

## ROAD SURFACE CLASSIFICATION THROUGH VEHICLE VIBRATION SIGNAL PROCESSING

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In India, road transportation is the most widely used means of transportation. Around 150,000 people die annually in India, and more than 450,000 people get injured or disabled due to automotive accidents. Informing the organizations involved in road construction and maintenance for the kind of road is vital and could help avoid major medical emergencies. An IoT-based method is used in work to describe the condition and place and the kind of road condition. The method uses the sensors available in the smartphone of the driver or the passenger mounted on the vehicle's handle (two-wheeler) using a phone mount and is kept parallel to the ground to detect the vibration of the road condition. The vibration data that the smartphone captures are in three routes vertical, horizontal, and depth. The data captured is recording the vibrations of the Accelerometer, which is a three-axis X, Y, Z, and a gyroscope for the same three-axis. The Accelerometer is of both kinds, linear and non-linear. For the accuracy of the data, this work uses the linear kind to remove the gravitational acceleration caused by the earth and an increment of 9.8 m/s<sup>2</sup> in the readings. The accuracy of the work is given by KNN for classification and precision, recall, f1-score, and support. The key intent of this research is to root out from the acquired data indispensable features and identify the condition of the road. The work mainly focuses on two-wheeler drivers but is readily applicable to four-wheeler vehicles. Any vehicle with a stable enough location to mount a phone with minimum body vibration can benefit from this work.