Contribution ID: 36

Advancing animal movement modelling through the integration of human mobility science

The Integrated Science of Movement is a concept of a new field of study emerging from two very similar, yet independently and parallelly developing research areas, human mobility and movement ecology. The resulting combination is very interdisciplinary, combining knowledge and methods from GIScience, computer science, physics, geography, transportation, and public health. Thanks to the fast increase in the amount of collected massive datasets on the movement of humans, human mobility science developed rapidly, resulting in sophisticated algorithms and models dedicated to simulation studies. One of the goals of the Integrated Science of Movement is to transfer these developments to animal mobility, delivering unprecedented innovations to this area. This project explores the transferability of one of the most important discoveries of human mobility science, which is the universal and ubiquitous laws of movement. These laws are the foundation for human mobility simulation studies, which found their application in a vast range of areas, such as disaster response, traffic management and disease spread modelling. In the project, we gather high-quality spatiotemporal data on the movement of various species with the intent to develop the first-ever animal mobility model. The outcomes of this project will be integrated with an advanced disease spread prediction simulation designed for the prevention and mitigation of African Swine Fever (ASF) virus spread.

References

Demšar, U., Long, J. A., Benitez-Paez, F., Brum Bastos, V., Marion, S., Martin, G., Sekulić, S., Smolak, K., Zein, B., & Siła-Nowicka, K. (2021). Establishing the integrated science of movement: bringing together concepts and methods from animal and human movement analysis. In International Journal of Geographical Information Science (Vol. 35, Issue 7, pp. 1273–1308). Taylor and Francis Ltd. doi: 10.1080/13658816.2021.1880589

Acknowledgement of financial support

"Scientific work carried out by VERUS - Association of Producers of the Agricultural and Food Sector, cofinanced from the state budget, under the program of the Minister of Education and Science called "Science for Society II", co-financing 1 960 185 PLN, total project value 1 960 185 PLN"

Primary author: SMOLAK, Kamil (Wrocław University of Environmental and Life Sciences)

Co-authors: Dr KACZMAREK, Adrian (Wrocław University of Environmental and Life Sciences); Mrs KOWAL-CZYK, Alicja (Wrocław University of Environmental and Life Sciences); Mrs SHEPEL, Anna (Wrocław University of Environmental and Life Sciences); Dr JÓŹKÓW, Grzegorz (Wrocław University of Environmental and Life Sciences); Mr SIERNY, Jan (Wrocław University of Environmental and Life Sciences); Mr HULEWICZ, Krzysztof (Wrocław University of Environmental and Life Sciences); Mr ŁYSKAWA, Mieczysław (Wrocław University of Environmental and Life Sciences); Dr CWYNAR, Przemysław (Wrocław University of Environmental and Life Sciences); Prof. ROHM, Witold (Wrocław University of Environmental and Life Sciences); Prof. PUSZ, Wojciech (Wrocław University of Environmental and Life Sciences); Dr SOWA, Wojciech (Wrocław University of Environmental and Life Sciences)

Presenter: SMOLAK, Kamil (Wrocław University of Environmental and Life Sciences)

Session Classification: AI & Simulation, Big Data & Analytics