New Trends in Fuzzy Sets, Intuitionistic Fuzzy Sets, Generalized Nets and Related Topics Volume II: Applications

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Generalized Net of the Process Cauterization Over Social Networks

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Abstract:

Development of social networks used apart for way of relation of young people largely and to different companies offer commodities and services to advertise their products and make report of opining of their potential customers. The proposed network provides one of the options for the use of social groups that it offers a method for clustering of information from different surveys. The whole process is described by one of the versions of the tools that use parallel processing of information or generalized networks.

Keywords: Generalized networks, Social networks, Neural networks, Clustering.

1. Introduction

The social network is a structure of nodes (representing mostly individuals or organizations) related to specific types of nodes as ideas, views, financial benefits, friendship, traditions hyperlinks and other. In its simplest form the social network represents a map of all relativistic links between nodes that are being studied.

The young people use the social networks as Facebook and Twitter not only to communicate and relate with their friends. For them they are means of receiving information related to their study or career. Four out of the five high school and college students stated that these sites are excellent or a good way to communicate with their schoolmates. Apparently even more - 7 out of the 10

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stated that they are as well useful even for getting information concerning family works and school events, or on creation of study groups and help between the schoolmates.

The social networks are one of the tools for your marketing policy. This is a factor witch over time will have an increasing effect and its importance will continue to grow enormously. Many promotional activities are already doing online, as this is the fastest way to reach large number of customers regardless of their location. Online marketing is a huge and very rich resource that can be extremely profitable for you and your business. The different individuals and organizations explore a series of social networks and seek, which one is most suitable for their marketing goals, personal data protection and many other needs.

The self – educational self – organizing cards are a special kind of artificial neuron networks.

The purpose of the self – organizing maps [4, 5] (SOM) is to transform the inlet model (signal) with a particular size in two – dimensional diskette card and to transform it adaptively in a topologically ordered mode.

In the SOM the neurons are located in an N – shaped network is a separate case at n=2.

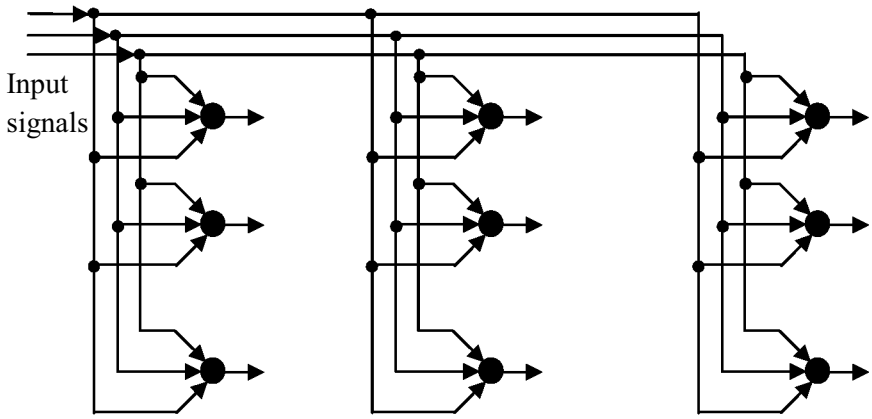

Fig.1 Two dimension neural network

This network is a one – layer straight stricture of neurons, located in lines and columns.

The education on the neuron network is based on the principle of competitive training when one sole winner in the card.

Generalized **Network model**

Initially "Generalized net"(GN) [1,2] stand these place:

- In place L1A – L1A- a token with characteristics „base data with customer data";
- In place L2A – L2A- a token with characteristics „base data with questions";
- In place L3A – L3A- a token with characteristics „base data the already clustered polls [3], and their user";

