EnviObserver – Participatory Sensing Tool for Environmental Monitoring

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Participatory sensing has emerged recently as a concept referring to activities that harness citizens to collect and share information about the environment. It is fostered by people getting more concerned about global climate change and the state of the environment, by mobile devices becoming more capable and pervasive, and by social media tools that enable people to easily share information about various issues, such as the environment. Participatory sensing could extend the sensor networks of environmental institutes both spatially and temporally, and produce useful information for situation awareness, forecasting and scientific research.

EnviObserver is a participatory sensing tool that utilizes people as living sensors, by enabling reporting of environmental observations using a mobile phone. EnviObserver focuses on active observations based on the users' own senses, like smell and vision, and it also enables entering readings from simple measurement devices such as a thermometer. Location and time of report are determined automatically. EnviObserver is not restricted by application area, as the design aims to enable easy configuration of observational parameters for various applications.

So far, the tool has been utilized in pilot trials for air and water quality monitoring and plant disease monitoring. In preparation is a pilot application for forest biomass monitoring, where participatory sensing is demonstrated in combination with satellite based remote sensing. Users take pictures of forest on the ground, using their mobile phone cameras. The images are delivered to server side for post-processing of forest parameters, which are then extrapolated with forest parameters derived from satellite images. As a result, the users receive information on forest resources like biomass and stand composition. This pilot concept has been prototyped, but not yet demonstrated with real users.

EnviObserver's conceptual architecture (Fig. 1) encompasses the following parts: 1) mobile application for providing user observations, 2) data model and database for storing the data, 3) interfaces for inputting observations and accessing the data, 4) visualization module for showing data on a map, and 5) alert services that can be used to notify users about new data.
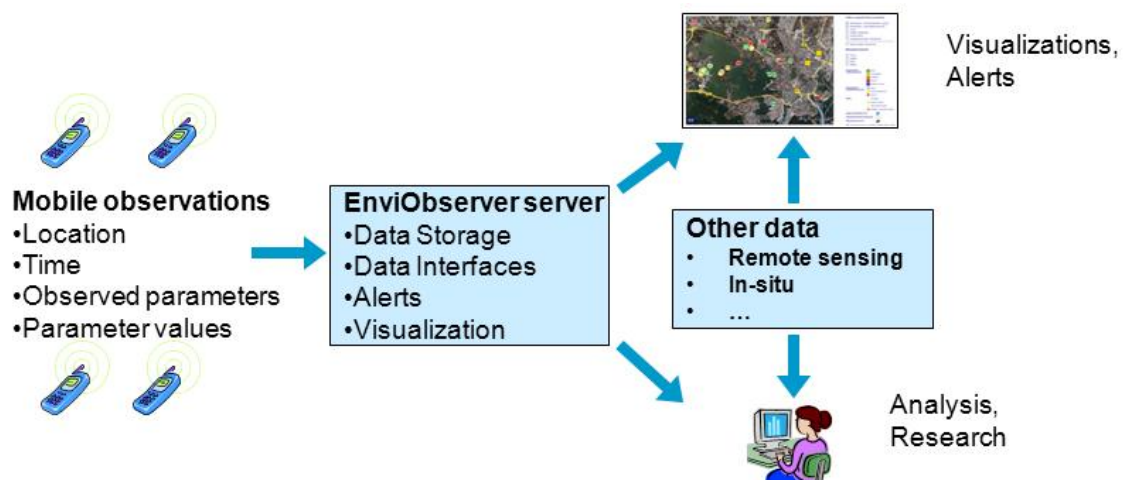

Figure 1: EnviObserver's conceptual architecture