

The concept of Synapse against popular opinion

Abstract

Emulation of the operation process in the human brain was performed by Artificial Neural Network (ANN). The new comments of this study with the concept of progressive tense like an action to new Comparison ANN with Biological Neuron Network were stated against popular opinions. However, their opinions just pointed out the role of Synapse as the weights in the framework of ANN. In this paper, another concept was better suggested. The role of Synapse should be treated as the weights of ANN, which connect two neurons of two hidden different layers. There was a new proposed opinion in this study when an accurate ANN model was built with optimal weights. The role of Synapse should be both the converting the action potential into electrical energy and chemical energy and synaptic strengthening corresponding to long-term potentiation (LTP) in Biological Neuron Network. From the concept of pharmacology, the action of updating weights with optimal values after training more data, was similar as keeping a normal converting for LTP just using medicaments for resisting some ageing brain diseases e.g. Dementia. The new proposed opinion by comparing both Neural Networks should be reasonable in this study.

(Keywords: Artificial Neural Network (ANN), Synapse, Electrical energy, chemical energy, synaptic strengthening, Long-term potentiation (LTP)), Pharmacology, Dementia,

1 Introduction

A biological neuron is very complex, only four main parts are introduced because the Artificial Neural Network (ANN) emulates these four parts (Lin, 2017). The physical meaning of ANN is an argument, although a study to research earthquakes prediction i.e. such as Lin et al 's study (2018) was reported.

Some literatures compared the Artificial Neural Network (ANN) with the Biological Neuron Network .e.g. synaptic weights and bias levels (Jain, et al., 1996; Kaur, 2009; Negnevitsky, 2011; Eluyode et al, 2013; Rameshkumar and Samundeswari, 2014). The results were included in Table.1. Their opinions were popularly considered. Synapse is only an analogy for weights. The role of Synapse should be treated as the weights of ANN, which connect two neurons of two hidden different layers. Therefore, their comparisons did not have the concept of progressive tense referred to the explanations in Table.1.

38 The comparison between Artificial Neural Network (ANN) with Biological
 39 Neuron Network should be future interpreted and rewritten more corrected and
 40 detailed in this paper. The more training data combine with weights of two neurons
 41 from two different hidden layers when training an ANN model (Lin et al., 2018). The
 42 Synapse in a Biological Neuron is last processing (Foster and Sherrington, 1897).
 43 Therefore, the information of Table.1 meets some logic problems. According to Hebb's
 44 Learning Rule, the popular opinion will be also re-interpreted from the concept of
 45 pharmacology as the aim of this paper through comparing ANN with Biological
 46 Neuron network.

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Table. 1 Analogy between biologic and artificial neural networks

Biological Neuron Network	Artificial Neuron Network
Soma	Neuron
Dendrite	Input
Axon	Output
Synapse	Weight

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50 Table. 1 This table shows the analogy between biologic and artificial neural networks
 51 (Negnevitsky, 2011; Lin, 2017). Synapse is an analogy for weights. It has not clear
 52 concept of progressive tense. The role of Synapse in biologic neural network should
 53 be not true and is very limited fidelity to biological realism.

54 2. Discussion

55 The synapse plays a role related to the memory. This process of synaptic
 56 strengthening is known as the long-term potentiation (LTP) (Lynch, 2004). Therefore,
 57 the role of Synapse should be both the converting the action potential into electrical
 58 energy and chemical energy and synaptic strengthening corresponding to LTP. As
 59 least there are new proposed in this study although ANN has very limited fidelity to
 60 biological realism. The Synapse has relationship to the adjusting of weight and bias of
 61 ANN similar as Hebb's Learning Rule (Hebb, 2002). The Synapse was related to
 62 weight and bias in the concept of popular opinions. However, the physical viewpoints
 63 and meanings are necessary for the ANN, so that the physical concept about ANN
 64 could help the human to create new better mathematical tool to perform to biological
 65 realism. Finally, Artificial Intelligence (AI) technology could be reasonably controlled
 66 by understanding the physical meaning of Synapse. On the other hand, from the
 67 concept of pharmacology, the comparison between ANN and Biological Neuron
 68 Network could be treated as updating weights with optimal values. It is similar as the
 69 action to keep normal converting for LTP just using medicaments for resisting some
 70 ageing brain diseases e.g. Dementia. This new comparison should be reasonable.

71 **3. Conclusion**

72 The role of Synapse should be both the converting the action potential into
 73 electrical energy and chemical energy and synaptic strengthening corresponding to
 74 LTP in Biological Neuron Network. The role of Synapse was treated as the weights of
 75 ANN, which connect two neurons of two hidden different layers. Synapse is not only
 76 an analogy for weights. This concept was different from previous studies. Updating to
 77 optimal weights through training data, was similar to have normal LTP with
 78 medicaments for resisting some ageing brain diseases e.g. Dementia. The explanation
 79 of this study was reasonable through comparing both Neuron networks.

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