

Comparison Of Data Mining Models To Predict Future Bridge Conditions

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Abstract : Highway and bridge agencies, such as the Ministry of Transportation in Ontario, use the Bridge Condition Index (BCI) which is defined as the weighted condition of all bridge elements to determine the rehabilitation priorities for its bridges. Therefore, accurate forecasting of BCI is essential for bridge rehabilitation budgeting planning. The large amount of data available in regard to bridge conditions for several years dictate utilizing traditional mathematical models as infeasible analysis methods. This research study focuses on investigating different classification models that are developed to predict the bridge condition index in the province of Ontario, Canada based on the publicly available data for 2800 bridges over a period of more than 10 years. The data preparation is a key factor to develop acceptable classification models even with the simplest one, the k-NN model. All the models were tested, compared and statistically validated via cross validation and t-test. A simple k-NN model showed reasonable results (within 0.5% relative error) when predicting the bridge condition in an incoming year.

Keywords : asset management, bridge condition index, data mining, forecasting, infrastructure, knowledge discovery in databases, maintenance, predictive models

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