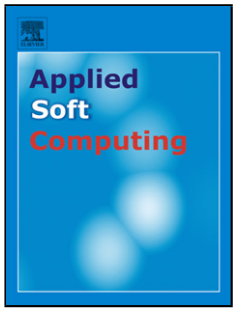

Title: Incorporating Markov Decision Process on Genetic Algorithms to Formulate Trading Strategies for Stock Markets

Author: Ying-Hua Chang Ming-Sheng Lee

PII: S1568-4946(16)30475-6
DOI: http://dx.doi.org/doi:10.1016/j.asoc.2016.09.016
Reference: ASOC 3815

To appear in: *Applied Soft Computing*

Received date: 17-9-2015
Revised date: 28-7-2016
Accepted date: 6-9-2016

Please cite this article as: Ying-Hua Chang, Ming-Sheng Lee, Incorporating Markov Decision Process on Genetic Algorithms to Formulate Trading Strategies for Stock Markets, Applied Soft Computing Journal http://dx.doi.org/10.1016/j.asoc.2016.09.016

Incorporating Markov Decision Process on Genetic Algorithms to Formulate Trading Strategies for Stock Markets

Chang, Ying-Hua
yhchang@mail.tku.edu.tw

Lee, Ming-Sheng
kevin.lee@mail.im.tku.edu.tw

Department of Information Management, TamKang University, Taiwan
No.151, Yingzhuan Rd., Tamsui Dist., New Taipei City 25137, Taiwan (R.O.C.)

Highlights

- The paper proposed a novel application for incorporating Markov decision process on genetic algorithms to develop stock trading strategies. This predicts the results of applying the Markov decision process with real-time computational power to help investors formulate correct timing (portfolio adjustment) and trading strategies (buy or sell). This study thus uses the excellent genetic algorithm parallel space searching ability to provide investors with the optimal stock selection strategy and capital allocation, and combines them with both constructs to solve the portfolio problem and improve return on investment for investors. This research can solve stock selection, market timing and capital allocation at the same time for investors when investing in the stock market. Additionally, when investors lack sufficient money and stock to buy or sell, the architecture of this study can complete the credit transactions.

Abstract

With the arrival of low interest rates, investors entered the stock market to seek higher returns. However, the stock market proved volatile, and only rarely could investors gain excess returns when trading in real time. Most investors use technical indicators to time the market. However the use of technical indicators is associated with problems, such as indicator selection, use of conflicting versus similar indicators. Investors thus have difficulty relying on technical indicators to make stock market investment decisions.

This research combines Markov decision process and genetic algorithms to propose a new analytical framework and develop a decision support system for devising stock trading strategies. This investigation uses the prediction characteristics and real-time analysis capabilities of the Markov decision process to make timing decisions. The