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Vibration-Based Data-Driven Model for Road Health Monitoring

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Abstract : A road's condition often deteriorates due to harsh loading such as overload due to trucks, and severe environmental conditions such as heavy rain, snow load, and cyclic loading. In absence of proper maintenance planning, this results in potholes, wide cracks, bumps, and increased roughness of roads. In this paper, a data-driven model will be developed to detect these damages using vibration and image signals. The key idea of the proposed methodology is that the road anomaly manifests in these signals, which can be detected by training a machine learning algorithm. The use of various machine learning techniques such as the support vector machine and Radom Forest method will be investigated. The proposed model will first be trained and tested with artificially simulated data, and the model architecture will be finalized by comparing the accuracies of various models. Once a model is fixed, the field study will be performed, and data will be collected. The field data will be used to validate the proposed model and to predict the future road's health condition. The proposed will help to automate the road condition monitoring process, repair cost estimation, and maintenance planning process.

Keywords : SVM, data-driven, road health monitoring, pot-hole
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