Enhancing Economic Event Prediction Through Time-Ordered Data Augmentation and Time Series Image Analysis With Convolutional Neural Networks

Kim, Seokmin (School: Cheongshim International Academy)

The study addresses the issue of insufficient data for constructing artificial neural networks by employing techniques of time series data augmentation and data imaging. Specifically, predictions of stock price fluctuations were improved by defining rapid increases and decreases based on the log returns of individual stocks. The imbalance problem in the dataset was resolved through augmentation using Probabilistic Auto-Regressive (PAR) model. Instead of Recurrent Neural Network (RNN), which show weaknesses in predicting abrupt price changes, Convolutional Neural Network (CNN), known for their strong capabilities in pattern recognition and classification, were utilized. Time series data were converted into images to serve as input data for CNN, significantly enhancing predictive performance. Through performance evaluation of the constructed classifier, the improved capability to predict rapid price increases and decreases compared to previous methods was demonstrated.

Awards Won: