

Low-Cost Image Processing System for Evaluating Pavement Surface Distress

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Abstract : Most asphalt pavement condition evaluation use rating frameworks in which asphalt pavement distress is estimated by type, extent, and severity. Rating is carried out by the pavement condition rating (PCR), which is tedious and expensive. This paper presents the development of a low-cost technique for image pavement distress analysis that permits the identification of pothole and cracks. The paper explores the application of image processing tools for the detection of potholes and cracks. Longitudinal cracking and pothole are detected using Fuzzy-C- Means (FCM) and proceeded with the Spectral Theory algorithm. The framework comprises three phases, including image acquisition, processing, and extraction of features. A digital camera (Gopro) with the holder is used to capture pavement distress images on a moving vehicle. FCM classifier and Spectral Theory algorithms are used to compute features and classify the longitudinal cracking and pothole. The Matlab2016Ra Image preparing tool kit utilizes performance analysis to identify the viability of pavement distress on selected urban stretches of Bengaluru city, India. The outcomes of image evaluation with the utilization semi-computerized image handling framework represented the features of longitudinal crack and pothole with an accuracy of about 80%. Further, the detected images are validated with the actual dimensions, and it is seen that dimension variability is about 0.46. The linear regression model $y=1.171x-0.155$ is obtained using the existing and experimental / image processing area. The R2 correlation square obtained from the best fit line is 0.807, which is considered in the linear regression model to be 'large positive linear association'.

Keywords : crack detection, pothole detection, spectral clustering, fuzzy-c-means

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