Thesis Defense

Computer Science Master's Program

"An Analysis of Neuroidal Memory Formation within D. melanogaster"

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Abstract:

The Neuroidal model poses a neurobiologically plausible theory for modeling the brain. This symbolic network has been shown to capture realistic memorization behaviors using the JOIN algorithm. The model has also been recently improved by incorporating Watts-Strogatz small-worlds within its base structure. From the efforts of neuroscience researchers, we have access to the Drosophila melanogaster (D. melanogaster) fruit fly's connectome, which has been found to also contain small-worlds in this thesis. By synthesizing the Ocellar Ganglion (OCG) region of Drosophila, we compare a digitized version of a real-world brain with an instance of the Neuroidal model. In this thesis, we offer novel results that display the stability of JOIN within OCG, and a striking comparative evaluation between the Neuroidal model and OCG's capacity for memories. This study further establishes the Neuroidal model as both an efficient and plausible neural network for general cognition.

Date: Wednesday, December 3rd, 2025
Time: 11:00 AM – 1:00 PM
Location: 14-232b
Committee: Dr. Kurfess, Dr. Frishberg, and Dr. Mukhopadhyay