CogSem

Navigation and search behaviour in Sonoran desert ants

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Ants possess a remarkable set of skills for efficient navigation and search, often travelling many meters to forage for food and then finding their way back to the nest effectively and efficiently. Numerous studies have characterized the navigation and search mechanisms in individually-foraging desert ants, in particular Cataglyphis fortis from northern Africa and Melophorus bagoti from central Australia. Here we investigate navigation and search in a species of harvester ant, Veromessor pergandei that is found in the Sonoran desert of Arizona and has a very different foraging ecology. Individual V. pergandei workers follow a pheromone-marked column from the nest to a foraging area (fan), where they forage individually in different directions. Upon finding food, workers navigate back to the top of the column and then appear to rely on pheromones to travel from there to the nest. The direction and length of column changes across days, and hence the end of the column (unlike the nest location) is a non-stationary target. We captured foragers that were returning to the nest from three places: 1) in the foraging fan, 2) in the column but still far from the nest, and 3) in the column close to the nest. Our analysis of orientation and mean distance revealed interesting differences between these three groups. We also explored Deep Learning as a method of characterizing differences in the three groups.

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