ROAD DAMAGE DETECTION AND CLASSIFICATION USING DEEP NEURAL NETWORKS (YOLOV4) WITH SMARTPHONE IMAGES

This paper worked on three versions of YOLO with the IEEE big data Cup challenge, where the most extensive road damage dataset available. To train the model, a transfer learning technique was applied while using pre-trained weights. The dataset was divided to 80% to the training set, 10% to validation, and 10% image for testing to perform each version.

With version 2, YOLO performed very poorly, even with the Adam optimizer. Here, the Confidence of object detection was only 0.25 or higher, and the threshold was set at 0.2 in this model. With version 3, the mean average precision was supposed to increase, but it decreased slightly. However, Tiny-YOLOv3, with the best weights achieved at 14,400 iterations, gives the highest map means it worked better than YOLOv3. Now, the YOLOv4 training was stopped because of the time restriction after 6400 iterations. Though increasing the network resolution might increase precision.

Here the problem is almost the same as mentioned before. The outcome might be great in this article, but the model's classes are too limited to predict when it comes to detecting the damages of the roads, and some of the classes are not even needed for damage segmentations.

REFERENCES

[1] Faramarzi, M. (2020). Road Damage Detection and Classification Using Deep Neural Networks with Smartphone Images. Available at SSRN 3627382.