

CREATIVE NEURAL NETWORK FOR THE SYNTHESIS OF LOGOS WITH THE ELEMENTS OF MODELING OF THE INTERACTION OF CONSCIOUSNESS AND SUBCONSCIOUS

Yushchenko A.G., Sendetskyi M.N., Aslanova L.A.

*National Technical University
«Kharkiv Polytechnic Institute»,
Kharkiv*

Simulation of creative processes with neural networks is of great value either for academic studies or for practical applications. In our case, such simulation is based on the theory of homology of creative processes, which postulates existence of a universal operator that is implemented in a neural network architecture [1]. A certain portion of images generated with the synthesizer network [2] - [4] meets the aesthetic criteria of the "teacher". The aim of our research is to improve originality of the images. As a prototype, we take a perceptron-based logo synthesis neural network that learns in supervised mode and uses the results of learning for subsequent synthesis [4]. It is well known that a subconscious stage is an important stage of human creative processes [1], so we attempt to supplement the prototype neural network with a fragment simulating subconsciousness. The new neural network implements a hybrid learning method that combines supervised and stochastic learning modes. First, four neural networks are created, and each of them is fed a randomly generated input vector for basic training. Then the random selection function is used. Then eight logos are generated to be evaluated by the teacher. The connection weights of a network having produced an approved logo are cloned to all subsequent networks. At the end of the cycle, up to thirty percent of noise is introduced to a pre-stored neural network, which is used as a "teacher", and the program generates ten input vectors, which are fed to the four "student" networks. On each input vector receipt, an answer is given, whether generation of an approved logo is ensured; each answer is recorded in memory and is compared to the answer of the "teacher" neural network. The answers are stored as Boolean values and are used for correction of "student" network weights. The comparison of the results of the prototype and the new network shows that while the number of "successful" logos is higher in supervised mode, the "hybrid" mode produces logos that are more «original».

References:

1. Yushchenko A.G. "Theory of creative processes as a scientific basis of biocentrism in eco- and bioethics", *Ecologicheskii Vestnik*. – International Sakharov Environmental University, 2008. – № 3. PP. 115-119
2. Laktionova E.A., Yushchenko A.G., "Creative Neural Network Machine for Fine Art Synthesis", *Student Conferences: Information Technologies and Intellectual Property, NTU "KhPI", Kharkiv, Ukraine, 2013. (in Russian).*
3. E.A. Laktionova, A.G. Yushchenko, "Creative neural network of artistic images synthesis of chrysanthemums", *Student conferences: Information Technologies and Intellectual Property, NTU "KhPI", Kharkiv, Ukraine, 2014. (in Russian).*
4. Yushchenko A.G., Makarchuk Y. A., "Creative neural network for the synthesis of logos", *International conferences: Problems of Informatics and Modeling. Section - Young Scientists. - NTU "KhPI", Kharkiv, Ukraine, 2013. (in Russian).*