Significance of Topological Neighborhood in SOM Cognitive Modeling

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Abstract: SOM neural network modeling is an established approach towards the resolution of standing matters in psychiatry and clinical neurology. A resulting claim, supported by the author in recent computational work, is that in this approach there is an exegetic neurocomputational norm realized in the topological neighborhood (TN) component of the SOM model.

In the case of autism TN is linked to impaired cortical representations associated with the disorders neuropsychological phenotype. In modeling studies of schizophrenia TN is linked to atypical signal-to-noise neuromodulation associated with acute delusions and, due to cortical map neuroplasticity, to the formation of chronic delusions. SOM modeling on phantom limbs revealed that TN is linked to deafferented map cortical invasion. In the case of stroke and brain lesions TN is associated with the neural reorganization mechanism.

Computational studies are under way in order to reveal detailed quantitative and qualitative implications of TN in modeling various neuropsychological phenomena.