

Participatory monitoring for energetic and environmental phenomena

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Participatory monitoring can be described as the practice of monitoring environments through low-cost and do-it yourself digital technologies by non-professional scientists. Recent advancements in information technology such as Internet of Things (IoT) and availability of broadband cellular networks spiked the application of participatory monitoring approaches. Monitoring environmental phenomena through a people-centered observation web using low cost sensors instead of expensive and hard to maintain public owned monitoring networks is now possible. While traditional measurement stations have higher accuracy in their measurements, they lack the spatial coverage required to monitor environmental phenomena in detail. Because of this fact they are mainly used for calibration of simulated data. Through the deployment of a large number of sensors the lower accuracy of measurements can be compensated by an increase in spatial coverage.

Early applications that incorporated sensors for measuring environmental phenomena were mainly focused on data gathering and data visualization. Open-source web services developed by the OGC (Open Geospatial Consortium) make the exchange of such data now possible and allow communities to communicate efficiently bi-directionally with citizens. Furthermore, recent applications of participatory monitoring make use of data analytics for informed decision making through the introduction of indicators based on ISO standards.

In the energy domain, participatory monitoring approaches have been used successfully for example in monitoring of air quality, noise emissions and mobility. This presentation will cover three examples of participatory monitoring of environmental phenomena and its linkages to energy. Examples include a sensory framework for monitoring impacts of seismic geothermal activities, the usage of mobile air pollution sensors on a tram across the city of Karlsruhe and the usage of open sensor APIs for smart cities applications.