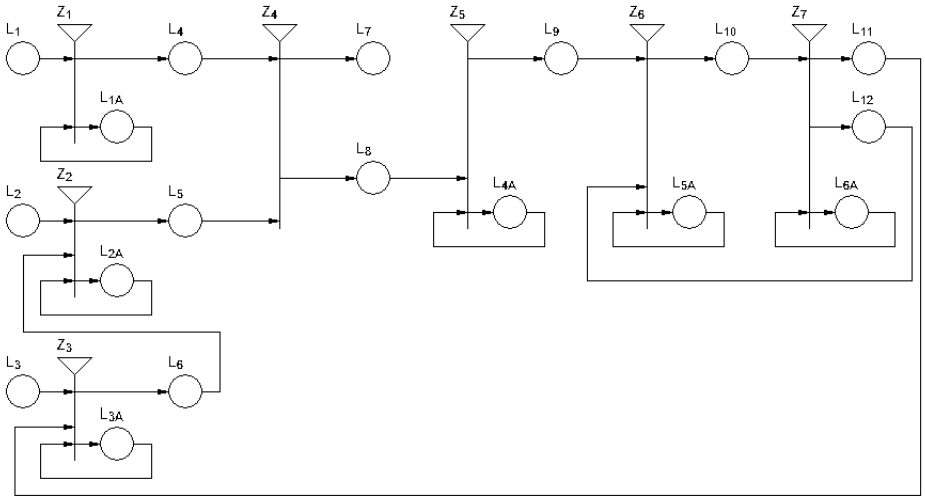

Fig.2 - Generalized net of the process cauterization over social networks

- In place L4A – L4A- a token with characteristics „base data with structures to SOM".
- In place L5A – L5A- a token with characteristics „weights coefficients".
- In place L6A – L6A- a token with characteristics „Archive weights coefficients; criteria for the end of the training".

GN summary contains the following set of transitions A:

$$A = \{Z1, Z2, Z3, Z4, Z5, Z6, Z7\},$$

where transitions describe these process:

- Z1 - Activity of the social network;

- Z2 - Compilation of polls;
- Z3 – Activity of user survey;
- Z4 - Completing the questionnaire;
- Z5 - Generating the structure of COM;
- Z6 - Calculation of outputs COM;
- Z7 - Recalculation of weights coefficients.

Transitions have the following description.
The token incoming in place L1 get characteristic „New user".

$$Z1 = < \{L1, L1A\}, \{L4, L1A\}, R1, \wedge (L1, L1A.) >$$

where:

R1 =

	L_4	L_{1A}
L_1	*true*	*true*
L_{1A}	*false*	*true*

In tokens L2 и L6, entering place with characteristics „New question in the polls" and „Request for questions to be added to the poll".

$$Z2 = < \{L2, L6, L2A\}, \{L5, L2A\}, R2, \wedge (\vee(L2, L6,), L2A) >$$

where:

R2 =

	L_5	L_{2A}
L_2	*false*	*true*
L_6	*false*	*true*
L_{2A}	$W_{2A,5}$	*true*

W2A,5 = "It is necessary to prepare the survey";
The token entering in place L3 get characteristic „New user survey".

$$Z3 = < \{L3, L11, L3A\}, \{L6, L3A\}, R3, \wedge (\vee(L3, L11), L3A) >$$

where:

R3 =	L_6	L_{3A}
L_3	*false*	*true*
L_{11}	*false*	*true*
L_{3A}	$W_{3A,6}$	*true*

W3A,6 = “Necessary is to prepare data survey”;
The token, entering in place L4 и L5, obtain characteristic „Client” и „Ready poll”.
In place L7, entering token with characteristic „Left client”.

$$Z4 = < \{L4, L5\}, \{L7, L8\}, R4, \wedge (L4, L5) >$$

where:

R4 =	L_7	L_8
L_4	*true*	*false*
L_5	*true*	*true*

The token entering in place L8 obtains characteristic „Completed survey”.

$$Z5 = < \{L8, L4A\}, \{L9, L4A\}, R5, \wedge (L8, L4A) >$$

where:

R5 =	L_9	L_{4A}
L_8	*false*	*true*
L_{4A}	$W_{4A,9}$	*true*

W4A,9 = “Structure is chosen to COM”;
The token entering in place L9, obtains characteristic „Structure is chosen to COM; Completed survey”.

$$Z6 = < \{L9, L12, L5A\}, \{L10, L5A\}, R6, \vee (L9, L5A, L12) >$$

where:

$$R6 = \begin{array}{c|cc} & L_{10} & L_{5A} \\ \hline L_9 & true & false \\ L_{12} & true & false \\ L_{5A} & false & true \end{array}$$

The token entering in place L10, obtain characteristic „Winner neuron and weight coefficients".

$$Z7 = < \{L10, L6A\}, \{L11, L12, L6A\}, R7, \wedge (L10, L6A) >$$

where:

$$R7 = \begin{array}{c|ccc} & L_{11} & L_{12} & L_{6A} \\ \hline L_{10} & true & true & false \\ L_{6A} & false & false & true \end{array}$$

The token, entering in place L11 и L12, receives characteristic „Clustering polls" and „New weight coefficients".

Realization in Matlab

The SOM are trained with 20 different vectors in Matlab. The testing vectors and neural network responds are given below. In the first part of the table responses of people, that responded to the questionnaire are given. A right of - number of clusters in which the answers come. For example: respondents answers № 8 are 5 cluster. The program code is implemented in Matlab environment.Implementation of the program is shown also in the figures below.

