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Design of an Simplified Artificial Neuron (I&F) Model in FPGA

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Abstract:

Spike neuron networks are a closer approximation to biological neurons. Integrate and fire (I&F) are one of the most popular models of spike neurons. This paper proposes a simplified model of the I&F neuron with the purpose of implementing it in an FPGA. The simplified model was developed in FPGA preserving the most important features of the model. The space of the FPGA used is really small and this will allow the implementation of a large network of I&F neurons. The main objective of the implementation in hardware is the use of these neurons for the navigation of mobile robots in future work.

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I. Introduction

Although in recent years the advancement of technology and especially of microelectronics, has allowed the creation of increasingly strong computational processors and high speed, these still fail to achieve the human brain ability in patterned, continuous, and recognition tasks, main reason why so simple tasks for the human being as the vision are still a rather complicated work for the most modern computers.

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