2.10 Road Damage Detection and Classification Using Deep Neural Networks with Smartphone Images

The research in this paper was done on damage detection or automatic road surface inspection with a large scale of 9053 damaged road images and 15,435 instances of road surface damage. The dataset was accessible by the public for privacy matters. SSD's setup uses Inception V2 and SSD using mobile-net, where the initial learning rate is 0.003 with a learning rate decay of 0.95 every 10000 iterations. Different types of class names of damages like D00 D01, D10, D11, D20, D40, D43, D44 were present and the accuracy were different from each other.

	D00	D01	D10	D11	D20	D40	D43	D44
Recall of SSD Inception V2	0.22	0.60	0.10	0.05	0.68	0.03	0.81	0.62
Precision of SSD Inception V2	0.73	0.84	0.99	0.95	0.73	0.67	0.77	0.81
Accuracy of SSD Inception V2	0.78	0.80	0.94	0.92	0.85	0.95	0.95	0.83
Recall of SSD MobileNet	0.40	0.89	0.20	0.05	0.68	0.02	0.71	0.85
Precision of SSD MobileNet	0.73	0.64	0.99	0.95	0.68	0.99	0.85	0.66
Accuracy of SSD MobileNet	0.81	0.77	0.92	0.94	0.83	0.95	0.95	0.81

Figure 1. Detection and classification results for each class

Here, MobileNet is a neural network used for classification and recognition, and SSD is a framework to detect some object. Both of them work for object detection.

Though the work is excellent, where the result returns a bounding box, and the classes are too limited because there might be different types of damages with different shapes, this will not handle all of them with different instances. That is where this model lacks.

REFERENCES

[1] Maeda, H., Sekimoto, Y., Seto, T., Kashiyama, T., & Omata, H. (2018). Road damage detection and classification using deep neural networks with smartphone images. Computer-Aided Civil and Infrastructure Engineering, 33(12), 1127-1141.