Transfer Learning-based Road Damage Detection for Multiple Countries

This paper contributes in using the Japanese road damage detection model in other countries with transfer learning. The authors also provide a large road damage dataset of 26620 images. They introduced a generalized model for detecting and classifying damaged roads for many countries.

At first, they created a localized damaged road dataset by adding 3590 images from roads of Czech and 9892 images from roads of India together, which are captured using smartphones. Next, they labeled those images for crack and pothole and then mixed them with the Japanese road dataset.

After that, the dataset was trained and evaluated on sixteen different deep neural network models in thirty scenarios on various combinations of the train and test datasets. Recommendations for other countries were provided based on the result from the evaluation.

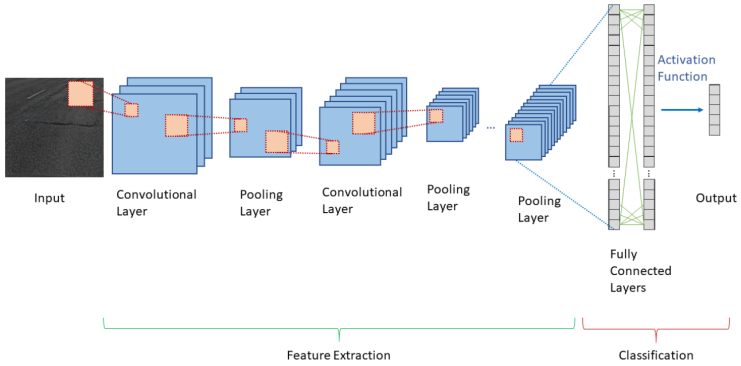

Figure 1. Typical CNN Architecture

SSD MobileNet is adopted in this paper as it is small, has low latency, and uses fewer resources. Using its convolutional feature extractor task of classification, detection and segmentation can be performed.

Figure 1. Predicted Labels for Sample Images

This study also uses bounding box annotation, which doesn't give the precise shape or details of the damaged road.

References:

[1] Arya, D., Maeda, H., Ghosh, S. K., Toshniwal, D., Mraz, A., Kashiyama, T., & Sekimoto, Y. (2020). Transfer Learning-based Road Damage Detection for Multiple Countries. *arXiv preprint arXiv:2008.13101*.