Distributed Air Quality Monitoring Based on Bluetooth Sensing Nodes and Virtual TEDS

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Abstract:
A smart sensor network implemented for air quality monitoring that includes a set of multivariable sensing nodes designed and using appropriate solid state sensors and low power consumption multi-input acquisition devices is presented. The communication between the nodes and a host personal computer (PC) that is used for advanced data processing and data logging is performed through a sensor channel acquisition interface characterized by class1 Bluetooth and serial port profile in order to emulate serial cable connections using RFCOMM between two peer devices. The non-linear characteristics of the air quality sensors requires the implementation of inverse modeling processing blocks at the PC level, which are materialized using IEEE 1451 standard elements such as virtual transducer electronic data sheet (Virtual - TEDS). A proposed neural network TEDS solution is also referred in the paper.

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Contents

Nowadays, the health and safety of the occupants of buildings is an important issue. Air quality is a key factor. Together with temperature or humidity normally related with air conditioning system parameters, the "on-line" monitoring of air contaminants is very important and assures the people safety at work or in their homes. Buildings' indoor "on-line" monitoring offers a number of important benefits including energy savings through demand-based control of outside air intake, improving and optimizing the air quality of the facility and identifying potential air quality problems at early stages.