Research on Economic Trading System Based on Artificial Intelligent

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Abstract. Contemporary, economic trading system has been greatly enhanced by utilizing digital economic transactions technique. However, existing trading platforms require workers to dispose numerous transaction data and operate the trading behaviour in benefit-maximum time point, which need experienced traders and may cause several operation errors. In this paper, we propose a novel artificial intelligent model to detect the benefit-maximum point and automatically achieve trading operation from numerous data input. The nonlinear neural network is trained to fit the rate of return of the trading system and the multi-factor trading model is established by relying on the prediction results of the neural network model as the scoring basis. Indeed, our model can achieve the trading decisions by learning from history trading data and other related information. From our extensive experimental results, we can conclude that our devised model can automatically realize economic trading operation on block-chain system with reasonable gas costs and acceptable benefits through comparing with existing models.

Keywords: Economic Trading System · Benefit-Maximum · Nonlinear Neural Network · Multi-factor Model

1 Introduction

The existing economic trading system is mainly based on mathematical quantitative methods to complete the decision-making and implementation of trading behavior, which is often accompanied by the deep involvement of computer technology. The economic trading system has been developed for many years in the overseas trading market with mature financial environment, and the trading method based on quantification can ensure that no matter how the investment market ups and downs, the performance can always be relatively stable, so it is favored by more and more traders [1]. In this context, the market size of the economic trading system is increasing, and its total share of the entire financial market is expanding.

An economic trading system is a platform of rules and regulations that govern the exchange of items and services between users. The platform is designed to promote economic growth and stability by providing a framework for international trade [2]. The system is based on the principles of free trade, which allow countries to specialize in the

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production of goods and services that they are most efficient at producing. This specialization leads to increased efficiency and productivity, which in turn leads to increased economic growth [3]. The system also helps to ensure fair competition between countries, as well as providing a mechanism for resolving disputes between countries [4]. The economic trading system is an important part of the global economy and is essential for the continued growth and development of the world economy [5].

Artificial intelligence is the ability of a computer or machine to think and learn from the input data. Artificial intelligence is a field of computer science that focuses on creating intelligent machines that can think and act like humans. Artificial intelligence has been utilized in a variety of applications including medical diagnosis to autonomous vehicles [6].

Additionally, the artificial intelligence is also utilized in robotics, natural language processing and computer vision. Artificial intelligence has the potential to revolutionize the way we live, work and interact with the world around any requester [7]. By leveraging the power of artificial intelligence, we can create intelligent, more efficient methods that can assist us to dispose complex problems and make better decisions. Artificial intelligence is an astonishing and rapidly evolving field that has the potential to transform our lives in the years to come [8].

At the same time, with the re-emergence of artificial intelligence technology in recent years, including deep learning, big data technology and data mining [9] and other concepts, various data processing technologies, financial prediction models and high-performance computers based on artificial intelligence technology have become more and more closely combined with quantitative investment [10]. The concepts and knowledge systems related to them have gradually become the research focus of the investment industry and scholars [11].

The reminder of this paper will be arranged with four sections including an introduction related contributions and primary parameter symbols that are used in proposed model. Subsequently, the system framework is provided with detail sequence of model procedures and corresponding explanations. Indeed, the experimental results and analysis are given in Sect. 4. Finally, we conclude the proposed model and provide possible methods for future improvements, which are shown in Sect. 5.

2 Preliminaries

In this section, we illustrate related contributions in economic trading system including algorithms and automatic operation models. Subsequently, we demonstrate the primary parameters and functions used in our model.

2.1 Related Works

At present, many artificial intelligence technologies have been introduced into economic trading systems, the most commonly used is genetic algorithms (GA), genetic algorithms are inspired by biology by applying genetic operators to increase individual adaptation values in the iterative process, the advantage of algorithms is that they do not need any clear definition of the objective function [12]. Therefore, genetic algorithms are often

Table 1. Summary of primary parameters.

Parameter Symbols	Functions
X	Input transaction values set
w	Factor weight
p	Number of factors
r	Reward of each factor weight

used to solve optimization problems and retrieval problems, genetic algorithms are used in many automated trading systems to choose the most beneficial moments, and many trading systems use genetic algorithms for portfolio optimization and data analysis.

With the continuous improvement and iteration of artificial intelligence algorithms, artificial neural networks (ANN) build models by adjusting the weights between connections by manipulating simple elements in parallel. It is widely used in classification, prediction and control and other issues [13]. It has the advantage of being able to build nonlinear models without knowing the interrelationships between variables.

2.2 Primary Parameters Introduction

Following Table 1 demonstrates the primary parameters and specific functions that are used in proposed artificial intelligent model.

3 Model Framework

3.1 Procedures Description

Following items illustrate the main procedures and function in the proposed trading system.

