ANOMALY DETECTION IN STOCK MARKET INDICES WITH NEURAL NETWORKS

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Abstract

Neural networks have been long used for time series analysis in various applications. The late boost in computer power and data engineering brought about a myriad of algorithms that are wrapped under the larger title of Data Science. The apparent proliferation of these algorithms is due to their employment for several applications that range from simple classification problems, such as spam e-mail identification, to pattern detection in images and videos and several forecasting applications. Heralding the world of machine learning, these algorithms are trained on large amounts of data with the objective to extract repetitive structures that are likely to persist. It is therefore explainable the recent attention that these algorithms are given from the perspective of economic applications. This paper employs a recurrent neural network algorithm on daily data for several stock market indices in order to detect anomalous behaviour. The approach is rooted in the jump-detection literature that has the objective to identify outlying realizations of log-returns for diverse stock market data. We show that this approach establishes economically significant patterns that can be considered as anomalies when compared to their past dynamics.

Keywords*:* anomaly detection, neural networks, LSTM, stock market

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