

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

The research was 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. In this article, the data set 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 the class name of the damages like D00 D01, D10, D11, D20, D40, D43, D44, and the accuracy were different from each other.

	<i>D00</i>	<i>D01</i>	<i>D10</i>	<i>D11</i>	<i>D20</i>	<i>D40</i>	<i>D43</i>	<i>D44</i>
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 the 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.

Reference:

- [1] Maeda, H., Sekimoto, Y., Seto, T., Kashiyaama, 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.