Pothole Detection Techniques Using Deep Learning and YOLO Variants

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Abstract :

Detecting potholes is a crucial part of maintaining roads and ensuring transportation safety, as damaged roads can lead to vehicle damage, accidents, and economic loss. Traditional methods like manual inspections or sensor-based systems are often slow, costly, and not very accurate. Thanks to advances in deep learning and computer vision, automated pothole detection is now a practical and efficient alternative. This survey explores the use of deep learning especially the YOLO (You Only Look Once) models for detecting potholes. It reviews and compares different YOLO versions in terms of accuracy, speed, and suitability for real-time use. We also examine research studies that have applied these models, pointing out their strengths and limitations. In addition, the paper covers how GPS-based reporting and integration with road maintenance systems can improve pothole management. Finally, it suggests future directions for making these systems even better.

Keywords- Pothole detection, YOLO, Deep Learning, Road Safety, Image Processing.