

Nest-Building Using Place Cells for Spatial Navigation in an Artificial Neural Network

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Abstract : An animal behavior problem is presented in the form of a nest-building task that involves two cooperating virtual birds, a male and female. The female builds a nest into which she lays an egg. The male's job is to forage in a forest for food for both himself and the female. In addition, the male must fetch stones from a nearby desert for the female to use as nesting material. The task is completed when the nest is built, and an egg is laid in it. A goal-seeking neural network and a recurrent neural network were trained and tested with little success. The goal-seeking network was then enhanced with "place cells", allowing the birds to spatially navigate the world, building the nest while keeping themselves fed. Place cells are neurons in the hippocampus that map space.

Keywords : artificial animal intelligence, artificial life, goal-seeking neural network, nest-building, place cells, spatial navigation

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