Arduino-based device for sensing urban air quality at high spatial resolution.

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Urban areas are severely exposed to man-made air pollution (motor vehicles, industry, heating. . .), which threatens the health of inhabitants of major cities. Quantifying precisely this pollution is therefore becoming an imperative and air quality sensor networks are being installed in more and more agglomerations. However, most of these networks monitor pollutants at a fixed location and data are interpolated to produce maps of air pollution. Given the extreme compartmentation of urban environments, essentially due to buildings, such interpolation may miss the fine scale heterogeneity of the pollutant distribution. Here I present a prototype of a portable Arduino-based air quality sensor coupled to a GNSS antenna that aims at being carried by pedestrians or bicyclists, hence acquiring air quality data all along their paths through the city. The sensor communicates data to the user's phone for a real-time inspection of his own exposure to air pollution. Assuming several people use this device at the same time across the same city, all data could be quickly reanalyzed to provide high resolution spatio-temporal maps of air quality. The two main perspectives would then to 1) build a phone application that helps users to find the healthiest itinerary from one place to another and 2) developing data analysis schemes able to provide local and short-term prediction of the air quality.