A Cost Effective Method for Pavement Roughness Computation

D.Y. Galagoda and N. Amarasingha

Faculty of Engineering, Sri Lanka Institute of Information Technology, Malabe, Sri Lanka

Pavement Roughness can be expressed as the anomalies in a pavement surface, which will affect the ride quality of a vehicle and the vehicle delay costs, fuel expenditure and tires and other expenses. Roughness can be expressed as International Roughness Index (IRI). Sri Lanka as a developing country lack of fund allocations has become a major issue for government authorities. Therefore, it is very important to have a proper database for proper planning of road networks. As the number of smartphone users is increasing, applications using smartphone sensors are also developing. In this research android applications were used to estimation of road roughness which can be used to collect road condition data cost effectively. Smartphones were attached to the front windshield of a test vehicle horizontally/landscape mode and standing vertically from road. Data collection was done by selecting the "Start/stop sampling" option in 'AndroSensor' and 'Roadroid' android applications by selecting video, photo or non –video mode with the defined route, maintaining 80km/hr speed. The study was done on 20 national roadway sections in Sri Lanka. The statistical analysis showed the percentage of similarity of the results of the measurement of evenness of pavement roads; between two smartphone application is 97.8% and linear regression model (R^2= 0.754) based on the relationship between estimated IRI values and existing IRI values evaluated using laser profiler which were obtained from Road Development Authority. Based on result from the experiment, smartphone application can be determined as an equipment that can be used to determine the surface roughness of pavements, as it provides data efficiently and with technical benefits.

Keywords: Smartphone sensors, Pavement roughness, Pavement condition, Android applications