

Supporting VGI with standardized Sensor Web and Web-based Geoprocessing

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SWSL - Sensor web, Web-based geoprocessing and Simulation Lab

SWSL (<http://sWSL.uni-muenster.de>) is one of five labs at the Institute for Geoinformatics, University of Münster, Germany. Its research focuses on sensor web technologies as well as on web-based geoprocessing. The goal of our activities related to sensor web technologies is to make all different kinds of sensors discoverable, accessible and task-able over the Web. The vision is to define a foundation for “plug-and-play” web-based sensor networks. These sensors (e.g. smartphones) can also be used to collect VGI. Additionally web-based geoprocessing technically realized as cloud-based or GRID-based services can extract relevant information from VGI.

Related Activities

SWSL currently establishes a noise mapping community, based on smartphone-technology. In near future, mobile apps will measure continuously noise and transmit the measured parameters to a central database. Based on analysis functionality it will be possible to create noise maps with this collected data. In the context of different external project SWSL gained considerable experience in VGI and especially in collecting human-made observations.

For instance members of SWSL developed a portal for submitting various kinds of human-made observations ranging from patient information to environmental observations. The portal bridges such human observations to the the sensor web so that they are subsequently accessible in an interoperable way. Further, we were involved in a project funded by Google.org with the aim of creating community-driven services for monitoring water supply and sanitation coverage in Zanzibar. A human sensor web has been set up through which individuals can report observations about the status of water wells used by their community by means of mobile phones. Also we extended the idea of VGI by developing an approach to “task” human sensors. In particular, we developed a socio-geographic network for crowdsourcing based on assigned tasks for gathering the information and for submitting it to the human sensor web. Users can register as human sensors at the system by defining their skills and impact area. Based on that information, submitted sensor tasks are forwarded to the most suitable human sensor. Motivated by their willingness to help, users can support others by supplying information about their local environment as responses to sensor task requests. This enables people to retrieve data which is currently not accessible on the Web.

Vision for VGI

SWSL sees a great potential of Sensor Web technology for VGI, as it already defines an interoperable approach to interact with sensors contributing VGI. In future, these sensors will be ubiquitous measuring a wide range of (environmental) parameters. Additionally, these sensors will be mobile or at least

incorporated in mobile phones, as carried around by people. These sensors can automatically measure different parameters without user interaction. Thereby a full coverage of sensor data for a specific topic will become available. This requires well-thought architectural approaches (to handle scalability and updates), as well as access and portrayal of historical and live data. Finally, this opens up a broad field of analysis questions, which have not been asked before (related to spatio-temporal phenomena).

VGI-related Publications of SWSL

- Foerster, T., Jirka, S., Stasch, C., Pross, B., Everding, T., Broering, A., & Juerrens, E. (2010, forthcoming). Integrating Human Observations and Sensor Observations – the Example of a Noise Mapping Community (p. 4). Presented at the Towards Digital Earth: Search, Discover and Share Geospatial Data Workshop (DE 2010), Berlin, Germany.
- Juerrens, E.H., A. Broering & S. Jirka (2009): A Human Sensor Web for Water Availability Monitoring. Proceedings of: OneSpace 2009 - 2nd International Workshop on Blending Physical and Digital Spaces on the Internet. September 1. 2009. Berlin, Germany.
- Lasnia, D., Broering, A., Jirka, S., & Remke, A. (2010). Crowdsourcing Sensor Tasks to a Socio-Geographic Network. In M. Painho, M. Santos, & H. Pundt (Eds.), Proceedings of 13th AGILE Interational Conference on Geographic Information Science (p. 8). Presented at the AGILE 2010, Guimaraes, Portugal.