

# **A unified artificial neural network model for asphalt pavement condition prediction**

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## **A B S T R A C T**

Most performance prediction models for asphalt pavements are either based on laboratory data or numerical distress data collected from field surveys. However, these models do not fully reflect the true performance of pavements in different traffic and environmental conditions. In the study reported in this paper, a multi-input unified prediction model based on an artificial neural network was developed by using a mixture of numerical and categorical features for in-service pavement test sections in the USA. Pavement age, cracking length and area, cumulative traffic loading, two functional classes of roads, four climatic zones and maintenance effects were considered as input variables while changes in the pavement condition index (PCI) were determined as the output. The developed model was found to be efficient in terms of processing time and accuracy in dealing with the complexity and non-linearity of multiple input parameters. The results showed that the model provided a high correlation between observed and predicted deterioration at the training stage. The testing and validation results also yielded high accuracy in predicting the PCI and could be combined with a pavement management system to plan timely and accurate maintenance strategies.