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*Portfolio Selection with Deep Learning*

In this talk, we propose a two-stage framework to construct portfolios based on deep learning algorithms. Both NASDAQ100 and CSI300 are selected as representatives of developed markets and emerging markets, respectively. At stage 1, once a stock index is selected, for each component stock in the index, we use principal component analysis (PCA), auto-encoder(AE) and restricted Boltzmann machine (RBM) as data representation methods to reconstruct the stock prices, and select outstanding stocks to enter the portfolio according to the characteristics of data reconstruction. At stage 2, taking the selected stock index as the target, we train the artificial neural networks to construct portfolios and to test investment strategies by validation. Our initial results show that (1) there is no significant difference in the performance of different data representation methods; (2) the contribution of communal information to the optimal portfolio decreases with the number of selected stocks; (3) the characteristics of different types of markets obtained by deep learning are different; (4) this approach achieves good results for different trading frequency data. This is a joint work with C. Zhang, R. Chen and G. Wang.