

The Optimization of choosing Investment in the capital markets using artificial intelligence

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ABSTRACT: Optimization is one of crucial items in behavioural sciences. These days the use of Meta heuristic has grown considerably in all fields. In this study, we will look for optimization of selection in a portfolio of investment opportunities. We've been looking for a selection logic using a meta-heuristic algorithm Called artificial neural networks. The results showed that using artificial neural network algorithm had an optimization in decision-making and selection of investment opportunities. The research is applied one considering the purpose and is looking for developing knowledge in a particular field.

Keywords: investment, meta-heuristic algorithms, artificial neural networks

I. INTRODUCTION

The Art of investment can be defined by risk and return. Investment means to accept some risk in exchange for an expectable return. For each person prior to entering the stock market, it is quite important to know and measure variety of risks and dangers. As we shall see, some of these risks and returns are diverse and others are not. Make sure you're prepared to pay for the additional risk (Rahmani, Elham, 2004). Allocation of capital in different assets is an important decision making issues among leading investors. The optimal choice of an investment portfolio using traditional models is difficult Due to the complexity of the phenomenon (Rahmani, Elham, 1393). Optimization due to fluctuations in economic indicators and Political conditions as a tool for risk reduction could be very important.

Neural networks

Artificial neural networks (ANN) is a practical way to learn the various functions Such as functions with real values, functions with discrete values and functions with the vector values. Neural networks learning are Immune from training data errors. Such networks are successfully applied in issues such as Speech recognition, identification and interpretation of images, and robot learning (Kasabov, N. K. ,1998)

Definition of neural network

It is a method of calculation. Several processing units are made based on interlocking connection.

Network includes an arbitrary number of Cells, or node or unit or neurons that linked the total input to output (Figure 1)

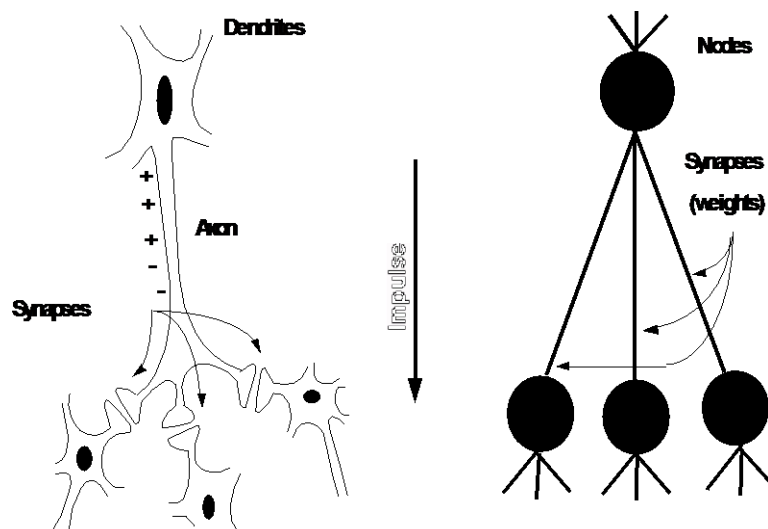


Figure 1: neuron system

Neural network capabilities

- Calculation of a known function

- Approximation an unknown function
- Pattern recognition
- Signal Processing
- Learning above items

Theoretical framework and research model:

The conceptual definition of neural network:

They are Systems and novel computational methods for machine learning, knowledge representation, and finally apply the gained knowledge to predict the output response of complex systems.

Investment portfolio (portfolio): a set of assets that are selected for investment.

The investment of financial assets usually includes securities, shares and stocks and any securities that may be issued in the financial field. In the selection of investment portfolio we try to select the combination of assets for investment that maximizes returns while the risk is below a certain amount and Or minimizes risk while efficiency is higher than a certain level. Certain level of risk or return determined according to the investor (M. M. Rashidi, et al, 2011).

Table 1: Operational definition of variables (Sadeh, DH, Nooraie, M, Hajikarimi, B, 2013)

Concept	Dimension	Component	Index
Neural Networks	Optimization	Optimal response	Repeatability in providing the optimal solution

Investment portfolio: This research will be examined with Cost and efficiency standards

Model problem

In Figure 2-3 and Table 2-1the model of the problem And how to calculate indices were presented.

