Volunteered Geographic Information: Looking Towards the Next 10 Years

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More than ten years have now passed since Mike Goodchild wrote his seminal paper on 'Citizens as Sensors' (2007). Since then, Volunteered Geographic Information (VGI) has become an ever more popular research topic within the spatial sciences. Much of the VGI research in the past has focused on OpenStreetMap (OSM), which is, undoubtedly, the most successful example of VGI to date. OSM is a citizen-driven initiative to create an open map of the world, which rivals many authoritative data sets in its richness and up-to-date nature (Mooney and Minghini 2017). Hence, there has been a large focus in the past on the quality of VGI and how it compares to topographic databases and other authoritative data sources. Interestingly, none of the papers in this special issue specifically focus on OSM. Instead the seven papers present an interesting cross-section of research that we would argue is a good indicator of trends in VGI as it enters into its second decade.

The first paper by Baker, Jeger, Mumford and Brown on biosecurity and Acute Oak Decline falls firmly within the field of citizen science, another type of grassroots initiative that often includes VGI. Where VGI is very much focused on the spatial component of the information, citizen science is a broader domain in which citizens take part in some aspect of scientific research from data collection to analysis to hypothesis generation (Bonney, Cooper, Dickinson, Kelling, Phillips, Rosenberg and Shirk 2009). Often the data that citizens collect within a citizen science project have a geographical component and hence the overlap between these two areas is clear. The analysis by Baker, Jeger, Mumford and Brown does, however, address the ongoing theme of data quality, in this case, the spatial bias in the data, which is one criticism often leveled at VGI and data from citizen science. The authors argue that by gaining a better understanding of these biases, a better evaluation of the data coming from citizens can be made. The ultimate goal is to be able to use such data with confidence in applications for pest and disease control in the future.

Another key research theme within VGI and citizen science is on citizen motivation and engagement. Since citizen involvement is the key to success in any of these types of projects, understanding their motivations to participate and developing engagement strategies that maximize participation is a frequently discussed topic in the literature. The paper by Gómez-Barrón, Manso-Callejo and Alcarria attempts to use theories from the social sciences and psychology to provide guidance in designing VGI projects that match the motivations of the participants. The paper also provides many helpful suggestions regarding how to build

and sustain engagement and participation in the longer run, which is a concern of many VGI and citizen science projects.

Another area of research that has seen a considerable amount of attention is in the use of data from social media, in particular the metadata associated with geo-tagged photographs from Flickr. The paper by Chen, Arribas-Bel and Singleton applies an improved clustering method to Flickr metadata to address a topical area of research interest in geography, i.e. the delineation of urban areas of interest. Much of the focus in the past has been on using population data in a very static manner yet the advantage of using VGI is the fine spatial detail and the dynamic nature of a data set such as Flickr. The authors show how urban areas of interest are not static but have a changing nature that reflects the complex underlying presence of points of interest, morphology and seasonality. Such an approach can aid planners in better understanding the use of space within a city.

As part of the research on comparing OSM data with topographic databases, national mapping agencies (NMAs) have become aware of this new source of data. The EU COST Action 'Mapping and the Citizen Sensor' was partly focused on bringing together European NMAs with VGI researchers to explore the potential of involving citizens and their local knowledge in improving and updating their authoritative databases. The paper by Rönneberg, Laakso and Sarjakoski is just one example of how NMAs are starting to build tools that bring citizens closer to the data production chain, turning citizens from pure consumers of the data to producers, which is a phenomenon associated with VGI (Coleman, Georgiadou and Labonte 2009). Although still in a prototype phase, the Map Gretel system demonstrates the potential of working with citizens and suggests ways forward that include integration with social media and gamification, both of which firmly address the themes of motivation and engagement.

The final three papers in this special issue are all examples of how VGI can be used in new areas of research. The paper by Curry, Croitoru, Crooks and Stefanidis is an exciting journey into how different sources of VGI are transforming research into migration, particularly in areas of conflict and war. VGI also opens up new possibilities in the area of civil and military defense as outlined in the overview paper by Papapesios, Ellul, Shakir and Hart. Finally, we see how VGI can become an important input to the development of 3D cadasters by Gkeli, Potsiou and Ioannidis, particularly in places where surveying has not been undertaken, where citizens can play an active part through mobile technologies, and where land rights are an issue. These are all areas where VGI will likely play a much stronger role in the future.

For us these seven papers represent a snapshot of ongoing areas of research interest within VGI but also a glimpse of the new and exciting ways in which VGI can and will make a real difference in the future. So where will VGI research be in 10 years from now? For sure it will continue to focus on data quality and issues related to motivation and engagement as these challenges are far from being solved. But the real advances will most likely be aligned with disruptive technological changes and the increased communication and networking that are hallmarks of the fourth industrial revolution (Schwab 2016) in which we now find ourselves.

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