Online Portfolio Selection Strategies

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Abstract

This thesis aims to introduce the existing portfolio selection strategies and formulate the problem of portfolio optimization mathematically. We are focus mainly on empirically better working algorithms and their implementations.

The main concept of portfolio selection is the sequential decision making based on previous market movements. In online portfolio selection we need to use strategies which are predictable processes with respect to the past changes.

We have the following main assumptions for all the calculations: no transaction costs, market liquidity, no impact cost and no short selling.

We introduce several benchmark strategies, such as Buy and Hold, Best Stock and Constant Rebalanced Portfolio, Follow the Winner strategies, Follow the Loser strategies, Pattern-Matching strategies and Meta-Learning algorithms. We also implemented some of the benchmarks and focused on a better performing, more complex Follow the Loser type algorithm called Online Moving Average Reversion (OLMAR). The design of the OLMAR strategy is based on the assumption that the market is mean reverting in a non-stationary way.

Our results confirm that the Best Constant Rebalanced Portfolio (BCRP) strategy outperforms all the other benchmarks (including the Best Stock) on NYSE dataset. Moreover OLMAR strategy has significantly larger return than BCRP.