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Automated Pothole Detection Using Convolution Neural Networks and 3D Reconstruction Using Stereovision

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Abstract : Potholes are a severe threat to road safety and a major contributing factor towards road distress. In the Indian context, they are a major road hazard. Timely detection of potholes and subsequent repair can prevent the roads from deteriorating. To facilitate the roadway authorities in the timely detection and repair of potholes, we propose a pothole detection methodology using convolutional neural networks. The YOLOv3 model is used as it is fast and accurate in comparison to other state-of-the-art models. You only look once v3 (YOLOv3) is a state-of-the-art, real-time object detection system that features multi-scale detection. A mean average precision(mAP) of 73% was obtained on a training dataset of 200 images. The dataset was then increased to 500 images, resulting in an increase in mAP. We further calculated the depth of the potholes using stereoscopic vision by reconstruction of 3D potholes. This enables calculating pothole volume, its extent, which can then be used to evaluate the pothole severity as low, moderate, high.

Keywords : CNN, pothole detection, pothole severity, YOLO, stereovision
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