

Bootstrapping Road Sign Detection for Self-Driving Cars using Weakly-Supervised Learning

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Given the escalating trend in the number of cars on the public roads, advanced autonomous driver-assistance systems become more accessible to the masses in order to keep safe all the traffic participants. Bosch Future Mobility Challenge is an IEEE ITSS certified contest that encourages students to develop complete autonomous driving solutions for scaled vehicles in controlled real-life scenarios. This work addresses the problem of traffic signs detection

constrained by running in a minimal embedded platform. Our solution consists of the generation of a synthetic object detection dataset using CARLA Simulator, a popular self-driving car virtual environment, enhancing it with image augmentation policies and bootstrapping the model performance by using knowledge distillation from a model ensemble. We make use of modern weakly supervised techniques to minimize labelling noise and achieve a fast, predictive, high-precision model that performs well in real-life scenarios. The model is integrated with ease into real-time applications that run on embedded platforms. Our proposed computer vision solution that powered the scaled self-driving car achieved third place at the Bosch Future Mobility Challenge 2022.

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