

THE UNIVERSITY OF HONG KONG

Faculty of Science

HKU-TCL Joint Research Centre for Artificial Intelligence

Principal Investigator (PI): Professor Wai-Ki CHING
Department of Mathematics
Faculty of Science

Project Title: On Online Portfolio Selection

Abstract:

Online portfolio selection is a sequential decision-making problem.

Different from the traditional portfolio selection problems, it focuses on exploring the most efficient and practical computational intelligence techniques to deal with real online asset trading problems, such as the stock trading. It is a type of sequential decision-making optimization problem where the investment strategy is determined at the beginning of each period. In a very short time, an investor has to make a quick decision taking into account the arrival of new market information in each period. Furthermore, transaction cost incurred whenever there is a change of investment proportions on risky assets which has a significant impact on the investment strategy and the return in long-term investment horizon. In this project, we consider an adaptive online portfolio selection problem with transaction costs. We first propose an adaptive online moving average (AOLMA) method to predict the future returns of risky assets by incorporating an adaptive decaying factor into the moving average method, which improves the accuracy of return prediction.

Net profit maximization models (NPMs) are then constructed where transaction costs are considered in each decision-making process.

The adaptive online net profit maximization algorithm is designed to maximize the cumulative return by integrating AOLMA method and NPMs together.

Numerical experiments will be conducted to show that our proposed algorithm dominates several state-of-the-art online portfolio selection algorithms in terms of various performance metrics, i.e., cumulative return, mean excess return, Sharpe ratio, Information ratio and Calmar ratio.