

Jordan University of Science and Technology

Using supervised machine learning algorithms in pavement degradation monitoring

Authors: Amir Shtayat, Sara Moridpour, Berthold Best, Mohammad Abuhassan

Abstract: Pavement monitoring plays a vital role in maintaining sustainable road network conditions and provides road users with satisfactory comfort riding. Regular and routine monitoring provide clear information on road conditions and the level of damage to pavement surfaces. In this study, a vibration-based method was used as a monitoring technique to evaluate the pavement surface conditions on local roads. Pre-processing techniques were used to cancel noise and prepare the data for feature extraction and prediction. Two multi-classification Machine Learning (ML) models were used, including Random Forest (RF) and Decision Tree (DT), for the automated classification and detection of different types of pavement distresses. In addition, a Support Vector Machine (SVM) technique was used to develop a binary ML model for the same classification and detection purposes. The results showed that the developed ML models provide high accuracy in predicting the road degradation classification with about 93% accuracy using the RF and 90% accuracy using the DT. Using the SVM model, the overall average accuracy of detection and classification of pavement defects was about 96%.