PROPERTIES OF ANN USED IN BANKRUPTCY FORECAST

Lecturer Florin MOLNAR Ph.D
Faculty of Computer Sciencies,
„Ioan Slavici" University, Timişoara,
România

Lecturer Adriana BEBEŞELEA Ph.D
Faculty of Economics,
„Ioan Slavici" University, Timişoara,
România

REZUMAT.Finanţele şi investiţiile sunt cele mai frecvente domenii ale aplicaţiilor reţelelor neuronale artificiale (RNA). Problemele cele mai reprezentative care sunt rezolvate de RNA sunt previziunile de faliment, evaluarea riscurilor de ipotecă şi alte împrumuturi, predicţii pe piaţa bursieră (preţuri de vînzare, obligaţiuni şi opţiune, returnare de capital, comerţ cu mărfuri etc.), prognoze financiare (returnare de investiţii) şi altele. Chase Manhattan Bank, Peat Marwick, American Express, sunt doar câteva din multele companii care aplică eficient RNA-urile în rezolvarea problemelor financiare şi de investiţii.

Cuvinte cheie: Reţele neuronale artificiale, predicţia falimentului, returnare de capital, investments, comerţ cu mărfuri.

ABSTRACT. Finance and investing are one of the most frequent areas of artificial neural network (ANN) applications. Some of the most representative problems being solved by ANNs are bankruptcy predictions, risk assessments of mortgage and other loans, stock market predictions (stock, bond, and option prices, capital returns, commodity trade, etc.), financial prognoses (returns on investments) and others. Chase Manhattan Bank, Peat Marwick, American Express are only a few of many companies that efficiently apply ANNs in solving their financial and investing problems.

Keywords: Artificial neural network, bankruptcy forecast, capital returns, investments, commodity trade

1. INTRODUCTION

Fundamental attributes of ANN can be divided into two broad categories:

- ANN architecture, which defines the structure primarily for the purposes of specifying number of neurons and connections between them, their other characteristics are input / output (I / O), the intensity of synapses, deviations, activation;
- Properties of ANN: how to learn, reactivation of synapses, associations and further comparisons with existing knowledge to new information, classified as new information;

Information processing by ANN does not occur after a sequential algorithm, but is based on a parallel decomposition of basic information elements, the process can be compared with a color decomposition into its fundamental frequencies and amplitudes, so that at any moment it can be reconstituted, for example, the paintings look a brain stores not as a series of pixels as with computers when it would be scanned, but will decompose in basic features such as lines, points, shapes, colors and spatial relationships .

In the last decade in the computer world have made numerous attempts to shape the design of circuits ANN, has settled the term paradigm for fundamental principles that shape the behavior of ANN. Usually these paradigms have been implemented in the form of mathematical equations. A paradox emerged that although mathematical modeling but is best suited for modeling sequential processes not ANN sequence, do not know basic operations such as series, integrals, matrix calculation. It appears logical problem of classical mathematical modeling ANN.

2. ANN MODELING

The possibility to use intuition ANN properties, there was acute problem of appropriate mathematical models, obviously based on that computer modeling to create the possibility of ANN emulation.

Modeling ANN was greatly influenced by processing visual information, which is one of the most complex information in the brain, has been established that it is processed in successive stages: thus, simple formulas, such as edges and contrasts are seen in the early stages and the later stages of complex optical path (between the eyes and brain).

3. ANN LEARNING SYSTEMS

Learning is one of the most important properties of ANN, intensely studied generating many questions: How do I learn? What is the most effective learning? How fast and how much can I learn?

Learning is not a unique process, there are different types of learning processes dependent species, levels of intelligence, the living environment. ANN engineering has selected the most effective learning and has a useful built in the ANN, borrowing many algorithms in electronic circuits. Generalizing the problem, learning is an activity in

which ANN adapts to stimulate and produce a response, the emergence of a stimulus into ANN, which recognizes and develops a new classification for it.

Because neurons can be connected in several ways, and learning will be dependent on it, learning the rules of mathematical equations will be described hereinafter learning equations. As there will be different people for different learning methodologies, different architectures similar to ANN are different methods that will be discussed below.

Both the natural neural networks and the biological process of learning occupies a place of exceptional importance, automatically derive the following fundamental questions: how ANN learned? What is the most effective learning? How much and how fast can I learn?

