Why including more Processing-Layers in Venn-Networks?

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Abstract:

It is thought that understanding the brain, especially higher cognitive functions, is the most challenging task for scientists ever. There are many reasons for that belief; some practical, such as the large magnitude of interacting components (cells, fiber-types and synapses) and others, more theoretical such as the overall capability of the brain to understand itself.

Over the past 30 years technological advances produced tools that greatly help scientists to unveil unknown issues within neuroscience. In medicine, nuclear magnetic resonance is a fine example of how live brains can be studied without harm. In computing, affordable yet powerful computers were made available to tackle the great complexities of brain studies. Also in computing, intelligent techniques were created to plausibly mimic brain functions.

One such intelligent technique used for brain studies is Venn-network. This artificial neural network may help on reducing the gap between micro-macro features found on brain studies. Highly inspired in biology, Venn-network can be used as a test-bed for selected simulations of physiological and pathological scenarios; concomitant, its computation presents activations that resemble functional images of live tissue. Venn-network allows the modeler to apply various types of processing units, connecting fibers and regions.

Previous works of Treves and Raizada suggest that throughout animal evolution, substantial (cognitive) processing abilities were obtained following the increase of lamination in the cortex. As the current implementation of Venn-network presents only one processing layer we expect that our work-in-progress of adding more layers *in-silico* leads to the increase of processing power observed *in-vivo*.

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