024 Goals

- ✓ Stock and Cryptocurrency Exchange
- ✓ Expand Quantitative Analysis Team
- ✓ S.E.C approval of multiple ETFs

Callaghan Investments

2025 Goals

- Stock Screening Service

Stock Screening Service

- *What is it?*
 - Recommend stocks to buy
 - Predictive Machine Learning

Stock Screening Service

- *How does it work?*
 - Financial metrics and historical data
 - Estimated Earnings per Share (EPS) result

Stock Screening Service

- *Why EPS?*
 - Strong financials, profitability, and future growth potential
 - 2.4% average price growth

Stock Screening Service

- *Why Machine Learning?*
 - Identify patterns and predict future outcomes
 - Adds confidence

Stock Screening Model: The Data

- Nasdaq.com
 - EPS history
- Yahoo Finance
 - Financial Metrics

Stock Screening Model: Process Overview

- *Step 1*: Gather EPS and stock data
 - Top 5,000 stocks by Market Cap
 - Ensures we have enough data

Stock Screening Model: Process Overview

- *Step 2: Obtain Financial Metrics*
 - 24 financial metrics per stock
 - Unexpected correlated metrics

Stock Screening Model: Process Overview

- *Step 3: Clean up and Remove*
 - Common stock only
 - Unavailable financial metrics
 - Missing EPS history

Stock Screening Model: Process Overview

- *Step 4:* Important model metrics
 - Most important metrics:
 - Precision
 - Proportion of stocks predicted to beat their estimated EPS that actually do

Stock Screening Model: Process Overview

- *Step 4:* Important model metrics
 - Why Precision?
 - Correct EPS prediction > Missed Opportunity
 - Avoid incorrect predictions

Stock Screening Model: Process Overview

- *Step 5:* Build model, evaluate, and tune
 - Build baseline model
 - Tune model to maximize Precision value

Stock Screening Model: Results

- Baseline Model
 - Precision Value: 72%
 - 962/1338 correct predictions

Stock Screening Model: Results

- Final Model
 - Maximize Precision value
 - Adjust and tune
 - Increase threshold

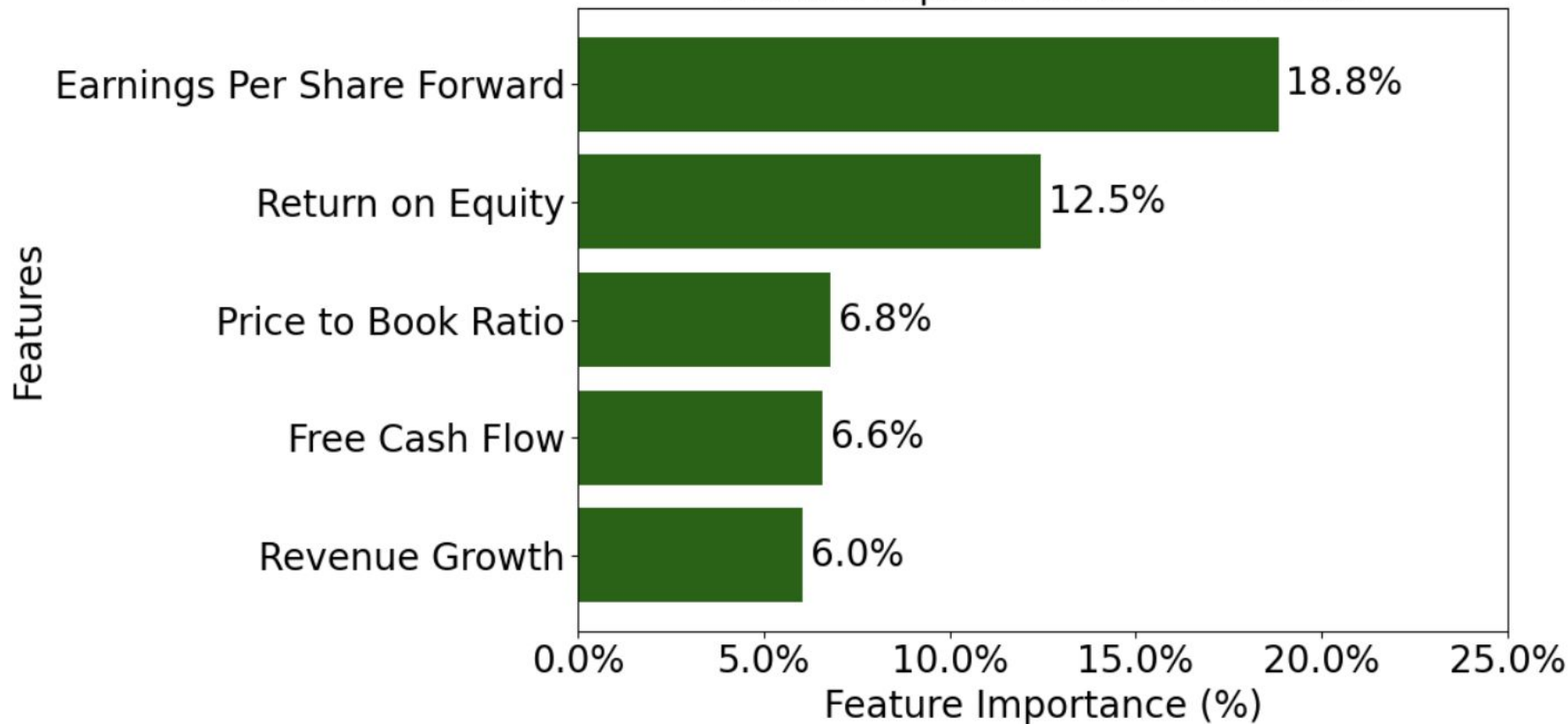
Stock Screening Model: Results

- Final Model
 - Precision Value: 88%
 - 112/128 correct predictions

Stock Screening Model: Best Financial Metrics

- Top 3 metrics and their percentage contribution
 - *Earnings Per Share Forward: 18.8%*
 - *Return on Equity: 12.5%*
 - *Price to Book Ratio: 6.8%*

