

Modulatory Interaction as a Support to Modeling Neural Substrates of the Decision Process

Jairo Diniz Filho *
Teresa B. Ludermir +

**Departamento de Fisiologia e Farmacologia, Faculdade de Medicina, Universidade Federal do Ceará, Rua Cel. Nunes de Melo, 1127, Porangabussu, Fortaleza, CE, Brazil.*

+*Centro de Informática, Cin, Universidade Federal de Pernambuco, CP. 7851, Av. Prof. Luís Freire, S/N, Campus Universitário, 50740-540, Recife, PE, Brazil.*
{jdf, tbl @cin.ufpe.br}

1. Introduction

There is experimental evidence of neuronal groups projecting widely in the brain which are associated to state functions, like those involved in attention and mood changes. Typically, those groups are relatively reduced in number if compared to the number of target neurons they reach. Furthermore, they represent examples of the modulatory role played by some groups of neurons in the central nervous system. These examples give support to the construction of modulatory functions in artificial neural network projects. On the other hand, there has been a growing interest in the discussion of the brain functions as being performed by specialized modular systems that can be recombined[1][2]. It is also suggested the existence of a dichotomy in the neural substrates, which could result or not in the aversion behavior[3]. Thus, in an elementary level, a decision process is represented in the present work by the choice of different alternatives, depending on which of these two substrates is actually involved.

2. Methods

In the present work, we propose a model that focus on the interaction between modules. This interaction take the form of a modulatory mechanism. In order to explore this model, our tests were conceived with the aim of representing the transposition of an obstacle by a hypothetical organism.

3. Results

The experiments showed that the intact organism transposed the obstacle. Experiments simulating structural lesions, however, showed a lack of this adaptive feature.

4. Conclusions

These results are thus compatible with the role of the modulatory mechanism as an adequate alternative to represent the flexibility feature necessary to the decision process.

References

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