Guillermo Barrios del Valle <gbv@ier.unam.mx>

Invitation to review for Energy & Buildings

1 message

Energy & Buildings <em@editorialmanager.com> Fri, Aug 25, 2023 at 4:10 PM
Reply-To: Energy & Buildings <support@elsevier.com>
To: Guillermo Barrios del Valle <gbv@ier.unam.mx>

Manuscript Number: ENB-D-23-02394

Deterministic and probabilistic occupant-centric control impacts on the indoor environment in free-running households

Fateme Akhlaghinezhad; Amir Tabadkani; Hadi Bagheri Sabzevar; Nastaran Seyed Shafavi; Arman Nikkhah Dehnavi

Dear Dr Barrios del Valle,

I would like to invite you to review the above referenced manuscript submitted by Dr. Amir Tabadkani , as I believe it falls within your expertise and interest. The abstract for this manuscript is included below.

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Kind regards,

Mohamed Ouf

Managing Guest Editor

Energy & Buildings

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Abstract:

Occupant behavior can lead to considerable uncertainties in thermal comfort and air quality in buildings. To address this issue, simulating occupant behavior using probabilistic controls has been proposed as a potential solution. This study aims to analyze adaptive thermal comfort and indoor air quality in free-running households. To achieve this, different deterministic and probabilistic strategies for window opening behavior and shading adaptation are being tested. To achieve this, Energy Management System (EMS) functionality of EnergyPlus inside an algorithmic interface, namely, Ladybug-tools is utilized to conduct 465 cases through modifying the geometrical dimensions, orientation, window-to-wall ratio (WWR), and window operable fraction, to identify effective control scenarios. Furthermore, Random Forest algorithm is used to estimate the impact of control scenarios individually on both indoor thermal comfort and air quality, including operative temperature and CO2 concentration. Findings confirmed that deterministic and probabilistic window control algorithms could reduce thermal discomfort hours by 56.7% and 41.1%, respectively, while deterministic shading controls resulted in 18.5% reduction. In addition, indoor CO2 concentration decreased by 87.8% after implementing the window control strategies. And the sensitivity analysis demonstrated that outdoor temperature had the strongest positive correlation with indoor operative temperature while a negative correlation with indoor CO2 concentration. Particularly, zone orientation and length were identified as the most effective design variables.

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