

## **PELT BASED DYNAMIC SEGMENTATION FOR NETWORK LEVEL PAVEMENT EVALUATION WITH 1MM 3D DATA**

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### *ABSTRACT*

With the development of 3D laser imaging technology, the latest iteration of PaveVision3D Ultra technology can obtain 1mm resolution data at full-lane coverage in three dimensions at highway speed. With extensive amount of 1mm 3D data from rapid network level survey, how to use such big data for pavement management and maintenance practices remains a challenge. Traditionally, highway routes are broken into predefined segments of fixed lengths for pavement evaluation, which can present problems in data redundancy and limitations to provide recommendations for project prioritization. In this paper, the Pruned Exact Linear Time (PELT) method is implemented to dynamically segment pavement sections into uniform subsections with consistent condition states. The PELT is based on optimal partitioning algorithm with a pruning step to reduce the computational cost, while not affect the exactness of the resulting segmentation. Pavement roughness, cracking, rutting, and predicted hydroplaning speed for safety analysis are calculated from the 1mm 3D data collected on a test site. PELT is applied to identify change points and determine homogeneous segments based on the calculated performance indicators. The dynamic segmentation process can assist DOT effectively using the available 1mm 3D pavement surface condition data to optimize pavement management decision-making.