An outlook about evolution modeling of small world brain functional network simulating memory connection mechanism

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**ABSTRACT**

In order to understand the character of the brain functional network, we propose a new evolution model to simulate the mechanism of the brain network. With the reference of the memory mechanism, the network was set up by the compression path algorithm and displayed good effect of its characteristic on degree distribution, average path length and clustering coefficient, especially on community.

The highlights in the connections during the evolution involve the reflection of the brain memory to functional network, not exactly the same as the preferential attachment mechanisms used in regular ring lattice and random network, holding the memory factors that induced the path compression to the functional connection in establishing the algorithms for the increasing model, resulting in the convergence rapidly to the small-world network and the representation intimately of the realistic complex networks.

The results of the simulation of the brain functional network by that way represent the properties of small-world, high clustering coefficient and modularity, especially the mean path length that indicates exclusively shorter close to a constant independent on the node scale.

The work of the article is expected to play an increasingly important part in our efforts to comprehend the physics of the brain’s connectome.

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