The Usage of Remote Sensing and Other Geospatial Methodologies to Assess and Manage Road Infrastructure

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Abstract

One of the most valuable and extensive infrastructure resources in the country is its road network and therefore, its assessment and monitoring is crucial to ensure that a safe and effective road system is in place. However, the process of evaluating the condition of transportation infrastructure, especially roads is an expensive, time consuming, and a highly labour intensive one. Most of the road evaluation methods widely used today use measurements that are taken in situ along with visual examinations and interpretations. However, the measurement and assessment of damage and deterioration of roads is in most instances qualitative and is limited to point observations. This is where remote sensing technologies come in to play. Remote sensing offers non-destructive methods to assess and monitor road conditions with very large spatial coverage without even having to leave the desk. Hence, the objective of this study is to bridge traditional road evaluation procedures with new technologies to overcome the cost and time constraints currently associated with it. This study introduces an automated set of tools that will allow the user to remotely capture important features related to the road infrastructure on the basis of satellite images pertaining to the area that will enable an effective assessment and monitoring process of the roads. The set of tools will be hosted by ArcGIS Model Builder and the significance here is that since the entire tool is automated, regardless of the user's knowledge in ArcGIS, they will still be able to make use of it. Because remote sensing is capable of collecting information from a wide spatial spectrum in a very short period of time, this set of tools will be invaluable in assessing and managing road infrastructure in the country, although it is important to acknowledge that these methodologies can never fully replace traditional geotechnical methods.

Key Words: ArcGIS Model Builder, Automated toolbox, Remote sensing

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