Using generalized regression neural network (GRNN) for mechanical strength prediction of lightweight mortar

by: S.V. Razavi, M.Z. Jumaat, E.S.H. Ahmed, P. Mohammadi

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Abstract

In this paper, the mechanical strength of different lightweight mortars made with 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95 and 100 percent of scoria instead of sand and 0.55 water-cement ratio and 350 kg/m³ cement content is investigated. The experimental result showed 7.9%, 16.7% and 49 decrease in compressive strength, tensile strength and mortar density, respectively, by using 100% scoria instead of sand in the mortar. The normalized compressive and tensile strength data are applied for artificial neural network (ANN) generation using generalized regression neural network (GRNN). Totally, 90 experimental data were selected randomly and applied to find the best network with minimum mean square error (MSE) and maximum correlation of determination. The created GRNN with 2 input layers, 2 output layers and a network spread of 0.1 had minimum MSE close to 0 and maximum correlation of determination close to 1.

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