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Algorithm and Software
for Proactive Pothole Repair

Introduction

Potholes are a common pavement distress that appear particularly during the spring freeze-thaw period in northern climates. Potholes reduce ride quality and if left unrepaired can lead to rapid pavement deterioration. Typically, when a pothole appears a repair crew is dispatched to place patch mixture in the hole with the hope that the patch will last until such time as a more permanent repair can be made. This reactive approach to potholes often leads to further pavement damage and also makes it difficult for repair crews to be scheduled in the most cost-effective manner.

In this study an attempt was made to develop a model to predict pothole formation and determine which routes are prone to pothole formation before the potholes begin to form. If pothole prediction were possible, this proactive approach would enable agencies to plan and schedule maintenance activities in a more cost- and time-effective manner, thus increasing ride safety and mobility.

Findings

- Traffic load plays a more important role in the formation of potholes in the urban and rural Interstate highways compared to the urban US highways and urban and rural state routes.
- Temperature is more important than traffic loads in pothole formation on rural routes.
- Applying the developed models could help agencies assign maintenance priority to highways predicted to develop comparatively more potholes.
- Analyses suggest that current condition data resolution may not be sufficient to predict a pothole of only a few feet in size, but it may be sufficient to predict which road segments of about 1 mile in length will or will not experience distress leading to potholes.
- Currently the resolution of the repair database is too low to prove or disprove the results of the analyses conducted. Higher resolution repair records are needed.

Implementation

While the findings of this study are encouraging, there are currently no results that are ready for implementation. The following recommendations are offered as possible future work:

- High-resolution repair records could be recorded with a mobile approach, like the PPTracker developed in this research.
- Schemes to automatically flag and fix quality control issues in the pavement databases could be developed and implemented.
- Other Indiana Department of Transportation databases that include information such as pavement age, pavement type, traffic volumes, complete weather data, and so forth could be more directly integrated into the algorithms.
- When increased resolution data becomes available, a true pothole formation prediction algorithm could be developed.

Recommended Citation for Report