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Real time astrocyte in spiking neural network (Conference Paper)Abed, B.A.-R.  Ismail, A.R.  Aziz, N.A. 

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Abstract

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Astrocytes, one type of glial cells, are considered to be an active partner to neurons in processing information of Central Nervous System (CNS). Therefore, studying the interaction between the astrocytes and neurons is important to create a novel model for Artificial Neuron-Glial Networks (ANGN). In this paper, a novel model for (ANGN) is proposed to model the real time interaction between Astrocytes and neurons by using Spiking Neural Networks (SNNs) and mathematical models for astrocyte-neuron interaction. How could this proposed model will be biologically inspired to model the real time interaction between astrocytes and neurons and to improve the performance of the SNN? However, these mathematical models are generalized and simplified to be used in the proposed network. The performance of the proposed network was compared with standard SNN and the simulation results showed that the proposed model evoked more spikes to fire whenever astrocytes were activating in a time window. This indicates that astrocytes are playing significant roles in processing information of the ANGN. © 2015 IEEE.

Author keywords

[Astrocytes](#) [Spiking Neural Network](#) [Spiking Response Model](#)

Indexed keywords

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[Intelligent agents](#) [Intelligent systems](#) [Neurons](#)[Artificial neurons](#) [Astrocytes](#) [Biologically inspired](#) [Central nervous systems](#)[Real time interactions](#) [Response model](#) [Spiking neural networks](#)[Time windows](#)

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- 1 Desterho, A., Malinen, Z.F., Spjornowski, T.J.
 An efficient method for computing synaptic conductances based on a kinetic model of receptor binding
 (1994) *Neural Computation* 6 (1), pp. 14-18. Cited 282 times.

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(2017) *Proceedings of IEEE Computer Society Annual Symposium on VLSI (ISVLSI)*[Astrocyte to spiking neuron communication using Networks-on-Chip ring topology](#)

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(2013) *Proceedings of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBS*[A Digital Realization of Astrocyte and Neural Glial Interactions](#)

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