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Monte-Carlo simulation of the artificial quantum neural network

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We consider a model of an artificial neural network that uses quantum-mechanical particles in a two-humped potential as a neuron. To simulate such a quantum-mechanical system the Monte-Carlo integration method is used. A form of the self-potential of a particle and two potentials (exciting and inhibiting) interaction are proposed. The possibility of implementing the simplest logical elements, (such as AND, OR and NOT) based on introduced quantum particles is shown. Further we show implementation of a simplest convolutional network. Finally we construct a network that recognizes handwritten symbols, which shows that in the case of simple architectures, it is possible to transfer weights from a classical network to a quantum one.

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