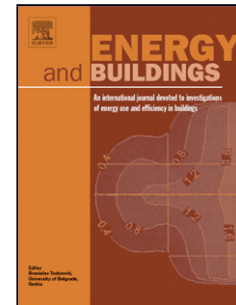


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One Size Does Not Fit All: Understanding User Preferences for Building Automation Systems

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Abstract:

In recent years, technological advances have substantially extended the capabilities of automation systems in buildings. Despite the achieved advances, automation systems have not been widely adopted by building occupants. This paper presents our investigations on automation preferences of occupants for the control of lighting systems and appliances in residential buildings. A survey was carried out to determine how preferences for level of automation vary by contexts as well as individuals' personalities and demographic characteristics. The contexts investigated in this study include rescheduling an energy consuming activity, activity-based appliance state control, and lighting control. The collected data from 250 respondents were analyzed using Generalized Linear Mixed Models. Based on the results, an automation level with higher user participation is more preferred for rescheduling an activity. For control of activity-based appliance states and lighting, levels of automation with lower user participation are more preferred. Our findings also indicate that income and education levels and also personality traits of agreeableness, neuroticism and openness to experience affect the preference of particular automation levels over the others. Findings from this study can be used in designing user-centered automation systems that lead to potentially more satisfying operation and hence, could enhance automation acceptability.

Keywords: Energy Efficiency; Adjustable autonomy; Occupant preferences; Appliance control; Lighting control; Automation

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