FINANCIAL CAUSALITY DETECTION

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ABSTRACT

Financial causality detection is an emerging challenge in the intersection of finance and natural language processing (NLP). This study explores a novel hybrid approach to detect both explicit and implicit causal relationships within financial texts. Prior research has focused on either traditional NLP methods like keyword extraction and dependency parsing or neural network models, but few have combined these approaches to comprehensively address causality detection in financial contexts. Our study employs NLP techniques such as dependency parsing and semantic role labelling (SRL) to identify causal structures and integrates deep learning models like FinBERT, which is fine-tuned for financial text. The preprocessing pipeline cleans the data and extracts key financial terms, followed by model training for cause-effect pair identification. Attention mechanisms and explainability tools, such as SHAP and LIME, are utilized to make the predictions interpretable.

Our results demonstrate that the hybrid model improves detection accuracy by capturing both explicit keyword-based causality and implicit, context-driven relations. The integration of explainability techniques adds significant value by providing insight into how the model arrives at its predictions. This comprehensive approach addresses gaps in previous studies by enhancing both the scalability and interpretability of financial causality detection. These findings have implications for the broader application of AI in financial decision-making and risk analysis.

Keywords: financial causality, NLP, deep learning, FinBERT, explainability