Artificial Intelligence in the Design of High-Strength Recycled Concrete

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Abstract : The increasing demand for sustainable construction materials has led to a growing interest in high-strength recycled concrete (HSRC). Utilizing recycled materials not only reduces waste but also minimizes the depletion of natural resources. This study explores the application of artificial intelligence (AI) techniques to model and predict the properties of HSRC. In the past two decades, the production levels in various industries and, consequently, the amount of waste have increased significantly. Continuing this trend will undoubtedly cause irreparable damage to the environment. For this reason, engineers have been constantly seeking practical solutions for recycling industrial waste in recent years. This research utilized the results of the compressive strength of 90-day high-strength recycled concrete. The method for creating recycled concrete involved replacing sand with crushed glass and using glass powder instead of cement. Subsequently, a feedforward artificial neural network was employed to model the compressive strength results for 90 days. The regression and error values obtained indicate that this network is suitable for modeling the compressive strength data.

Keywords : high-strength recycled concrete, feedforward artificial neural network, regression, construction materials
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