Structures
Volume 46, December 2022, Pages 1243-1267

Prediction of concrete materials compressive strength using surrogate models

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https://doi.org/10.1016/j.istruc.2022.11.002

Abstract

Using soft computing methods could be of great interest in predicting the compressive strength of Ultra-High-Performance Fibre Reinforced Concrete (UHPFRC). Therefore, this study developed four soft computing techniques. The models are the Linear- relationship (LR), pure quadratic, M5P-tree (M5P), and artificial neural network (ANN). The models were trained and developed using 306 datasets comprising 11 input parameters, including the curing temperature (T), the water-to-cement ratio (w/c), silica fume (SF), cement content (C), fiber content (Fb), water (W), sand content (S), superplasticizer (SP), fiber aspect ratio (AR) and curing time (t). Experimental results were used and compared to the model performances to validate the developed models. The models were developed based on 192 training datasets, and the model's accuracy was checked using 41 testing datasets; the model's outcomes were validated using 32 experimental