CITIZEN SENSING FOR IMPROVED URBAN ENVIRONMEN-TAL MONITORING

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ABSTRACT

Highly dynamic urban environmental phenomena call for detailed and timely environmental information to support decision making. To derive this information, environmental data needs to be collected. Often, these data are produced by official organizations and are too sparse to meet the information demands from public and organizations. There is a need for flexible and affordable alternatives to complement the formal environmental monitoring stations. Recent development of low cost, low power and multifunctional sensors provide alternative approaches to collect environmental data. Integration of formal data and informal citizen sensing data could potentially improve data quality and spatial-temporal resolution.

The aim of this study is to integrate (informal) citizens collected data with formal data sources. A case study was established in the city Amsterdam with official organizations, municipality, citizens and scientists. Air quality monitoring was chosen as an example for implementation. Using Amsterdam as a living lab, the case study was intended to find out appropriate methods to involve citizens using low cost sensors as complementary way to collect data to improve spatial and temporal resolution of current air quality maps and analyses the opportunities, problems and challenges. With the experience from a pilot study using the Smart Citizen Kit, the citizens are involved from sensors selection to data collection, integration and visualisation in this case. The data from air quality monitoring stations managed by The National Institute for Public Health and the Environment (RIVM) and GGD Amsterdam are selected as formal data sources. Citizens collected data are selected as informal sensor data sources. Statistics and geostatistics approaches are used for data integration and interpolation for air quality mapping. Based on evaluation criteria, the effects of the different integration methods are evaluated. The outcome of this study provides insight in the added value of informal sensor data for improved urban environmental monitoring.