Review of: "The functional unit of neural circuits and its relations to eventual sentience of artificial intelligence systems"

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Both the positive and the negative of this brief article may be attributed to its astonishing simplification. The title that brings up a new entity called ‘functional unit of neural circuits’ is in itself an over-simplification. The brain certainly is proficient in its hundreds of different functions -- perception, imagination, recall and problem-solving just being some of the notable ones, on which the article appears to have focused on. The diagram of the functional unit highlighting two important concepts such as threshold logic and feedback control loop is certainly useful and significant; but at the cost of neglecting the astounding outcome and the multi-faceted complexity of neural networks.

To make my point with one simple example. From referral statements such as the evidence for the overlap of neural substrate for both visual perception and mental imagery, the enigma of perception and imagery gets assumed to be taken care of. As per the latest trend in neuroscience, perception itself is a highly complex process involving top-down prediction and parallel motor-action and control. See the works of Andy Clark and Jakob Hohwy.

However, the article is commendable and relevant as it presents a simplified diagram incorporating the two important concepts of backpropagation in open and closed circuits probably enabling and covering nearly all significant brain functions such as perception, recall and imagination and the ultimate suggestion that the Electro-magnetic Field Oscillation in neural circuits is the immediate cause of self-consciousness.

The recent work of Colin G. Hales and Marissa Ericson, referred to by the authors, does make some powerful arguments in support of the brain electro-magnetic field as the most plausible neural correlate of consciousness. However, even this exhaustive study only makes the case that an EMERGENT attribute of the electro-magnetic field in brain must be seen as the causal factor of consciousness. It’s just not any of the already known properties or laws of electro-magnetism. Colin and Ericson call it as the strong emergence and plead that this emergent property must be seen as an integral part of the Standard Model of Particle Physics.

Essentially, we still have no explanation of how the individually-felt sensation / consciousness arises.

All in all, while this article deals with some important concepts and insights with respect to neural networks, the scientific community would be highly reluctant to share the excitement and euphoria shown in terms of explaining human-consciousness or producing machine-consciousness some time in the near future.