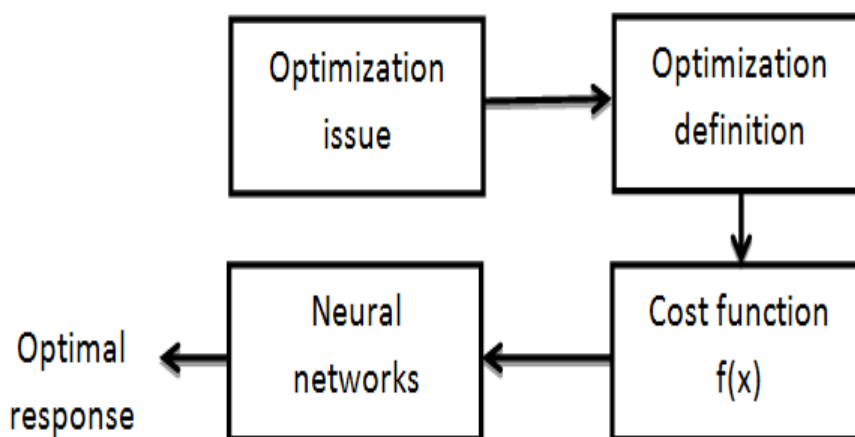


Figure 2: model problem (ataash pazh, Ismail, 2007)

Concept	Dimension	Component	Index
Capital Market	Coverage of investment	Diversify investments	Percept coverage of investment
	Investment cost	Cost	cost value

II. RESEARCH METHODOLOGY

Considering the purpose the researching applied research. The aim of this research was to develop practical knowledge in a particular field. Considering the features of the subject this research is a descriptive study. In terms of the time of data collection it is a survey based study and In terms of the ways of data collection is a field study. The population is investment opportunities in Iran That the Information of cost efficiency could be achieved. According to information obtained 17 investment position were identified. For the analysis of neural networks Matlab software was used. Seven investments identified. After obtaining information from authoritative sources Investments are identified. Price and return of it are given in the table below. The study examined the types of investments.

Table 3: Investment Position

Services	Production	Risk According to the experts	Rating According to the experts	Investment opportunities	Row
1		0.02	0.69	Savings in the bank	1
1		0.72	0.87	Investing in stock	2
	2	0.90	0.17	Mining investments	3
1		0.55	0.73	Buy Currency	4
	2	0.66	0.37	Investment in construction	5
	2	0.89	0.47	Investment in the production of automobile parts	6
1		0.12	0.72	Investment in transport services	7
	2	0.96	0.11	Investment in agriculture	8
	2	0.41	0.68	Investment in the petrochemical industry	9
	2	0.56	0.72	Investment in construction and road building	10
1		0.45	0.81	Imports of electronic components	11
1		0.91	0.20	Imports of agricultural implements	12
1		0.61	0.17	Import chemicals	13
1		0.13	0.68	Drug imports	14
1		0.21	0.79	Imports of IT equipment	15
1		0.56	0.53	Import of Cosmetics	16
1		0.72	0.34	Insurance	17

III. DATA ANALYSIS

Performed the program:

To run we perform with the costs 4.5 and 2.5 of the marginal databased on the total risk of 9.75

In both costs The Reproducibility algorithm was run.

Neural network configuration:

Input nodes: 1

The number of middle layers: 5

The number of neurons: 100

3 descriptive analytical results of neural network algorithm

4-3-1 Frequency of investment position at the expense of 2.5

In table 4-9 the amount of repetition in any of the investments was shown.