№	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Q 8	Q 9	Q 10	Q 11	Q 12	Q 13	Q 14	Q 15	K 1	K 2	K 3	K 4	K 5	K 6
1	4	5	2	3	4	5	3	4	4	4	3	3	5	5	5	0	0	0	1	0	0
2	4	4	4	4	3	4	5	5	4	3	2	3	4	1	1	0	0	0	0	0	1
3	5	5	5	5	5	4	4	3	4	5	3	4	5	4	5	1	0	0	0	0	0
4	3	3	3	3	4	4	4	3	4	3	4	4	4	4	5	0	0	0	1	0	0
5	3	4	5	3	4	5	5	5	4	3	4	3	4	3	3	0	0	1	0	0	0
6	3	4	5	5	5	5	5	5	4	4	5	5	3	3	3	0	0	1	0	0	0
7	3	4	5	5	5	4	4	3	5	5	4	5	4	5	4	1	0	0	0	0	0
8	3	4	5	3	4	5	2	3	4	4	3	4	5	2	3	0	0	0	0	1	0
9	3	3	4	4	5	5	4	4	4	4	5	5	3	3	1	0	0	1	0	0	0
10	5	5	5	5	5	4	4	3	4	5	3	4	5	4	5	1	0	0	0	0	0

Figure 3 shows howmany clusters divide SOM and its topology.

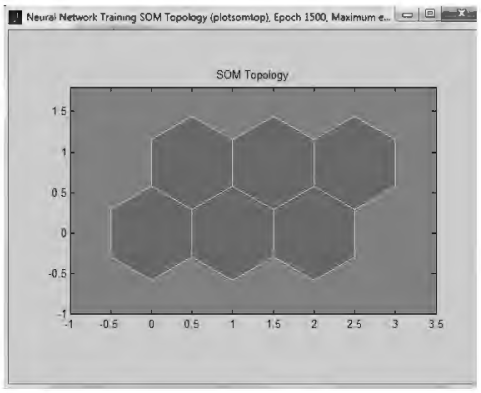

Figure.3

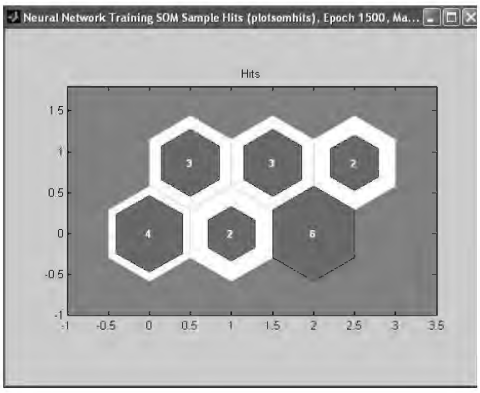

Figure.4

In figure 4 shows the distribution of all possible answers in clusters.
In figure 5 shows the connections between clusters in SOM.

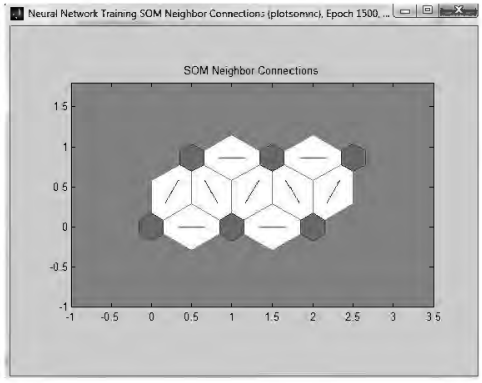

Figure 5

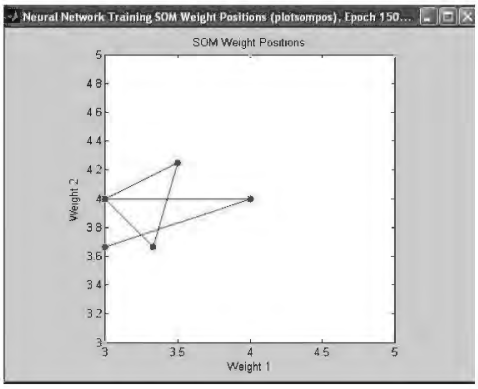

Figure 6

In figure 6 the weights of clusters in 2D graphics are shown.
In figure 7 the distances between neighboring mass clusters are shown.

