Machine learning approaches to predict thermal demands using skin temperatures: Steady-state conditions.

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Resumen: Inefficient controlling strategies in heating and cooling systems have given rise to a large amount of energy waste and to widespread complaints about the thermal environment in buildings. An intelligent control method based on a support vector machine (SVM) classifier is proposed in this paper. Skin temperatures are the only inputs to the model and have shown attractive prediction power in recognizing steady state thermal demands. Data were accumulated from two studies to consider potential use for either individuals or a group of occupants. Using a single skin temperature correctly predicts 80% of thermal demands. Using combined skin temperatures from different body segments can improve the model to over 90% accuracy. Results show that three skin locations contained enough information for classification and more would cause the curse of dimensionality. Models using different skin temperatures were compared. Optimal parameters for each model were provided using grid search technique. Considering the overfitting possibility and the cases without learning processes, SVM classifiers with a linear kernel are preferred over Gaussian kernel ones. [ABSTRACT FROM AUTHOR]

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