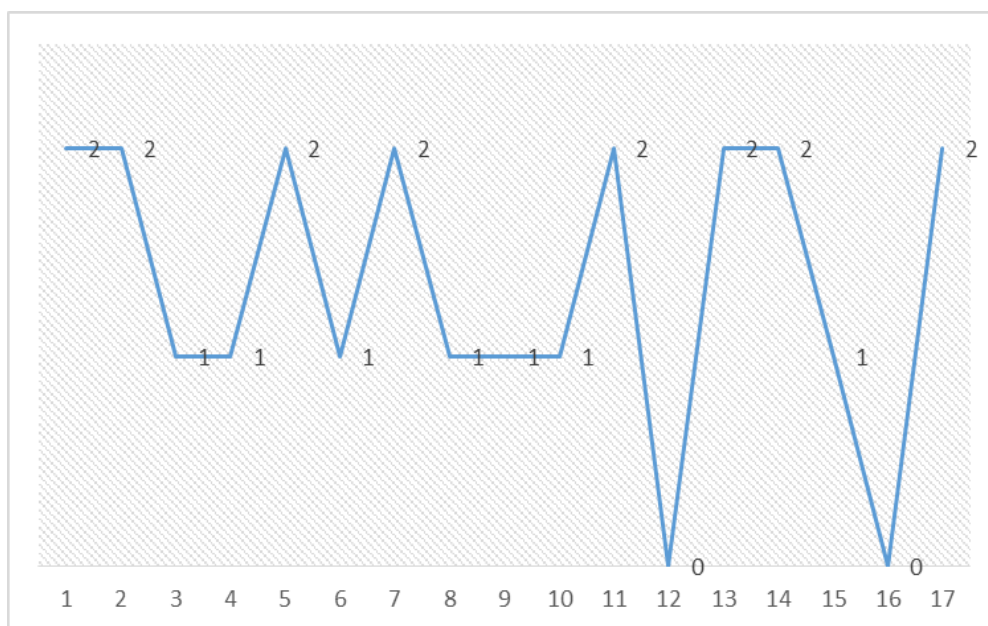


Figure 4.7: the reps in any of the investment

3.2 Frequency investment position at the expense of 4.5

Table 4-10 the repetition in choosing of any of the investments was shown.

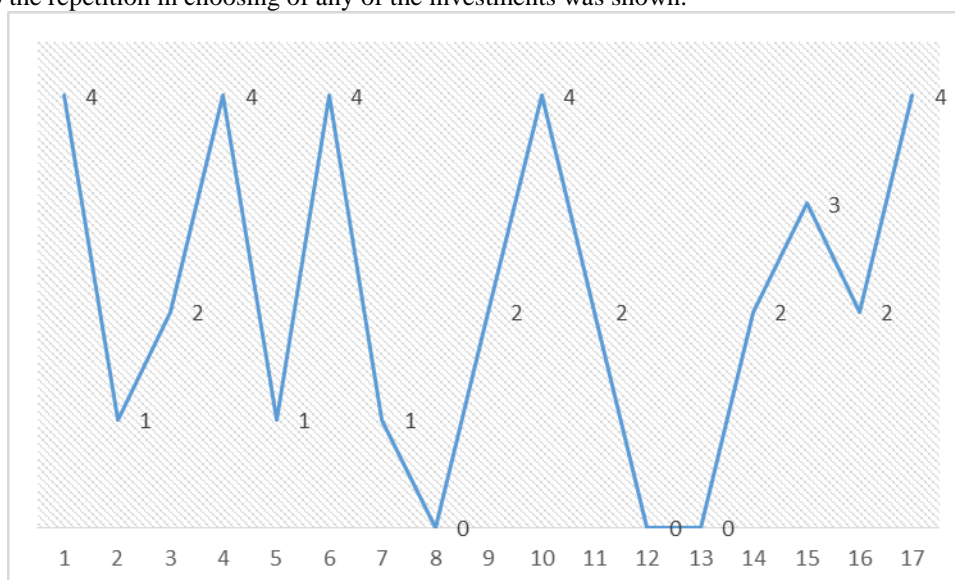


Figure 4.8: the repetition rate in any of the investment

IV. CONCLUSION

In this research Neural network algorithm using the decision matrix regarding the selection of investment Showed that it is a very good tool. In this Snoopy M. Rashidi, et al (2011) and sadeh, DH, et al. (2013) the advantage of neural networks algorithm for solving discrete problems mentioned. In this study, multiple optimal solutions with slight deviation have been achieved. In the review of investments in more positions to reach Goals the neural network algorithm can be used to prioritize and select investment opportunities. Our research showed that by adding criteria better decisions can be made. M. Rashidi, et al (2011) also pointed to the importance of Metaheuristic algorithms compared to other methods. In this study, it was found that Investment in banks and stock and importing equipment, IT, housing and insurance have a well position and we can invest in these cases with the least risk in Iran. In this sadeh, DH, et al. (2013) they used linear programming model, risk indicators and the returns of gained results showed that the study does not have the ability of the current research. So researchers as a limitation raised multiple optimum solutions and Suggested way to use the Meta heuristic. Artificial Neural Networks as learning algorithm scan solve complex problems easily. M. Rashidi, et al (2011) have pointed out in their study about the High accuracy of this algorithm that in the behavioural sciences can be used an important tool for decision-making.

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