Concrete Compressive Strength

Data Type: multivariate

Abstract: Concrete is the most important material in civil engineering. The concrete compressive strength is a highly nonlinear function of age and ingredients. These ingredients include cement, blast furnace slag, fly ash, water, superplasticizer, coarse aggregate, and fine aggregate.

Sources:

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Data Characteristics:

The actual concrete compressive strength (MPa) for a given mixture under a specific age (days) was determined from laboratory. Data is in raw form (not scaled).

Summary Statistics:

Number of instances (observations): 1030
Number of Attributes: 9
Attribute breakdown: 8 quantitative input variables, and 1 quantitative output variable
Missing Attribute Values: None

Variable Information:

Given is the variable name, variable type, the measurement unit and a brief description.

The concrete compressive strength is the regression problem. The order of this listing corresponds to the order of numerals along the rows of the database.

Name -- Data Type -- Measurement -- Description

Cement (component 1) -- quantitative -- kg in a m3 mixture -- Input Variable
Blast Furnace Slag (component 2) -- quantitative -- kg in a m3 mixture -- Input Variable
Fly Ash (component 3) -- quantitative -- kg in a m3 mixture -- Input Variable
Water (component 4) -- quantitative -- kg in a m3 mixture -- Input Variable
Superplasticizer (component 5) -- quantitative -- kg in a m3 mixture -- Input Variable
Coarse Aggregate (component 6) -- quantitative -- kg in a m3 mixture -- Input Variable
Fine Aggregate (component 7) -- quantitative -- kg in a m3 mixture -- Input Variable
Age -- quantitative -- Day (1~365) -- Input Variable
Concrete compressive strength -- quantitative -- MPa -- Output Variable
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Past Usage:

Main
1. I-Cheng Yeh, "Modeling of strength of high performance concrete using artificial neural networks," Cement and Concrete Research, Vol. 28, No. 12, pp. 1797-1808 (1998).

Others
2. I-Cheng Yeh, "Modeling Concrete Strength with Augment-Neuron Networks," J. of Materials in Civil Engineering, ASCE, Vol. 10, No. 4, pp. 263-268 (1998).

3. I-Cheng Yeh, "Design of High Performance Concrete Mixture Using Neural Networks," J. of Computing in Civil Engineering, ASCE, Vol. 13, No. 1, pp. 36-42 (1999).

4. I-Cheng Yeh, "Prediction of Strength of Fly Ash and Slag Concrete By The Use of Artificial Neural Networks," Journal of the Chinese Institute of Civil and Hydraulic Engineering, Vol. 15, No. 4, pp. 659-663 (2003).

5. I-Cheng Yeh, "A mix Proportioning Methodology for Fly Ash and Slag Concrete Using Artificial Neural Networks," Chung Hua Journal of Science and Engineering, Vol. 1, No. 1, pp. 77-84 (2003).

6. Yeh, I-Cheng, "Analysis of strength of concrete using design of experiments and neural networks,": Journal of Materials in Civil Engineering, ASCE, Vol.18, No.4, pp.597-604 ?2006?.

Acknowledgements, Copyright Information, and Availability: