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Leveraging Satellite Imagery to Map Road Surface Conditions

Classifying road conditions is a time taking and expensive task as the two current methods of road classification require driving on each road to classify their condition. However, a possible solution is to use satellite imagery to classify road conditions. The objective of this project was to develop a method in which satellite imagery could be used to accurately map road conditions. This was done by using a geographic information system and collecting the statistics of the blue spectral band in the satellite imagery to correlate certain statistical values with good, fair, and poor road conditions. After collecting, analyzing, and implementing the blue spectral band statistics, a map was created classifying road conditions as one of three conditions: good, fair, or poor. By visiting some sample sites, it was determined that the map was in fact accurate and specific. This project has many implications especially with the Department of Transportation. The process used in this project to create the map of road conditions can be scaled to be used for images of roads all over the nation and world and later given to the Department of Transportation to then deploy their resources to repair the roads classified as poor. This can save millions of dollars in the United States alone. The future of the project is also bright as machine learning and artificial intelligence can be used to optimize and speed up the process to completely revolutionize the mapping of road conditions.