JOURNAL OF SPATIAL INFORMATION SCIENCE
Number 21 (2020), p. 1–4 doi:10.5311/JOSIS.2020.21.729

EDITORIAL

JOSIS' 10th anniversary special feature: part two

We open this editorial with the sad news that a member of our editorial board, Christian Freska, passed away this autumn. Christian was an active and supportive member of our editorial board, bringing his unique and longstanding expertise on spatial cognition to JOSIS, as represented by his contribution to the first part of our anniversary issue [7]. We will miss him.

The second part of our special tenth anniversary issue brings together nine more vision papers from members of our editorial board. With these, we have published a total of 24 vision papers authored by members of our editorial board and their colleagues. All of these papers take stock of themes related to spatial science. They look back at successful and impactful research and forward to potential future research areas and societal needs. When we planned the tenth anniversary of JOSIS, we had little idea of what was to come. As we write this editorial in December 2020 we are still in the grip of a global pandemic, which has led to the deaths of more than a million individuals. Some of us are in lockdown, others are working from home, while in some locations life has almost, at least for now, returned to normal.

The progress of the pandemic, and the non-medical measures taken to control it, has been profoundly spatial. Understanding animal and human mobility, developing applications to allow contact tracing, and analyzing large volumes of data locally and globally to support government at all levels have been at the heart of both successful and unsuccessful attempts to mitigate the effects of the pandemic. Understanding the difference between relative and absolute rates of change and negotiating the effects of the modifiable areal unit problem have moved from being nerdy discussion topics to the subject of mainstream media reporting [3]. Science has arguably been very successful in developing potential solutions and understanding the process of the pandemic, with politicians worldwide (with a few notable exceptions) praising science and its contribution. Equally however, science has failed to successfully persuade many governments, societies, and individuals to change their behavior and reduce the strain put on health services worldwide.

For us, as the editors of JOSIS, this points to an important issue and challenge for future years. How can we better educate societies to understand science, and use it when making decisions? How can we present our science to policy makers and politicians critically, but effectively, making clear that uncertainty is an essential part of good science, rather than an excuse not to act? These issues are not new, but as societies grapple with global issues including climate change and inequality—and develop frameworks to address these issues such as sustainable development goals—they become more and more central to our capacity to act. Suspicion and mistrust of new technologies is unsurprising given the

seeming lack of concern by many technology developers for pressing issues such as privacy when collecting movement data or bias in the use of artificial intelligence. Countering these challenges requires us to think harder about the potential consequences and uses of our research, and to discuss and question the choices we make as spatial scientists [11]. Our discipline bridges established scholarship in geography and spatial analysis with quick-changing innovations in computer science and technology. Thus, we are in a unique position to inform for the better how the (increasingly spatial) computer and data-driven systems of the future will be built and used.

The vision papers in this issue, point to some potential areas where much progress could still be made. For example, Brunsdon and Comber [1] discuss the importance of more critical big data analysis and Mokbel [9] argues for making space a first order part of systems rather than an add on. Promoting spatial thinking is an ideal opportunity to think harder about the implications and consequences of working with spatial data more generally. Two vision papers discuss movement. Demsar et al. [4] describe opportunities and challenges for an integrated science of movement, using Geographic Information Science as an bridging field for work on human and animal mobility. Bringing together different research domains can also provide us with a chance to learn from one another, and extract research from individual silos not only in terms of methods, but also with respect to the sorts of questions, interpretation and challenges that arise when we work with movement data. Buchin and Wenk [2] highlight many of the basic methods required to carry out movement similarity analysis, and in doing so identify an important area where methodological science can contribute—by developing efficient algorithms and making assumptions underlying conceptual models clear. Only by stating and clearly communicating assumptions is it possible to explain to those using analytical tools how models abstract and do not replicate reality, and in turn educate those using models as to why they can never predict or replicate all aspects of real worlds.

Duckham and Ho's [5] vision paper highlights how these worlds can reflect profoundly different values and ways of understanding, and that spatial information science has a duty to reflect upon data models used and their origins, considering how these might reproduce Eurocentric thought, ignoring Indigenous ways of thinking about space. This challenge is accepted in a very different context by Fotheringham [6] who suggests that the challenge in local modeling is recognising that the "unobservable processes producing the observable outcomes we want to change are not the same everywhere and need to be examined locally." Yuan [12] makes a plea for more research on events, which she argues are essential to geospatial understanding, yet constrained by domain-specific attempts at modeling. A more pluralistic understanding of events, and their implications both individually and societally would require us to think much harder about how we model, analyse and communicate with and about spatio-temporal processes and data. Sester [10] emphasises the long history, dating back to the antiquity, of cartographic generalisation, and its importance in visualising such information. Understanding and educating those using visual representations about generalisation is essential as the speed with which maps and other graphics can be produced and propagated has been accelerated through by the widespread availability of open data, software tools, and social media globally. Finally, Klippel [8] discusses the promise of immersive technologies as a way of communicating spatial information, emphasising the opportunity to bring place-based representations into the domain of spatial science. Doing so requires that we remember that place is an

inherently local way of thinking about space, and that one-size fit all solutions are unlikely to bring progress or meet the needs of diverse societies.

As JOSIS enters its second decade, we see a bright future for spatial science. Advances in technology, increasingly rich and openly available datasets and a global community of researchers working on with spatio-temporal data all point to the importance of our research. This future brings with it challenges and, we believe, requires a recognition that our work has real implications. To address these challenges, we need to increase the diversity of our solutions and those producing them, more critically question the ways in which spatio-temporal data can be used, embed our work in its societal relevance, and spend more time communicating and educating beyond the academy about our work. We invite all of you to work with us on these challenges, and to consider publishing your work addressing them in JOSIS.

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