

cityAIR: a new air quality index for cities

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Due to a generalised increase of mobility and road traffic in urban areas, the total emissions from road traffic have risen significantly, assuming the main responsibility for the disregard of air quality standards. Pollutant concentrations are evaluated through monitoring, using permanent measurement stations or mobile units, and prediction models based on emissions and meteorological conditions. In order to find an air quality index, the pollutant concentrations are combined through a classification scale anchored on the legal limits and, on the other side, on the impacts over human health. Typically these classification models consider only the worse pollutant, i.e. the one which concentration is higher given a certain scale. The objective of this paper is to present a new air quality index, cityAIR, developed for urban contexts. The mathematical formulation of cityAIR stands on two logics: whenever at least one of the pollutants considered overcomes the legal limits for the concentration, this will be the only relevant one for the index calculation, and the value will be the minimum of the scale (zero or red); when there is no limit violation, then all the pollutants are considered for the overall air quality, which is calculated through a multi-criteria combination of the concentrations, where trade-off is allowed. A case study is presented, where a cityAIR values surface was calculated for Viana do Castelo, a mid-sized Portuguese city, considering concentrations of CO, NO₂, O₃, C₆H₆ and PM₁₀.

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