The Consequences of Walking on a Graph: the Case of the Malabar Giant Squirrel, *Ratufa indica*

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A growing body of models of animal movement, based on the central idea of a random walk of the individuals, is available in the literature. In the vast majority of these models, it is assumed that the movement space is not structured, or is homogenous. Where movement space heterogeneity has been dealt with, the spatial resolution of the model is rather coarse-grained, and is particularly not useful for analyzing movement data of animals in microstructured movement spaces. One particular instance is seen in the case of the foraging movements of *Ratufa indica*, where, like all other arboreal animals restricted to movement along tree-to-tree canopy connections, the constraints imposed by the movement space are hard to ignore. We present a simulations-based approach towards understanding foraging movements of this animal. To quantify its spatial structure, we model the movement space of the animal as a graph G = (V,E), where V represents the set of points on which the animal can be found, and E, the set of edges, with each edge between two vertices indicating the possibility of a single-step movement between the two vertices. We apply the model to fine-scale data on the foraging movement of *R. indica* to determine the relative extents to which its movements are spatially-driven or resource-driven. Finally, using the example of *R. indica's* foraging movements, we discuss the importance of spatially structured models of animal movement.

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