OR060

Emergence of a Lévy-like searching through agents' local interaction

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It is well discussed whether animals show Lévy-like searching or not. Lévy-like algorithms are considered to be efficient in case of extinction because of their supper-diffusion property. The problem is however, how one can achieve searching efficiency without assuming power-law distributed step lengths. Therefore, we developed new agent-based algorithm in which the agent changed the directional rule using other's directional information in its limited visual field. Foragers, which don't know any available food location information, must get some ambiguous information from other agents. If the agents accept that information absolutely, then the agents don't refer the global property which the swarm has and will get to their goal as only a result by just obeying that information such like chemical pheromone recruitments. However, changing the directional rule by expecting the others moving directional information in local area, the agent might hold ambiguous global information within local information. We investigated whether rule change based on local agents' interaction would achieve effective random searching or not. We developed a random walk algorithm and checked whether the searching efficiency and power-law distributed step lengths were achieved. While changing directional rules by expecting other's movement, agents in our algorithm modulate deviation of changed directional rules depending on amounts of other agents. Thus, agents might realize position gap while referring the global property. Comparing the movement analysis of ten foraging ants in acrylic bowl, we showed our model and ant experiment achieved Lévy -like movement.