Do-It-Yourself Environmental Sensing: empowering citizens to reinvigorate their awareness of, and concern for, pollution

Air pollution is one of the most important factors currently affecting quality of life in big cities. However, despite the fact that poor air quality has been shown to directly affect human health, our daily exposure to such pollutants has been inadequately captured and publicly shared. There are state agencies measuring the air quality and informing citizens in the press or on their websites, but usu ally individuals are not fully aware of their personal exposure, either immediate or long-term. However, the lack of awareness is not only caused by ineffective methods of communication from the state agencies; it is also the type of data that their fixed sensors provide.



PAIR: mobile sensing device prototype

Pollution levels can vary at a small scale and carbon monoxide is especially concentrated around transport routes and disperses rapidly over a few tens of meters. This is exactly when a mobile sensing device can be most useful and convey information about immediate conditions of an individual. We developed a prototype device built on an Arduino board with an interchangeable sensor attached on the top. We worked with a carbon monoxide sensor because CO because it is one of the pollutants accounted in the Air Quality Index.

How does it work?

Concentration of gas is equal (according to conversion definition and calibration of the circuitry) to the sensor' s voltage or, alternatively, the voltage is measured via AD converter (analog input of Arduino board). It is presented by a number in a specific text sequence encoded using DTMF scheme to sound.



Sound can then be recorded via any device capable of sound recording (old-fashioned mobile devices can be used too). Consequently, the sound file is transferred to server via mms, or uploaded via internet connection.

Server collects decoded data and visualization is also possible to provide immediate response to user' s mobile device. Nothing else, whether it be special cables or something geeky, is necessary.



PAIR – CO sensor is situated on the top (right-hand side of the figure) with power and audio switches; speaker is in the middle of the device.

Potential uses of DIY air sensing are:

- better coverage (finer-grained data)
- increased environmental awareness
- increased air pollution issues knowledge
- educational tool
- citizen science
- increased activity at community level
- complementary data for official agencies
- eventually also behavioral changes