Financial News in Predicting Investment Themes
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Motivation and Problem

Questions
- Can neural models learn relationships between financial news and relative asset returns?
- What are more and less effective ways in encoding large corporuses of documents, such as news articles?
- Can neural models learn to ascertain the relevance of particular news articles?

Datasets
Fama and French [1], as well as Applied Quantitative Research (AQR) [2], one of the world’s largest quantitative hedge funds, have made data on daily factor returns public.

Approach

Architectures
- Baseline feed-forward neural network.
- Recurrent neural network with attention.
- Convolutional embedding with attention.

Evaluations
- Five factors: market, size, value, momentum, volatility
- Multilabel predictions
- Varied forward-looking prediction windows (1w, 6m)

Results

Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>Accuracy (6m)</th>
<th>Accuracy (1w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random guessing</td>
<td>69%</td>
<td>69%</td>
</tr>
<tr>
<td>Baseline NN, doc2vec embeddings</td>
<td>90%</td>
<td>80%</td>
</tr>
<tr>
<td>RNN with attention, doc2vec embeddings</td>
<td>80%</td>
<td>70%</td>
</tr>
<tr>
<td>Attention network, conv. embeddings</td>
<td>95%</td>
<td>73%</td>
</tr>
</tbody>
</table>

Takeaways

The baseline NN and attention network with convolutional embeddings seemed to outperform GRU with attention.

GRU, being a more complex model, was prone to overfitting.

Additionally, predictions were more accurate on a longer time scale, suggesting more noise in financial markets in short-term.

Analysis

Qualitative
Most and least attended documents, December 2007:
How Many Mutual Funds Routinely Rout the Market? Zero The bull market in stocks turned six last Monday, and despite some rocky stretches — like last week, when the market fell — it has generally been a very pleasant time for money managers, who have often posted good numbers.

Deep Freeze on Great Lakes Halts Cargo Shipments THUNDER BAY, Ontario —The trip to pick up a load of iron ore powder in Conneaut, Ohio, was supposed to take four days by way of the Great Lakes.

Conclusions

- Using relatively little data, models using a convolutional embedder and doc2vec yielded document embeddings that, when fed to other neural architectures, were mildly predictive of factor returns.
- This suggests some relationship between financial news and short-term investment themes.
- Further, insight from the attention mechanism also suggests that, when supervised against empirical forward asset returns, neural network methods are able to differentiate between news articles that are more or less relevant to financial markets.

References


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