Realization of detection of illegal sidewalk-riding by specific small motorized bicycles using generated images for transfer learning with diffusion models and image segmentation

Primary Researcher: Tetsuya Manabe
Assistant Professor, Saitama University

In this research project, we propose and evaluate an efficient training data generation method using a diffusion model and image segmentation in order to suppress illegal sidewalk-riding by specific small motorized bicycles. Specifically, the proposed method uses a diffusion model to (1) remove vehicle objects that lead to incorrect identification and (2) supplement images of background areas, respectively, in contrast to the conventional method that generates training images by viewpoint conversion images obtained from roadway driving. In (1), the time required to generate training data per image increased compared to the conventional method, but the addition of the vehicle object image completion to the viewpoint conversion algorithm improved the identification performance of the riding environment. In (2), the training data generation time was shorter than that of the conventional method. These results contribute to the realization of detecting illegal sidewalk-riding by specific small motorized bicycles using generated images for tranfer learning with diffusion models and image segmentation.