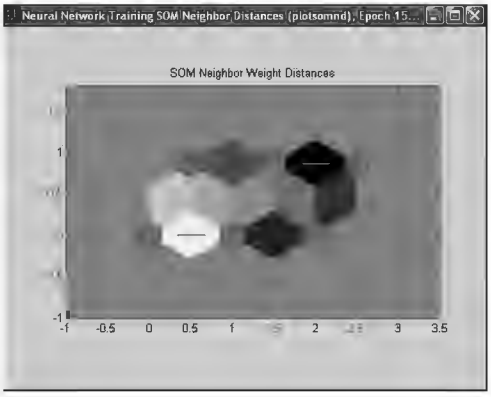

Figure7

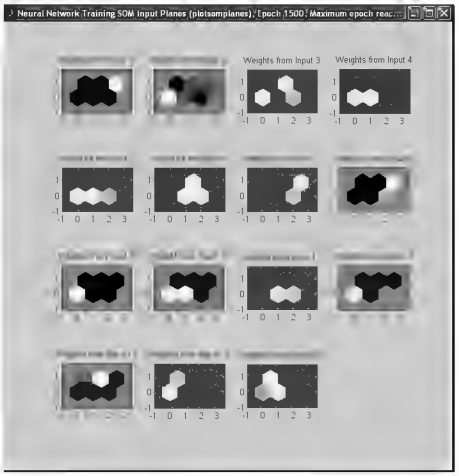

Figure 8

In figure 8 the clusters which have largely weight (darker color better) are shown.
In figure 9 shows all input vectors.

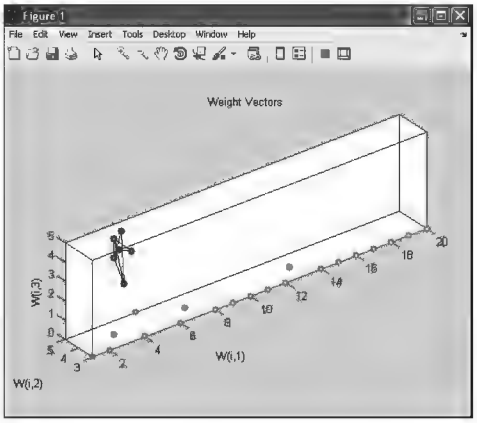

Figure 9

Inference

SOM clustering input, here based on them can make some conclusions:

- Data from group 1 showed that users of social groups within the cluster actively use social networks for all their needs and questions!

- Data from group 2 showed that users of social groups within the cluster are not so active in their social network!
- Data from group 3 show that users of social groups within the cluster using social network only when advertising a product or purchase!
- Data from group 4 showed that users of social groups within the cluster are included only when they need new friends and dating!
- Data from group 5 suggests that users of social groups within the cluster use social network only when they want to participate in rallies and organizations!
- Data from group 6 show that users of social groups within the cluster visited social network only when you want to see the news or write a comment!

Conclusion

The neurons type - SOM network is implemented. The complete investigation procedure is identified with OM. Proposed method will improve the development of social networks also as a way of communicating mostly young people, and it is used by various companies offering products and services to advertise their products and make a survey of the potential client.

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The papers presented in this Volume 2 constitute a collection of contributions, both of a foundational and applied type, by both well-known experts and young researchers in various fields of broadly perceived intelligent systems.
It may be viewed as a result of fruitful discussions held during the Eleventh International Workshop on Intuitionistic Fuzzy Sets and Generalized Nets (IWIFSGN-2012) organized in Warsaw on October 12, 2012 by the Systems Research Institute, Polish Academy of Sciences, in Warsaw, Poland, Institute of Biophysics and Biomedical Engineering, Bulgarian Academy of Sciences in Sofia, Bulgaria, and WIT - Warsaw School of Information Technology in Warsaw, Poland, and co-organized by: the Matej Bel University, Banska Bystrica, Slovakia, Universidad Publica de Navarra, Pamplona, Spain, Universidade de Tras-Os-Montes e Alto Douro, Vila Real, Portugal, Prof. Asen Zlatarov University, Burgas, Bulgaria, and the University of Westminster, Harrow, UK:

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The consecutive International Workshops on Intuitionistic Fuzzy Sets and Generalized Nets (IWIFSGNs) have been meant to provide a forum for the presentation of new results and for scientific discussion on new developments in foundations and applications of intuitionistic fuzzy sets and generalized nets pioneered by Professor Krassimir T. Atanassov. Other topics related to broadly perceived representation and processing of uncertain and imprecise information and intelligent systems have also been included. The Eleventh International Workshop on Intuitionistic Fuzzy Sets and Generalized Nets (IWIFSGN-2012) is a continuation of this undertaking, and provides many new ideas and results in the areas concerned.

We hope that a collection of main contributions presented at the Workshop, completed with many papers by leading experts who have not been able to participate, will provide a source of much needed information on recent trends in the topics considered.

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