Forecasting Foreign Currency Exchange by Agents in An Artificial Market

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1. Introduction

Foreign currency exchange market produces typical economical time series data and an accurate forecasting for foreign currency exchange is a challenging problem. We have already reported our early attempt in [1] by various artificial neural networks and compared their performances. After the graduation of the third author: Samekawa, we introduce a new idea, that is, the introduction of virtual agents and they learn forcecasting foreign currency exchange in a virtual market. Each trader, i.e. each virtual agent maintains his confidence and thedegree of the confidence for his forecasting is measured by their variance. Given data for training each virtual agent are exchange rate between Japanese Yen and US dollar, between Japanese Yen and German Marc, Nikkei Index in Tokyo Stock Market and Dow Jones Indexfor 30 industries in New York Stock Exchange Market. The Learning Method is Genetic Algorithm and some parameters are forced to be the same value for similar foreign currency exchange rates patterns in trainning data, the similarity of which is measured by the area ofdifference between the pattern of training data and the pattern of former data.

Intermediate results have been reported in [2] and we will show our improvements in[3] and also by the first and the second author.

Improvements and Simulation Results

Leaning method for agents in our forecasting system is Genetic Algorithm and the percentages of gene-operations start with 10% mutations, 10% selections and 40% crossings and they ar e relaxed gradually to reach in final learning stage to 10% mutations, 20% selections and 1 00% crossings.

Another attempt is an introduction of Wiener Process in our forecasting system. Our fi nal forecasting system consists of two stages. Agents in an artificial market give their forec astings by using improved Genetic Algorithm, then they are corrected through the Wiener P rocess procedure, that gives satisfactory results in our simulation study.

REFERENCE

[1] SAMEKAWA, Masahito (1999): Forecasting foreign currency exchange by various artificial neural networks and their comparison, Graduation Thesis, Hosei University, Faculty of Engineering, Department of System and Control Engineering with Supervisor: Professor Kenji NAGASAKA.

[2] NAGASAKA Kenji and SAMEKAWA, Masahito (2000): Forecasting foreign currency exchange by agents in an artificial market and by pattern recognition of similar fluctuation, Proceedings of the Seventh Japan-China Symposium on Statistics, 261-264.

[3] SAMEKAWA, Masahito (2001) : Economical Forecasting by an Artificial Market, Master Thesis, Hosei University, Graduate School, Engineering Division, System Engineering Major with Supervisor : Professor Kenji NAGASAKA.

RESUME

We construct a forecasting system with a combination of agents in a virtual market by improved our Genetic Algorithm as our learning method and corrections through Wiener Process. Simulation studies show a satisfactory results.