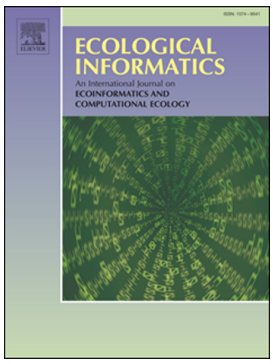


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# Simulating the Architecture of a Termite Incipient Nest Using a Convolutional Neural Network

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## Abstract

Subterranean termites form colonies containing thousands of individuals, and maintain these colonies by consuming wood and other materials containing cellulose. In this consumption process, they cause serious damage to wooden structures. Information on the population size of termites is an important factor in developing strategies aimed at controlling termites. In this study, we provide a reasonable possibility of estimating the population of an incipient nest dug by a colony that has not yet discovered any food source. We build an agent-based model to simulate termite tunnel patterns in which the behavior of simulated termites (agents) is governed by simple rules based on empirical data. The simulated termites do not communicate with each other using pheromones. They move toward the ends of tunnels, excavate when their progress in that direction is