

ROAD DAMAGE DETECTION AND CLASSIFICATION WITH DETECTRON2 AND FASTER R-CNN

The authors in this paper explored Detectron2's implementation of Faster R-CNN using different base models and configurations for detecting road damages. The detection is based on Object Recognition using Fast R-CNN. They also experimented with these models on the Global Road Damage Detection Challenge 2020 Dataset. There are 21,041 images (2,829, 7,706, and 10,506 for Czech, India, and Japan, respectively) in the training set. And test1 has 2,631, and test2 has 2,664 images. In total, the training dataset contains 34,702 annotated instances. Four types of annotated road damage types were classified, respectively Pothole, Alligator Crack, Transverse Crack, and Longitudinal Crack.

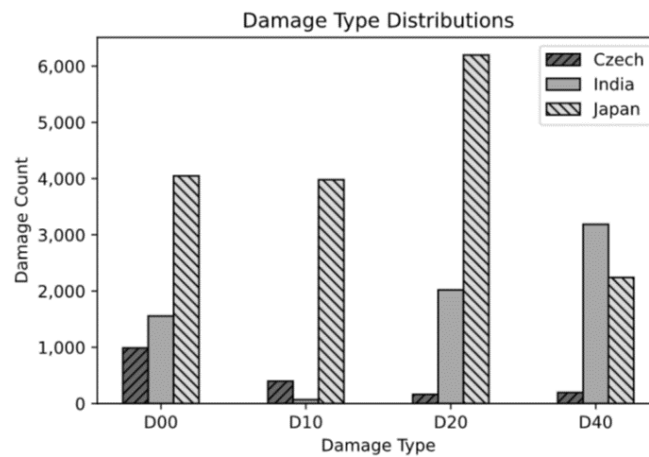


Figure 1. Damage type distributions over three countries (Czech, India, and Japan)

The X101-FPN base model for Faster R-CNN with Detectron2's default configuration gives them the most efficient result, which provides F1 scores of 51.0% and 51.4%, respectively, for the test1 and test2 sets of the challenge. They also evaluated the results against the existing annotations and came across some inconsistencies. Therefore, they suggested strategies to improve the labeling process for the dataset.

Nevertheless, the model can make a mistake in prediction like the below picture. Also, Faster R-CNN is not state-of-the-art in object detection, which cannot predict polygon shape. So, it doesn't show us the shape of the damage.



Figure 1. Error in road damage type prediction by a machine learning model

REFERENCES

- [1] Pham, V., Pham, C., & Dang, T. (2020). Road Damage Detection and Classification with Detectron2 and Faster R-CNN. arXiv preprint arXiv:2010.15021.