

A Comprehensive Review of Artificial Intelligence Applications in Sustainable Building

Authors : Yazan Al-Kofahi, Jamal Alqawasmi.

Abstract : In this study, a comprehensive literature review (SLR) was conducted, with the main goal of assessing the existing literature about how artificial intelligence (AI), machine learning (ML), deep learning (DL) models are used in sustainable architecture applications and issues including thermal comfort satisfaction, energy efficiency, cost prediction and many others issues. For this reason, the search strategy was initiated by using different databases, including Scopus, Springer and Google Scholar. The inclusion criteria were used by two research strings related to DL, ML and sustainable architecture. Moreover, the timeframe for the inclusion of the papers was open, even though most of the papers were conducted in the previous four years. As a paper filtration strategy, conferences and books were excluded from database search results. Using these inclusion and exclusion criteria, the search was conducted, and a sample of 59 papers was selected as the final included papers in the analysis. The data extraction phase was basically to extract the needed data from these papers, which were analyzed and correlated. The results of this SLR showed that there are many applications of ML and DL in Sustainable buildings, and that this topic is currently trendy. It was found that most of the papers focused their discussions on addressing Environmental Sustainability issues and factors using machine learning predictive models, with a particular emphasis on the use of Decision Tree algorithms. Moreover, it was found that the Random Forest regressor demonstrates strong performance across all feature selection groups in terms of cost prediction of the building as a machine-learning predictive model.

Keywords : machine learning, deep learning, artificial intelligence, sustainable building

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