GNM: GridCell Navigational Model

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Abstract

It has been shown that grid cell firing patterns in the medial entorhinal cortex, can be used as a mapping reference for spatial navigation in mice. We propose a novel computational model for patterns of grid cells and combine it with a mechanism to tune the weights of cells, which we use to create a decision-making process for robot navigation. The method is used as an unsupervised method for uninformed online search with unknown environments. This method shows superior algorithmic steps over current search methods. The typical size of the memory can also be reduced without compromising completeness.

Examination Committee: Prof. Dimitri Metaxas (Chair), Prof. Ahmed Elgammal, Prof. Badri Nath, Prof. Aaron Bernstein