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Learning user preferences to maximise occupant comfort in office buildings.

García-Pedrajas, Nicolás (ed.) et al., Trends in applied intelligent systems. 23rd international conference on industrial engineering and other applications of applied intelligent systems, IEA/AIE 2010, Cordoba, Spain, June 1–4, 2010. Proceedings, Part I. Berlin: Springer (ISBN 978-3-642-13021-2/pbk). Lecture Notes in Computer Science 6096. Lecture Notes in Artificial Intelligence, 681-690 (2010).

Summary: It is desirable to ensure that the thermal comfort conditions in offices are in line with the preferences of occupants. Controlling their offices correctly therefore requires the correct prediction of their thermal sensation which is often determined using the ISO 7730 norm. The latter defines the predicted mean vote, i.e. the mean thermal preferences of an average group of people, based on a number of variables that are either difficult to measure in practice or require the placement of many sensors in the offices of a building, which is very costly. This paper addresses these issues and predicts the comfort preferences of users solely based on the temperature readings and their previous comfort votes. In order to determine how relevant the latter are to a new state a distance measure is defined that quantifies the similarity between two states. Based on that similarity the previous votes are weighted and the expected comfort vote for the new state is determined. The paper concludes with an experimental analysis using real field study data that show under which climatic conditions our approach outperforms existing approaches.

Keywords: intelligent systems; thermal comfort; decision support systems
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