"Open Source City Project (Jakarta Pilot Study): Innovations for Urban Resilience from a GeoSocial Intelligence Perspective"

Etienne Turpin (Postdoctoral Fellow, University of Wollongong)

As cities evolve to become increasingly complex systems of people and interconnected infrastructure, the impacts of both extreme and long-term environmental change are significantly heightened. Understanding the resilience of urban systems and communities in an integrated manner is key to ensure the sustainability of cities, which face considerable climatic, economic, and socio-demographic challenges in the 21st century. As Southeast Asia's most populous and most dense metropolitan conurbation, and the second largest urban footprint in the world, Jakarta's residents are exposed to rapid transformations of urban structures and systems. [1] Recent trends in weather intensification, sea level rise, extreme pollution, severe land subsidence, and river and coastal inundation make Jakarta a key site for researching and responding to the 21st century challenges of urban resilience. [2] Moreover, the combination of Jakarta's progressive municipal government, active civil society organizations, and increasing foreign capital investment all suggest a unique potential for both transforming and improving the social life of residents through a technologically-sophisticated, scientifically-innovative, and publicly accessible networked GeoSocial Intelligence framework. [3]

As part of the SMART Infrastructure Facility's 'Urban Livability, Sustainability, and Resilience Research Group', Dr. Etienne Turpin and Dr. Tomas Holderness have developed the project PetaJakarta.org, with co-investigators Sara Dean, anexact office Director of Design, Dr. Rohan Wickramasuriya, SMART GIS Research Fellow, and Dr. Matthew Berryman, SMART IT Architect. [4] The overall aim of the Open Source City pilot project in Jakarta is to advance our capacity to understand the resilience of cities to both extreme weather events and long-term infrastructure transformation. To this end, we have developed the open source data collection software CogniCity, which allows us to harness the power of social media by gathering, sorting, and displaying information about flooding, inundation, and critical water infrastructure in Jakarta, Indonesia. Because Jakarta's citizens are well-known for their love of social media, [5] and because the city has been dramatically effected by increasingly severe and costly flood events in recent years, [6] PetaJakarta.org can channel the strength of local habits to address an urgent problem while also creating a valuable pilot study for the development of our GeoSocial Intelligence framework for data gathering and analysis. Such a robust framework for simultaneously studying and facilitating urban resilience can be re-deployed by municipal governments and citizen-led groups in other metropolitan areas with high concentrations of social media users (i.e. the majority of megacities in Asia). With these future deployments in mind, CogniCity is designed as an open source platform that can be amended and reconfigured to easily address other urgent issues (waste or sewage removal, transport and traffic congestion, weather emergencies, elections and governance, etc.), in other languages, within different urban systems.

Ultimately, this pilot study project asks how innovative techniques for data collection can utilize the existing public enthusiasm for social media and extensive mobile communication networks to understand and improve urban resilience in relation to flood management, weather-related emergencies, and emergency response. While addressing the problem of flooding in Jakarta is urgent, the methodological problems facing megacity researchers today extend well beyond both Jakarta's geography and the specificity of flooding and inundation. [7] In fact, how to better utilize the extensive network of personal mobile communication devices and social media platforms to improve urban resilience is a critical area of research. [8] Such research demands attention to the question of the legacy of technological responses to social and environmental issues; [9] it also forces researchers, activists, and scholars to reckon with the question of technological innovation in relation to urban resilience, democratic practices, and the participatory co-management of civic infrastructure. [10]

In this presentation, we will argue that although the proliferation of social media might first appear as so much noise for civil and information system engineers, with the proper open source software innovations for gathering, sorting, and analyzing data, this noise can be transformed into critical information for both understanding and promoting urban resilience and democratic practices. [11] By connecting network models of urban infrastructure to crowd-sourced and social media-based data collection, and then making this information and analysis available through a public, web-based platform, our project links innovative areas of information science research and multiplies the potential of each by producing an innovative, open source framework for citizen-participation in the co-monitoring and co-management of urban systems. [12]

Notes

[1] According to one report, "The population of Greater Jakarta Metropolitan Area, comprised of DKI Jakarta, Bogor, Depok, Tangerang and Bekasi (Jabodetabek), reached 27.9 million according to the 2010 national census, with a growth rate of 3.6 percent per annum over the period 2000-2010." Jakarta Post, "Population growth of Greater Jakarta and its impact," 26 March 2011.
[2] Turpin, E., Bobbette, A., Miller, M., eds. (2013). Jakarta: Architecture + Adaptation. Depok: Universitas Indonesia Press.
[3] Holderness, T. (2013). "GeoSocial Intelligence," IEEE Technology & Society Magazine. [Forthcoming March 2013].
[4] PetaJakarta.org/banjir is a web-based platform used to harness the power of social media to gather, sort, and display information about flooding for Jakarta residents in real time. The platform runs on the open source software known as CogniCity—a GeoSocial Intelligence framework developed at the SMART Infrastructure Facility—which allows data to be collected and disseminated by community members through their location-enabled mobile devices. More online at petajakarta.org/banjir; the open source code for the software can be read and copied by following the link to the CogniCity webpage.
[6] Kusno, A., (2011). "Runaway city: Jakarta Bay, the pioneer and the last frontier," Inter-Asia Cultural Studies 12:4, 513-531.
[7] Andris, C. and Bettencourt, L. (2013). "Development, Information and Social Connectivity in Cote d'Ivoire," SFI Working Paper: 2013-06-023. www.santafe.edu.
[8] Bettencourt, L. (2013). "The Uses of Big Data in Cities," SFI Working Paper: 2013-09-029. www.santafe.edu.
[9] Mrazek, R., (2002). Engineers of Happy Land. New Haven: Princeton University Press.
[10] Turpin, E., ed. (2013). Architecture in the Anthropocene: Encounters Among Design, Deep Time, Science and Philosophy. Ann Arbor: University of Michigan Publishing/Open Humanities Press.
[11] See Holderness, T. (2013); and, Walker, J., and Cooper M. (2011). "Genealogies of Resilience: From Systems Ecology to the Political Economy of Crisis Adaptation," Security Dialogue 14.2.
[12] Paar, P. and Rekittke, J. (2011) "Low-Cost Mapping and Publishing Methods for Landscape Architectural Analysis and Design in Slum-Upgrading Projects," Future Internet 3, 228-247; Brosius, J.P., Tsing, A., Zerner, C. (2005). Communities and Conservation: Histories and Politics of Community-Based Resource Extraction. Oxford: AltaMira Press.