



Sampling Useful Synthetic Data for UAV Object Detection

Recent findings have shown that model performance for object detection can be improved by using training data from virtual environments, e.g. computer games like GTA V. The goal of this work is to leverage this finding to build an end-to-end training system for object detection (particularly person detection) from UAVs with procedurally generated training data from a virtual environment. In particular, the capability of virtual environments to easily produce ground truth labels shall be used to generate the most informative training data. In this context, the model loss will be used as a metric for information content.

The plan for this work is as follows: The so-called DeepGTA V framework will be adapted for UAV imaging. Then, some randomly sampled training data will be produced and used to train a model architecture which has been proven to work in other contexts (e.g. YOLO (v4), Faster R-CNN, SSD). An interface, which allows the training process to interact with the data generation process, will be implemented. The hypothesis that randomly sampling (e.g. let an agent fly at random altitudes, random locations with random angles) is inferior to heuristic sampling (such as exploring areas with higher loss) will be tested. This will be done by implementing a system that improves the data generation process by producing “information rich” training samples. The final models will be tested on a real and a synthetic test set in order to evaluate the advantage of either approach.

The goals of this work are: generating a dataset for object detection (in particular people) from UAV perspective from a virtual environment, using this dataset to train a model architecture for object detection from the literature and improving the data generation process from simple random sampling in the virtual environment.



Kontakt

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