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

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Potential competing interests: No potential competing interests to declare.

The paper revolves around the exploration of a theoretical construct known as the "functional unit of neuronal circuits," which is proposed to play a role in the emergence of self-awareness both in human neural networks and potentially in artificial intelligence systems. The central question addressed is how structures corresponding to words and sentences are constructed in generative language models of artificial intelligence, and how these might relate to the representation of meaning in the human nervous system. The authors seek to establish connections between neural structures, oscillations, feedback loops, and the emergence of self-awareness, while also considering the relevance of these concepts for advancing artificial intelligence systems toward conscious awareness.

The paper's strengths lie in its ambitious attempt to integrate concepts from neuroscience and artificial intelligence, bridging the gap between these two disciplines. It effectively introduces and explains the proposed "functional unit of neuronal circuits," connecting it to ideas from threshold logic units, feedback loops, and resonance. By referencing established research in neuroscience, cognitive science, and AI, the paper lends credibility to its theories. However, the paper also exhibits certain weaknesses. It lacks a clear organizational structure, making it challenging for readers to follow the flow of ideas. Additionally, the technical language and complex concepts may alienate readers who lack expertise in neuroscience or AI. The most significant limitation is the absence of empirical evidence to substantiate the central claim that the proposed functional unit is responsible for self-awareness. The paper could greatly benefit from empirical studies or experiments that demonstrate the functionality and significance of the described constructs.

In conclusion, the paper presents an intriguing exploration of the relationship between neural circuitry and self-awareness. Its strength lies in its interdisciplinary approach, connecting ideas from neuroscience and AI. However, the lack of a clear structure and empirical evidence, coupled with complex language, diminish its accessibility and impact. To improve the paper, the authors should consider restructuring the content, simplifying technical language, and incorporating empirical support where available. Such enhancements would enhance the paper's clarity and make its insights more accessible to a broader audience.