Identification of Occupancy Status by Statistical Change Point Detection of CO2 Concentration - DTU Orbit (04/11/2019)

There is an increasing focus on energy savings in buildings but still there exist a gap between the calculated and the realised energy performance. A statistical analysis performed on in situ measurements of occupied buildings is one way to reveal if the occupants’ behaviour, the build quality, or the building design is the underlying reasons for this performance gap. A critical issue when carrying out the statistical analysis of the measurements from occupied buildings is to handle the measurement disturbances caused by the occupants’ interaction with the building. In this paper, an offline method combining ventilation theory of buildings with change point detection of time series measurements of indoor CO2 concentrations is proposed to detect vacant and sleeping periods in dwellings. The proposed method is tested using the CO2 measurements obtained from a single apartment. The method developed has classified 19% of a 14-days period as a vacant or sleeping period with an 81% accuracy based on indirect measures.

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Contributors: Rasmussen, C., Relan, R., Madsen, H.
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