Pothole Detection and Management System using AI

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Abstract: *Potholes put pedestrian and vehicular safety in peril, creating a traffic hazard. In the majority of developing nations, it ranks among the main factors in traffic accidents that result in the loss of life and property. In order to identify potholes quickly and accurately, this project aims to assess the performance of cutting-edge neural network techniques like YOLO and Faster R-CNN with VGG16 and ResNet-18 architectures. A new YOLOv2 architecture is also proposed to handle the "pothole" and "regular road" class imbalance issue, and its performance is evaluated in comparison to other object identification algorithms using accuracy, recall, intersection over union, and frames processed per second (FPS).*

Keywords: Deep Learning Neural Network; CNN; YOLO Algorithm Object Detection; Image Processing

REFERENCES

[1]. Silvister et al., "Deep Learning Approach to Detect Potholes in Real-Time using Smartphone," 2019 IEEE Pune Section International Conference (PuneCon), 2019, pp. 1-4, doi: 10.1109/PuneCon46936.2019.9105737.

[2]. Rastogi, U. Kumar, A. Kashyap, S. Jindal and S. Pahwa, "A Comparative Evaluation of the Deep Learning Algorithms for Pothole Detection," 2020 IEEE 17th India Council International Conference (INDICON), 2020, pp. 1-6, doi: 10.1109/INDICON49873.2020.9342558.

[3]. R and N. S, "Pothole and Object Detection for an Autonomous Vehicle Using YOLO," 2021 5th International Conference on Intelligent Computing and Control Systems (ICICCS), 2021, pp. 1585-1589, doi: 10.1109/ICICCS51141.2021.9432186.

[4]. Rasyid et al., "Pothole Visual Detection using Machine Learning Method integrated with Internet of Thing Video Streaming Platform," 2019 International Electronics Symposium (IES), 2019, pp. 672-675, doi: 10.1109/ELECSYM.2019.8901626.

[5]. Kumar, Chakrapani, D. J. Kalita and V. P. Singh, "A Modern Pothole Detection technique using Deep Learning," 2nd International Conference on Data, Engineering and Applications (IDEA), 2020, pp. 1-5, doi: 10.1109/IDEA49133.2020.9170705.

[6]. A Deep Learning Approach for Street Pothole Detection DO 10.1109/BigDataService49289.2020.00039