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## Simulation of a fear-like state on a model of dopamine system of rat brain

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### Abstract

© Springer International Publishing Switzerland 2016. In this paper we present the following hypothesis: the neuromodulatory mechanisms that control the emotional states of mammals could be translated and re-implemented in a computer by means of controlling the computational performance of a hosted computational system. In our specific implementation we represent the simulation of the fear-like state based on the three dimensional neuromodulatory model of affects (here the basic emotional inborn states) that we have inherited from works of Hugo Lövhelm. We have managed to simulate 1000 ms of work of the dopamine system using NEST Neural Simulation Tool and the rat brain as the model. We also present the results of that simulation and evaluate them to validate the overall correctness of our hypothesis.

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### Keywords

Affective computing, Artificial intelligence, Dopamine, Emotion modeling, Fear, Neuromodulation, Rat brain, Simulation