Feature Importance for Final Model

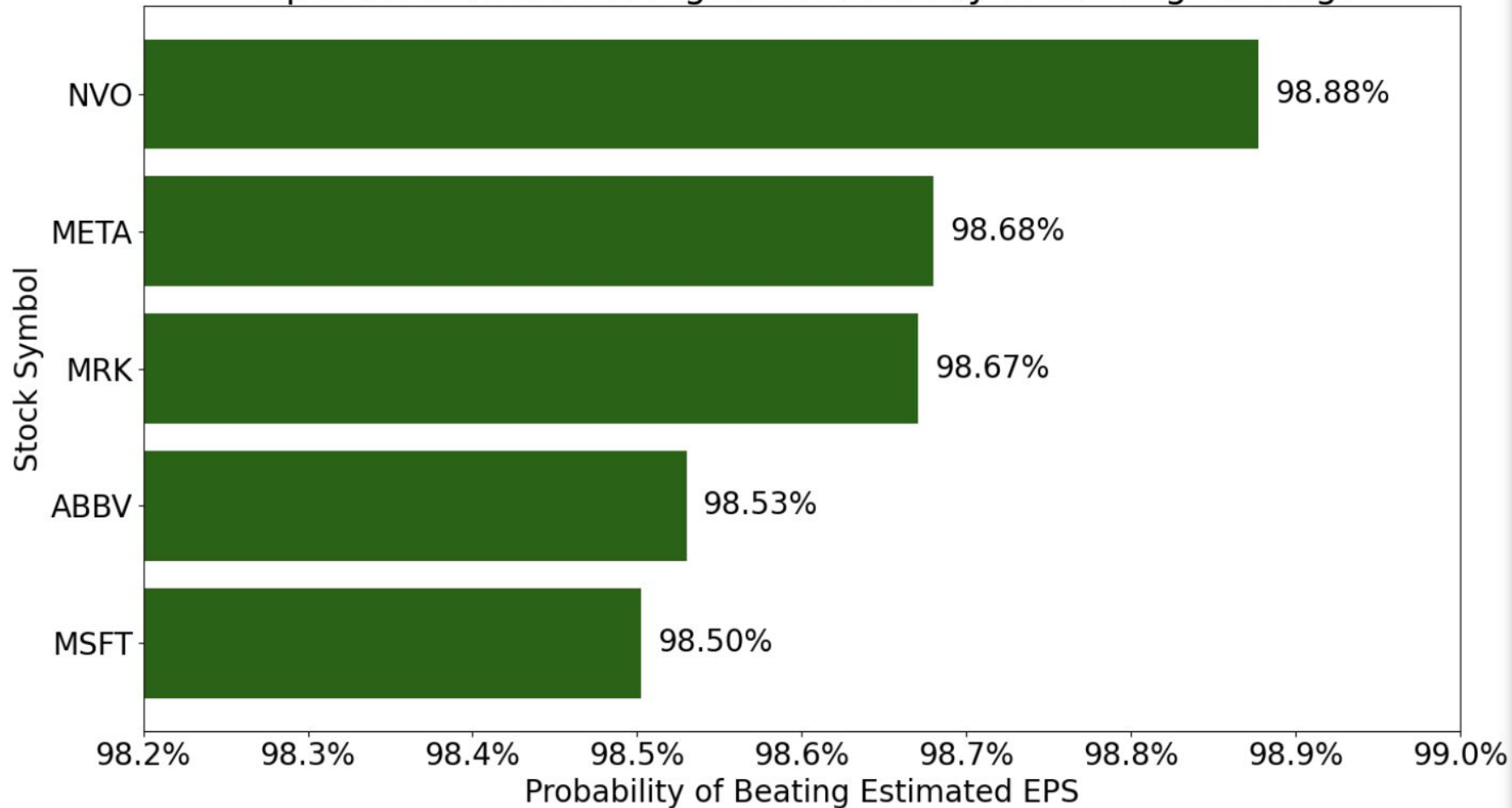


Stock Screening Model: Top Stock Picks

Top 5 stocks with highest probability to
beat their estimated EPS

- | | |
|-------------------------|-------------------------|
| 1. <i>NVO</i> : 98.88% | 4. <i>ABBV</i> : 98.53% |
| 2. <i>META</i> : 98.68% | |
| 3. <i>MRK</i> : 98.67% | 5. <i>MSFT</i> : 98.50% |

Top 5 Stocks with the Highest Probability of Beating Earnings



Stock Screening Model: Limitations and Solutions

- Yahoo finance
 - Data is not real-time
 - Limited historical data
 - Solution: Financial Data Provider

Stock Screening Model: Limitations and Solutions

- Computational Capacity
 - Resource intensive
 - Solutions
 - GPUs (Graphics Processing Units)
 - Data center rental

Stock Screening Model: Limitations and Solutions

- Beating estimated $\text{EPS} \neq$ price increase
 - No guarantee of price increase
 - Solution: Research other features and parameters

Stock Screening Model: **Future Actions**

- More financial metrics
- Technical Analysis indicators
- Try other ML algorithms
 - Neural Networks and Support Vector Machines

Callaghan Investments: **Stock Screening Service**

Questions