A guess for natural neural activity and a modification suggestion on the ANN

Y. G. Zhang
(The Institute of Systems Science, academia Sinica, Beijing, China, 100080)
Masanori Sugisaka
(The Bunri University, Oita, Japan)

ABSTRACT Based on the knowledge of brain and neural science, the author has a guess on the basic brain neural activity, that every stimulation from vision or other sensitive organs forms a micro-lighting in brain. The activity in brain neural organ, in fact, is a successive micro-lighting process. Also, the author suggest to modify the structure of Artificial Neural network(ANN), based on the guess above.

Key words: ANN, micro-lighting, brain neuralology

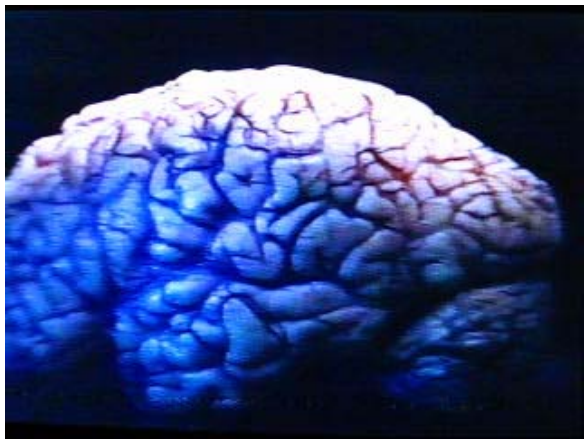
I. Introduction

In recent years, as the growing of interests on the research about artificial brain, people try to find some new type of model to describe the real activity in our brain, and aimed to lead a engineering model to develop artificial intelligent technology, in which the intelligence is more close the real process in our human brain. The authors think of that so far any intelligence appeared in the so-called "intelligent equivements" is not the true intelligence because they were given but not obtained. That means those intelligence are not evolutionary or not recognative by some sensing organs. So, trying to propose a mode to get information and then to transfer to knowledge is a valuable research direction. In addition, the present ANN model has some drawback, in fact, in every ANN all nodes in the same layer are connected to the all nodes in the next layer is not reasonable, in that case any ANN will can do only one job.

II. The guess----A micro--lighting for stimulate

We analyzed the real brain neural process, the fact is that the stimulate make the brain face have response only on some specific area, not the whole brain face. Also, it located the different area for the different type of stimulating, such as vision and listening. We could think of a neural network should be responded like the following: there are several coding type for the different stimulates, the coding form not very complicated as we thought; the coding form lead a micro-lighting which only active an area of the neural network.

Based on the knowledge and analysis above we try to guess a model for the real neural activity like that when a stimulate comes and active the network, a micro-lighting appear, it is stochastic and directed to a specific area of brain face, just like the real lightning in sky. (see fig.1)



Simulation to the natural brain

Fig.1

This micro—lighting is a process in very short time. A primitive recognition process is a series of this kind of micro—lighting processes.

The micro—lighting is stochastic, but for a same recognition scheme has only small change and it will be fixed after repeating and training.

III. The suggestion on the ANN's modification

If you are interested in the guess and agree with us, we will propose a modification idea on the known Artificial Neural Network (ANN). There we suppose that some nodes which are located in several layers and the nodes in the same layer are connected to the all nodes in the next layer. See the Fig.2

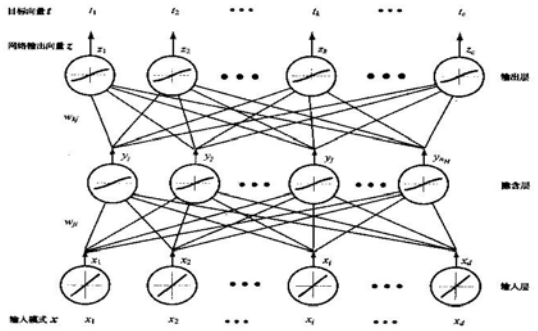


FIG.2

No doubt, the ANN is a very good model to simulate a learning process and have had many very successful researches. However, the assumption is not very natural. The problem is that what does the node means? In fact, the original thinking is to represent the contacted parts between the neural cells. These connections are the linkage between synapses and axons, these connections are only appeared in the neighbors of neural cells. These connections are nonlinear parts and can be simulated as a sigmoid or some other nonlinear function. It cannot be extended to the far neural cells. So, we suggest that these connections should restrict in the near nodes in a cells. So, we suggest that to change the connection type to that in Fig.3. (see Fig.3)

In fact, the fig.3 is a complicated electrical circket network. At the output terminal every end is a

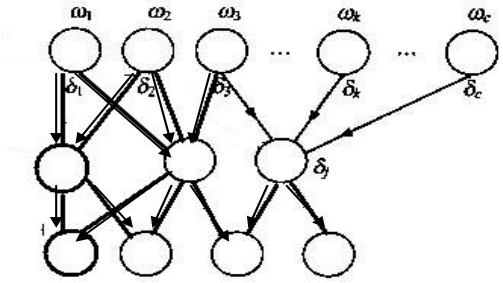


FIG.3

thermal unit and they are controlled by a threshold, if the voltage is high then the threshold it will be reactive and temperature get higher. We could define a state of the network by the set of all weights on the connections. In addition, the state of the network is essential, because it really storages information in the state.

IV. The open problems

While we proposed the model and the modification suggestion on ANN, it still has many questions to answer and more research works are needed.

1） How to define the input for this new type of ANN?

In another words, this question can be mentioned as that we need to give different coding form for vision, listening, and so on.

2) How to store the network state and to identify it? This will essential for recognition and to form a knowledge.

3) How to rebuild up the state? That means memory and recall function.

After resolve these problems this network will be really useful for building up an artificial brain. And it will be an intelligent chips.

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