Visual Movement Analytics

Call for Papers for a special issue of the Information Visualization journal

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A pre-conference workshop of the AGILE 2016 conference on "Visually-supported Computational Movement Analysis (VCMA2016)" recently served as a platform to discuss trends and novel techniques for visual analytics of movement data. The workshop covered a range of topics and used movement data from several application domains, including movement ecology (animal tracking), transportation (vehicles, vessels and air traffic tracking) and health informatics (pedestrian movement). The workshop description and programme are available here: http://viz.icaci.org/vcma2016

This special issue of the ***Information Visualization*** journal aims to expand the discussion of this exciting new topic beyond the workshop and calls for submissions from anyone interested in this topic, not only workshop participants. We invite submissions of full journal manuscripts that describe research on the general theme of **visual movement analytics**.

Understanding movement is important for a range of applications: town and transport planners need to understand how people commute; cycle hire scheme operators need understand how the bikes are used to help run operational aspects and future planning; animal ecologists are increasingly tracking the movement of animals and birds and using these to help understand more about their ecology and response to external factors. The past 10-15 years have seen a dramatic improvement of positioning technologies (GPS, WLAN, Bluetooth, mobile phone positioning, RFID etc.) that have led to massive volumes of tracking data being collected about virtually any object that moves, in a multitude of application domains. Consequently, many new methods for analysing these data have been developed, and **computational movement analysis (CMA)** has evolved as a new sub-field of GIScience. However, many challenges still remain — often induced by the introduction of new sensor technologies. One of these is in the area of **visual movement analytics,** which concerns integration with appropriate visualisation methods for both movement data and analytical methods outputs.

This special issue aims to demonstrate recent advances in visual movement analytics and showcase convincing examples, including best-practice applications in relevant domains. We are interested in **any application** for which understanding movement is important.

Movement data come in different forms. Where location loggers are placed on moving objects, sampled sequences of locations are produced. However, movement can often also be inferred from counts of objects at fixed locations with time references, from fixed times with spatial references or from origin-destination data. We are interested in use of **any data type** from which movement can be inferred.

Alongside the increase in availability and use of movement data are methodological developments that help analyse these data. Movement is a complex spatio-temporal phenomenon, often linked to other contextual data. Resampling, statistical and machine-learning techniques can help reduce this complexity, but decisions have to be made about what scale of analysis is appropriate and how do aggregate the data. Some analytical techniques are able to help identify suitable scales and aggregations for analysis. But there is evidence that combining these techniques with interactive graphics as in visual analytics, can help direct the analysis in ways that are more appropriate suited to the domain and question being answered. We are interested in **computational analytical techniques, supported by interactive visualisations**, where visualisation provides clear advantages

to reasoning about the data. We are particularly interested in visually-supported approaches that help identify appropriate scales of analysis and appropriate grouping of moving objects.

We therefore call for contributions on the following (non-exhaustive) range of topics:

- New visually-supported analytical methods for movement data
- New visually-supported analytical methods for integration of movement data with data from co-located sensors
- New visually-supported analytical methods for integration of movement data with contextual environmental data
- Evaluation of existing or new visually-supported methods
- Use of new or existing methods in new application domains, such as human-computer interaction (e.g. eye-tracking data), movement data derived from alternative sources (e.g. video tracking), etc.

If you are unsure whether your work would fit the scope of this special issue, please contact urska.demsar@st-andrews.ac.uk.

Submission procedure:
Manuscripts should be prepared according to the instructions for authors of the *Information Visualization* journal and submitted through the journal webpage: http://ivi.sagepub.com/
Please, select the relevant special issue when submitting your manuscript.

We would appreciate a notification of intent: please, send the preliminary title and a 200 word abstract of your intended submission to urska.demsar@st-andrews.ac.uk by 15 Jan 2017.

Timeline for submissions:

- Call for papers published: July 2016
- Pre-notification of intent: 15 Jan 2017
- Full paper submission for special issue: 31 Jan 2017
- Initial decision on full papers: 30 April 2017
- Final papers due for special issue: 1 July 2017
- Final decisions on full papers: 1 Sept 2017