- Data Collection: Collection could be used to collect and analyze data from various sources including market prices, economic indicators and trade agreements. Collected data can be utilized to identify patterns and trends in the market and allowing for more informed trading decisions
- Risk Analysis: Artificial intelligence model will be utilized to identify potential risks in the trading system including currency fluctuations or political instability. Analysis procedure can assist traders to make more informed decisions about their trading strategies
- Automated Trading: Artificial intelligence can be utilized to automate the process of trading goods and services between countries. This can assist to reduce costs and increase efficiency
- Negotiation: Artificial intelligence can be utilized to automate the process of negotiating trade agreements between countries. This can help to reduce costs and increase efficiency.
- Performance Monitoring: Artificial intelligence can be used to monitor the performance of the trading system, allowing for more effective management and optimization of the system.

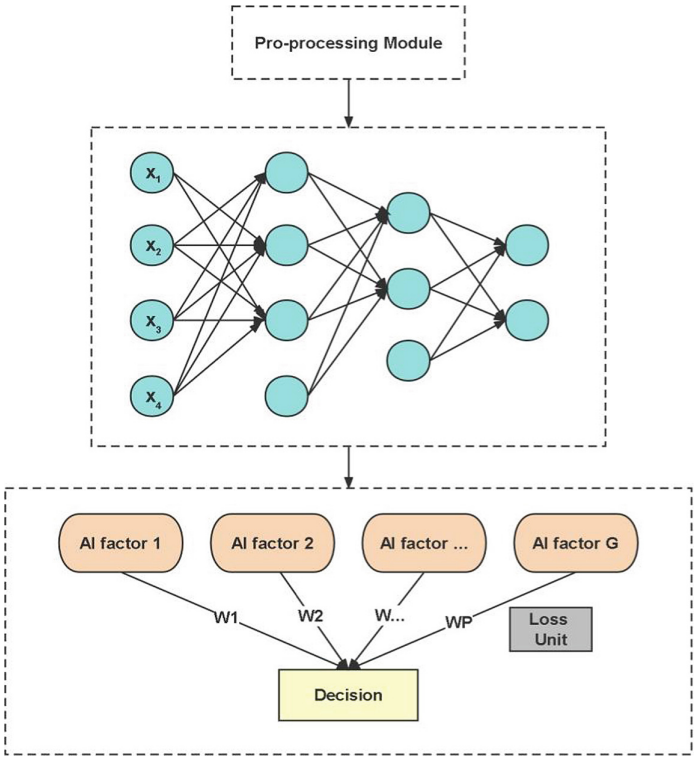

Fig. 1. System framework structure

3.2 System Model Description

Following Fig. 1 demonstrates the general framework of proposed model with a neural network and a factor evaluation module.

Following Eq. 1 describes the loss unit calculation formula for each factor weight wp, where the symbol r means reward of weight w and cov represents the covariance calculation.

$$wi = \sum_{j}^{p} w_i w_j cov(r_i, r_j) \tag{1}$$

4 Experiments

4.1 Experimental Setups

We simulate the generation of a pool of 300 stock transactions, using the missing value filling method, outlier processing according to the 3Sigma rule, a small amount of data beyond 3 times the standard deviation of the outlier treatment, normalize the data.

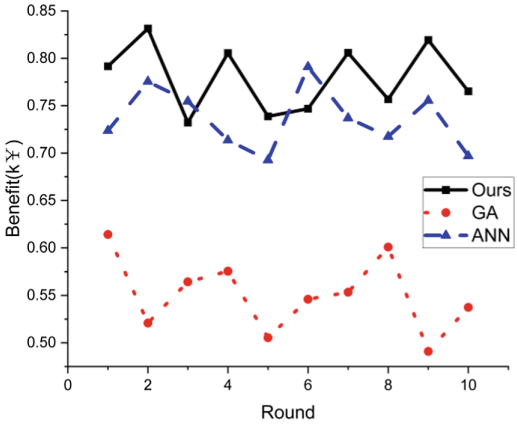

Fig. 2. System framework structure.

Table 2. System cost comparison results.

Models	Cost (Kgwei)
Ours	3.75
GA	4.31
ANN	3.92

4.2 Performance Evaluation

We simulate the other previous introduced method including genetic algorithms (GA) and artificial neural networks (ANN) with the same conditions for evaluating the benefits with our proposed model. Following Fig. 2 demonstrates the finial benefits that are generated by proposed with total 10 rounds simulation.

4.3 Cost Evaluation

We simulate the existing artificial methods and our model at homogeneous experimental settings. Table 2 demonstrates gwei in the block-chain transaction costs.

5 Conclusion

The utilization of artificial intelligence technique in economic trading systems has the potential to revolutionize the way we trade. From our experimental results, we can conclude that our model can analyze large amounts of data quickly and accurately with allowing traders to make more informed decisions and increase their profits. Proposed model can also reduce the risk of human error, as they are able to identify patterns and trends in the market that may not be leaked. Proposed model can also be utilized to

automate certain aspects of trading including order placement and execution, which can assist to reduce costs and increase efficiency. In the future, researcher can develop more effective model, which may become even more sophisticated with allowing traders to make more accurate predictions and increase their profits even further.

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