THE UNIVERSITY   **OF HONG KONG**

Department of Mathematics

Qualifying Research Seminar

Time Series Forecasting Based Online Portfolio Optimization with Risk Control

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Rm 210, Run Run Shaw Building, HKU

Abstract

Online portfolio selection has garnered substantial interest in recent years owing to its proven efficacy and practical application in portfolio management. Various sophisticated algorithms have been developed recently, utilizing historical data to predict the future returns of risky assets accurately. These algorithms are adept at formulating and resolving effective models to ascertain optimal investment strategies. Some also consider real-market characteristics, including transaction costs and asset correlations. In this work, we present a comprehensive study on Online Portfolio Selection, proposing a novel strategy based on time series prediction and Conditional Value-at-Risk. It innovatively integrates State-dependent Autoregressive Integrated Moving Average models for asset return prediction and Conditional Value-at-Risk to manage potential financial risks effectively. The primary goal of our strategy is to maximize cumulative returns while mitigating downside risks in various market conditions, which is a significant challenge in the Online Portfolio Selection domain. Through extensive numerical experiments across diverse datasets, the proposed strategy has been rigorously evaluated against 18 other portfolio selection strategies. The results indicate that the proposed strategy can outperform other algorithms in achieving higher cumulative returns and maintaining superior risk-adjusted return profiles. Additionally, the proposed strategy has demonstrated robustness to parameter variations and adaptability to market volatility, making it a valuable tool for portfolio managers.

All are welcome