

Inexpensive Road Condition Assessment Using An Rgbd-Based Deep Convolutional Encoder-Decoder Segmentation

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Pothole detection plays a vital role in road assessment. In this work, a low-cost data acquisition system is developed that can be applied on cars. Two major hardware in our system are the edge computing device and RGB-D sensors which are used for obtaining pothole data including 2D RGB and 3D depth data. In addition, Robotic Operating System is used to connect the hardware components. An RGB-D pothole dataset has been generated and trained on a deep convolutional neural network which consists of two encoder networks that can capture features from the RGB and depth map. The performance of the segmentation is compared to state-of-the-art road assessment methods. The results have shown the proposed RGB-D fusion approach outperforms other methods. Besides, the pothole area and volume have been computed to quantify the size of detected potholes. This study is a steppingstone for data collection and processing through crowdsourcing and internet-of-things in smart cities for road assessment.