

FOREWORD

Movement ecology is a relatively new discipline in the field of ecology that studies the spatio-temporal patterns and processes at the basis of animal movement. Ecologists track animal movement using telemetry tools (such as for example bio-logging GPS tags), and then combine resulting trajectories with contextual data on environment, such as those collected through remote sensing. Combined data are then used to build statistical models that describe the determinants of animal movement, such as environmental constraints (e.g. snow layer, habitat fragmentation, human disturbance) or the inner status of individuals (e.g. memory, orientation capacity). Movement is also the focus of a different field of research, i.e. human mobility, which is studied in a set of disciplines, from GIScience, to computer science, physics, geography and transportation science. In analogy with movement ecology, human mobility benefited from the recent development of sensors capable of capturing human movement in real time and at detailed spatial and temporal scales (e.g. GPS trackers).

While data and analytical methods are similar between movement ecology and human mobility, there is surprisingly little interdisciplinary awareness of these similarities. Recently, GIScientists have called for the establishment of the Integrated Science of Movement, with the specific aim to bridge the gap between movement ecology and human mobility and raise awareness of respective problems, data and methods. This would fundamentally help ecologists to improve their understanding of the impact of anthropogenic environmental change on animal movement in the Anthropocene. Indeed, ecologists measure wildlife-human interaction mainly via the collection of static (at least at high to intermediate temporal resolution) data from remote sensing sources (e.g. road maps, high resolution forest cover, etc.), to assess, for example, the effect of landscape fragmentation on migratory propensity. However, data on human presence and activity are intrinsically dynamic, rather than static. Developing new methods to implement such data (e.g. road traffic or human recreational activities) in the study of movement ecology would crucially improve the ecologists' understanding of the tight relationship between animal movement and human activities.

In the wake of the COVID-19 pandemic, human mobility data, which were previously difficult to obtain, have become open and available and there is an opportunity to use these in conjunction with animal data to study wildlife-human interaction. This however requires bespoke complex spatio-temporal methods for both data fusion and analysis that currently do not exist. Solving this challenge is crucial for movement ecology investigation, as for example to unveil the effect of COVID-19 human lockdowns on animal movement and behavior. By introducing a specific ecology problem to the GIS scientists and spatial computing scientists, we hope to kick-start an interdisciplinary effort to develop methods, metrics and other solutions that will integrate analysis of dynamic anthropogenic activity, such as human mobility, into the study of animal movement.

This year we received 9 paper submissions in total. After a rigorous peer-review process by the program committee, in total 8 papers (including 4 full papers, 4 short papers) were accepted by the workshop and selected for presentations. The workshop program also consists of three keynote talks from well-known experts from academia and industry.

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