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Dynamic Monitoring of Asphalt Pavement Using Mobile Application

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Abstract: The quality of the pavement has a significant influence on the final price of goods and services, the safety of drivers, pedestrians and cyclists, and the driver's comfort. Pavement condition assessment is essential when developing road network maintenance programs. Thus, it is essential for government authorities or private entities to dynamically monitor the pavement condition for more precise interventions in maintenance planning with fewer expenses. In practice, the data collection process is to a large extent automated. However, pavement distress detection (cracks, potholes, etc.) is mostly performed manually, which is labour-intensive and time-consuming. In this paper, the authors presented the method of dynamic monitoring of asphalt pavement using vibration data from a smartphone application named Sensor log. Most modern smartphones have a variety of built-in sensors, like an accelerometer, gyroscope, GPS, proximity and vibration sensor. The large variety of sensors makes these devices powerful measurement tools, allowing the emergence of new systems and applications. The authors collected data of different speeds using mobile devices with sensor log application, a mobile holder, a scooter, a bicycle, and another device for video recording the pavement surface. In this study, the authors focused on low hierarchy roads like local roads and streets. After the data analysis, the authors found the relation between vibration frequencies to the type of degradation. The results show that this method can detect degradation and type of cracks in asphalt pavement with reasonable accuracy.