A Fine-Grained Dataset and its Efficient Semantic Segmentation for Unstructured Driving Scenarios

ICPR 2020 Poster on ”Computer Vision, Robotics and Intelligent Systems”

Kai A. Metzger, Peter Mortimer, and Hans-Joachim Wuensche

Institute for Autonomous Systems Technology (TAS)
Department of Aerospace Engineering
University of the Bundeswehr Munich

10.12.2020

Motivation

Legend

- ego vehicle
- asphalt
- gravel
- soil
- low grass
- high grass
- bush
- tree trunk
- tree crown
- forest
- misc. veg.
- crops
- fence
- pole
- misc. sign
- traffic sign
- car
- person
- rider
- truck
- building
- obstacle
- wall
- sky
- water

Legend

- ego vehicle
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- sky
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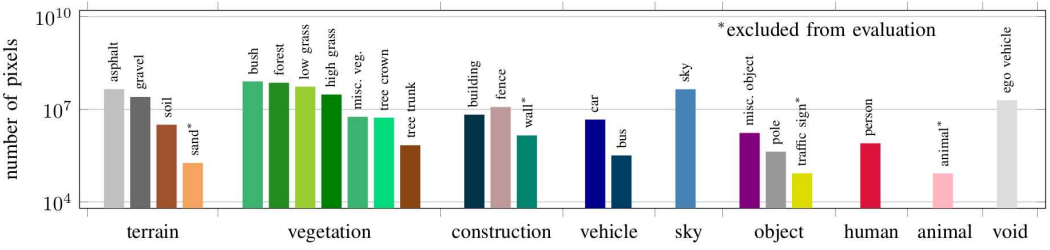
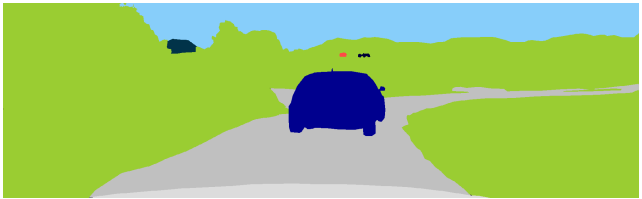


Class Distribution in the TAS500 dataset.

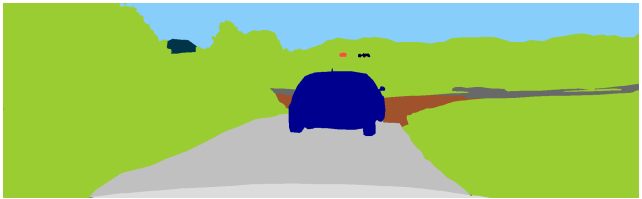
Fine-Grained Semantic Segmentation



Legend

ego vehicle ( )
building ( )
car ( )
animal ( )
obstacle ( )
sky ( )
vegetation ( )
road ( )

Fine-Grained Semantic Segmentation



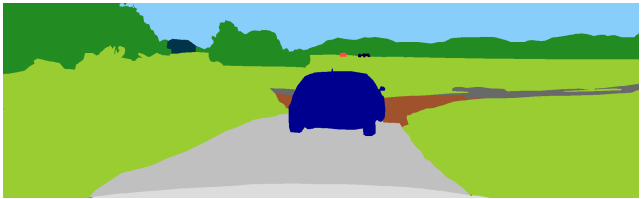
Legend

ego vehicle ( )
building ( )
car ( )
animal ( )
obstacle ( )
sky ( )

vegetation ( )

asphalt ( )
gravel ( )
soil ( )

Fine-Grained Semantic Segmentation



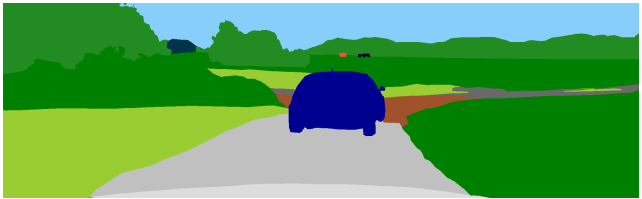
Legend

ego vehicle
building
car
animal
obstacle
sky

drivable veg.
non-driv. veg.

asphalt
gravel
soil

Fine-Grained Semantic Segmentation



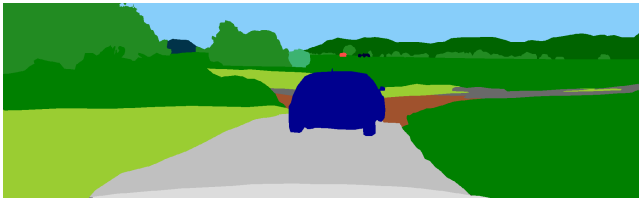
Legend

ego vehicle
building
car
animal
obstacle
sky

low grass
high grass
non-driv. veg.

asphalt
gravel
soil

Fine-Grained Semantic Segmentation



Legend

ego vehicle
building
car
animal
obstacle
sky

low grass
high grass
bush
forest
misc. veg.

asphalt
gravel
soil

Fine-Grained Semantic Segmentation

# Klassen	Level of granularity	Val mIoU (%)	Val mBJ (%)
14	Baseline (terrain, vegetation)	53.00	52.79
17	Terrain → *asphalt*, *gravel*, *soil*, *sand*	53.54 (+0.54)	**54.29 (+1.50)**
18	Vegetation → *drivable*, *non-drivable*	**54.77 (+1.77)**	53.56 (+0.77)
19	Drivable vegetation → *low grass*, *high grass*	52.30 (-0.70)	42.88 (-9.91)
23	Non-drivable vegetation → *bush*, *forest*, *misc. vegetation*, *tree crown*, *tree trunk*	49.70 (-3.30)	50.12 (-2.67)

Validation Performance of the Fast-SCNN network for different levels of granularity.

Fine-Grained Semantic Segmentation

Thank you for your attention!

The TAS500 dataset and the pretrained models are available online at www.mucar3.de/icpr2020-tas500.