

Machine Learning Approach to Identify Determinant Factors of Stock-Market Crash in Indonesia

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Abstract

The stock market is an essential entity in the financial economics of a country, including Indonesia. It is important to identify the likelihood of the crash event to anticipate the follow-up impact and mitigate the risk. We develop a machine learning model to predict the probability of the market crash, which is identified as the decline of the composite price index by more than 3%. More than a thousand variables were included in the model as predictors, but the analysis reveals that only a tiny subset of them is significant. Based on the performance in prediction, the ensemble of random forest algorithm and gradient boosting is the best approach. A series of variable importance analyses were then implemented to produce dominant factors that influence the crash event.

Keyword: ensemble learning, feature importance, gradient boosting, random forest, sensitivity