

THE ANALYSIS OF THE FINANCIAL MARKET WITH USE OF ARTIFICIAL INTELLECT

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Annotation. In the given work analysis of technology of forecasting of the financial market is carried out. Analysis of the factors influencing the market is carried out, the possibility forecasting of exchange with use of a synthetic neural network is defined and attempt is carried out to frame a similar network.

I INTRODUCTION

In mathematics, for forecasting events use statistical methods and methods on the basis of probability on which it is possible to assert with the certain probability, that the future event will take place whether or not. Alongside with traditional methods of forecasting also the theory of an artificial intellect which has well recommended itself in the field of management roughly develops, there, where application of human intelligence and intuition is necessary, in particular at the decision of problems of forecasting. It prefers in the big class of problems of recognition of images, forecasting, creation of associative memory, economy, management of objects with which bed or usual computers do not consult at all. In the given work the problem of forecasting of the financial market is considered by the example of a dollar exchange rate to leu with use of an artificial neural network.

II THE ANALYSIS OF THE ENTRANCE DATA

It agrees to the data of journal Forbes of 24 % of milliard conditions it is made by people occupied in business in the world financial markets.

The world financial market is divided:

- The market of state exchequer obligations (fixed incomes). The goods in this market are the exchequer obligations produced by corresponding state institutes of countries, as a rule, by Treasuries.

- The market of precious metals (commodities). The goods in this market are precious metals (silver, gold, platinum, a palladium, etc.).
- The share markets (Stocks). The goods in this market are shares of the companies. In the beginning of the last century began formation of the share markets - the share market of the companies.
- International exchange market FOREX (currency). The goods in this market are currencies of various countries. It is youngest of all segments of the financial markets and most roughly developing.

In the given work the forecast of exchange, therefore the analysis is considered, the engineering and tools of forecasting are used on the basis of market FOREX.

Forecasting of the market is carried out on the basis of the technical and fundamental analysis. The technical analysis is based to postulates:

- The rate (price) takes into account all. Any factor influencing the price (economic, political or psychological) is taken already into account by the market and included in the price.
- Price range is subordinated to tendencies (a direction of movement of the price).
- The history repeats. This postulate bases on objectivity of laws of physics, economy, psychology. Those rules that acted in the past, act and now, and also will act in future.

The given analysis allows to predict rather precisely day time dynamics of the prices, and is allocated powerful and difficult mathematical calculations.

The fundamental analysis represents the greater interest as it cannot be described a mathematical method and to reveal exact communications between factors as influence their exchange rate constantly varies also forecasting is based to experience and intuition - just that area where the artificial intellect is used. In the fundamental analysis various messages on currency - financial events in the world, the phenomena of political and economic life both the separate countries, and the world community as a whole which can influence development of the currency market are studied. The analysis is carried out, in exchange rates they can result in what change. Here important there is an information on work of stock exchanges and the large companies such as market-makers, discount rates of the central banks, an economic rate of the government, possible changes in political life of the country, and also every possible hearings and expectations. As a whole the fundamental analysis allocates four groups of the factors directly influencing the market: economic, political, hearings and expectations, and force-major.

Economic forces reflect a condition of economy of the state and are submitted as economic indicators. Certainly the market of currencies is influenced with huge quantity of factors, but in the given work the most influential as the purpose is are considered only to prove an opportunity of forecasting instead of achievement of the maximal accuracy. In opinion of the majority of traders

and on the basis of articles and Internet forums, it was found out, that among indicators in the USA have the greatest value:

- Average hourly earnings;
- GDP - Gross domestic product;
- International trade (Trade balance);

These indicators leave in numerical value once a month. Everyone has the date and time of the announcement. In Moldova, on the basis of change of exchange rate within last 2004 factors are allocated:

1. Seasonal prevalence. Seasons are implied by seasonal prevalence (summer, autumn, winter, spring) which indirectly confirm such fact as - agricultural works - import of raw material and fuel and as the corollary results in a rise in price of dollar
2. Export - import. The data on export and import which indirectly define competition of national production in comparison in imported. The high level of the prices inside country and a low price level behind its limens usually mean the high prices for a foreign exchange. The production, the above the price for it so also the exchange rate grows is more imported and stabilized.
3. Importation of the foreign capital. In this case is present in view of official remittances that are taking place through the Moldavian banks. According to a national bank, for last 2004 in the Moldavian economy the citizens working abroad, it has been enclosed about 475 million USD. And about 70 % falls at spring and autumn.

Political factors express by the way applications of chapters of the states leading economists about economy and a policy of country, a meeting of politicians, signing of various agreements.

The force-major factor is a critical situation which results in a sharp modification of exchange. To a situation force major it is possible to refer natural disasters, acts of terrorism, military operations. In modern company this factor is especially actual.

III. EXPERIMENTAL

For training a neural network sample is under construction on the basis of last 2004 and the beginning 2005. The analysis is carried out with use of software package Deductor 2.0 Lite. Optimization of sample was carried out with use Self Organizing Maps which allow to project a multivariate entrance vector on a two-dimensional plane. After training, appeared, that samples is optimum for use. The choice of architecture of a network which will predict a dollar exchange rate to lei is based that the most popular for the given circle of problems is the network on the basis of algorithm Resilent Propagation. Search of optimum architecture of network which after education gives a minimum error of forecasting, consists in selection of an amount of neurons of network and

a steepness of function. After duration experience, the optimal has appeared a network consisting of 4 layers with an amount of neurons (10 10 8 1).

IV RESULTS AND DISCUSSION

After education, the neural web gives away the prognosis of a mean rate the next weeks:

Table 1

Date (dd/mm/yyyy)	The prognosis	rate
2/7/2005 - 2/13/2005	11.7685	12.4914
2/21/2005 - 2/27/2005	11.7690	12.5245
3/7/2005 - 3/13/2005	12.3276	12.5972

Proceeding from the obtained outcomes, it is possible to draw a conclusion, that the neural network will recognize a test set with the big errors. And sharp inflections of values take place.

V CONCLUSIONS

On the basis of erroneous forecasting an artificial neural network it is possible to define the following causes:

- The dollar within 2004 hardly varied from 11,6 up to 13,2. The neural network is not capable to envelop so big spectrum of values.
- Logic expressions, such as political expressions, are coded in a binary kind. The program of them will recognize as value from a floating point that distorts sense of encoding and results in incorrect outcome.

For correcting this situation it is necessary:

- To construct samples with parameters for the last months when the rate varied in area 12 lei.
- To optimize sample, having removed erroneous examples.

VI REFERENCES

1. Masalovich A. Нейронная сеть - оружие финансиста.
http://www.tora-centre.ru/library/ns/nn_fin2.htm.
2. Gavrilo A. V. Лабораторный практикум по нейронным сетям.
<http://ermak.cs.nstu.ru/site/students/ai2/>.
3. Starikov A. Нейронные сети как средство добычи данных.
<http://www.basegroup.ru/neural/ns.htm>