Research undertaken in this area has highlighted the historical stages of assimilation of knowledge at different levels in different living environments and more even in different species of animal and humanoid beings. Not all learning has the same efficiency, depending on the actual behavior of each species, engineered ANN selects the most effective ways of learning and integrate the most useful types of ANN, reaching even the design of specialized circuits in this so.

In general one can say that learning is the process by which ANN Adapts to stimuli and generates an appropriate response and convenient (possibly after adjusting their specific parameters). learning is a continuous classification receive input stimuli (input) stimulus occurs when a new entry ANN, it either recognizes or develops a new classification index. When ANN response (output) is desired, one can say that ended learning or in other words have acquired new knowledge.

Learning paradigm in learning rules thus comprise ANN, described by mathematical expressions, equations called learning, which they describe the learning process, which in fact is a process auto adapter weight parameters (synaptic weights).

ANN knowledge acquired through training (learning), learning involves adaptation of ANN free parameters (weights, thresholds, learning rate, sometimes as the activation function or network structure) as a result of environmental stimuli found in the network.

Training vectors are presented sequentially and ANN in synaptic weights, which basically stores the knowledge data base is adapted to extract information that these vectors contain.

4. CHARACTERISTICS OF ANN

Mathematically analyzing the ANN can highlight the following features:

- Complexity - dimensions and interconnections needed to be able to perform a particular task;
- Capacity - number of bits, memorable ANN;
- Choice paradigm - which is implemented in the most favorable case of ANN concrete application;
- Performance;
- Effective learning;
- Answer - tactical response time to application internal stimuli;
- Repeatability - the ability to get the same answer him successive application same input stimuli;
- Sensitivity to noise - accuracy to obtain responses in case of input noise (interfering signals);

5. IMPLEMENTATION OF ANN

ANN should be implemented in a user-accessible, given that the complexity and size of their operation there is no question in manual.

a. software implementation

And in the implementation of ANN in the last decade has become software implementation (the program) at the expense of hardware (circuit), in fact this generation is the trend of the last two decades, observing a strong replacement of wired logic with the scheduled. Advantages of software implementation for ANN specific to any software implementation are:

- Flexibility - easy switch from one application to another;
- Facility - the ease with which users can be operated even without high knowledge in computers.

b. Implementation of hard

This implementation is generally in some decline from the software because of the advantages is the latter, however has an advantage which can never be matched by software techniques, namely the speed of execution, just for its operation have developed hybrid techniques, in speaking! follows: the development and optimization of structures is done through software that emulates the best resources hard structure, and finally translate it into a powerful hard structure.

Without going into details, that would not be the subject of this paper are reminded that the following special classes of circuits:

- Analog electronic circuits;
- Digital electronic circuits (numeric) - This category includes processors parallel general use, but also the more recent specialized neural computing, specialized VLSI circuits.
- Hybrid electronic circuits;
- Optical circuits.

6. ANN USING SPECIFICS AND CRITERIA

The question is more efficient use of neural networks in those types of applications that fully exploit their specificity, evident that there are types

of problems that folds almost perfect to use RNA as well as other generating even incompatible with them, generally based on experience in the field say that RNA can be used in those types of problems with the following features:

• mathematical model of the process is unknown, is too complex associated with accuracy (precision) insufficient and in some cases can not be determined;

• available data are considered in some cases incomplete, and there are signals noise, disturbance (noise can extrapolate the notion of technical and other categories of economic processes, genetic);

• there are a number of constraints (restrictions) applied to the process and to be optimized simultaneously.

Obviously, that in contrast to previous statements is not appropriate (ie beneficial) use RNA for applications where the mathematical model is known, precise and relatively easy to establish, in a word type deterministic applications.

Examples and the biggest successes have been achieved so far in the technical and information.

7. CONCLUSIONS

Finance and investing are one of the most frequent areas of neural network (NN) applications. Some of the most representative problems being solved by NNs are bankruptcy predictions, risk assessments of mortgage and other loans, stock market predictions (stock, bond, and option prices, capital returns, commodity trade, etc.), financial prognoses (returns on investments) and others. Chase Manhattan Bank, Peat Marwick, American Express are only a few of many companies that efficiently apply NNs in solving their financial and investing problems

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