

Financial Risk Modelling using big data-driven applications and machine learning techniques

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Background

This proposed research is rooted in the rise of big data as a source of significant information and potential value in financial industry (Maxfield, J., 2015). As noted by Sampagnaro et al. (2015), the use of large data sets can overcome some of the issues associated with the monitoring of financial risk, where quantitative financial data may not be available. Krishna (2016) demonstrates how changes in regulation around financial risk management have increased the importance of data management components in the overall process.

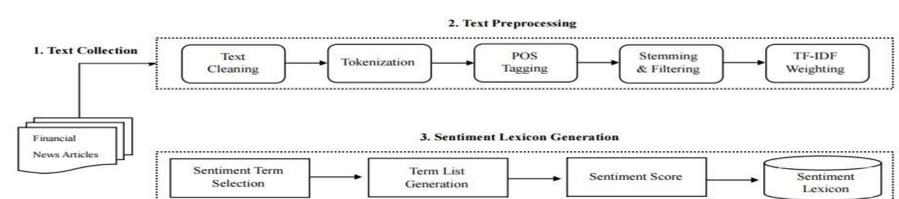
Aim

The primary rationale is to understand and improve financial risk prediction models. The existing models can be improved by employing novel computer science techniques, where;

- Non-conventional data sources, e.g. news articles and sentiment analysis
- Data wrangling to mix quantitative financial and qualitative non-financial data
- Machine learning techniques to discover new unforeseen regularities (or anomalies) in data streams

Approaches

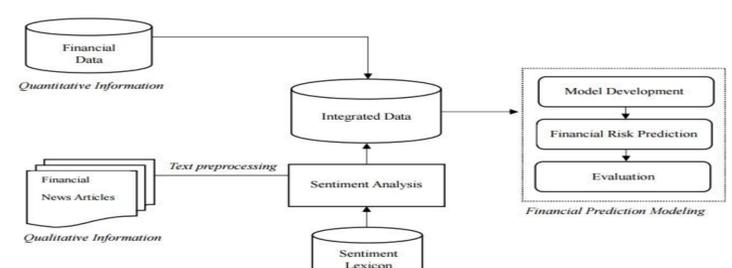
It is the first task to produce sentiment lexicon using financial news article for the proposed model. This can be applied to adopt a way for producing a new domain-specific lexicon, which is to extract meaningful score of sentiment from financial news article. The process of producing lexicon for sentiment analysis is described below as Figure 1.



Proposed model

Figure 2 shows the proposed framework for financial risk modelling that process quantitative and qualitative data based on big-data analytics. Three tasks are performed in the proposed model;

- Generation of a sentiment lexicon from financial articles
- Analysis of sentiment employing a domain-specific lexicon
- Financial risk prediction modelling using both financial data and sentiment variables



References

1. Krishna, D. (2016) Big Data in risk management. *Journal of Risk Management in Financial Institutions*. 9(1) p46-52
2. Maxfield, J. (2015) In Plain Sight: The Extraordinary Potential of Big Data. *Bank Director*. 25(3) p48-49
3. Sampagnaro, G., Meles, A and Verdoliva, V. (2015) MONITORING IN SMALL BUSINESS LENDING: HOW TO OBSERVE THE UNOBSERVABLE. *Journal of Financial Research*. 38(4) p495-510