Information Sheet

The DLR 3K Munich Vehicle Aerial Image Dataset

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Introduction

This is the dataset used in the paper K. Liu and G. Mattyus: Fast Multiclass Vehicle Detection on Aerial Images, Geoscience and Remote Sensing Letters, IEEE, Volume:PP , Issue: 99. If you use this datasets or our results on this dataset please cite this paper:

```
@ARTICLE{ Liu_Mattyus2015,
author={Liu, K. and Mattyus, G.},
journal={Geoscience and Remote Sensing Letters, IEEE},
title={Fast Multiclass Vehicle Detection on Aerial Images},
year={2015},
month={},
volume={PP},
number={99},
pages={1-5},
keywords={Detectors;Feature
extraction;Histograms;Roads;Training;Vehicle
detection;Vehicles;Classification;near real-time;vehicle
detection},
doi={10.1109/LGRS.2015.2439517},
ISSN={1545-598X},}
```

In the paper we used only two vehicle classes, the ‘car’ and the ‘truck’.

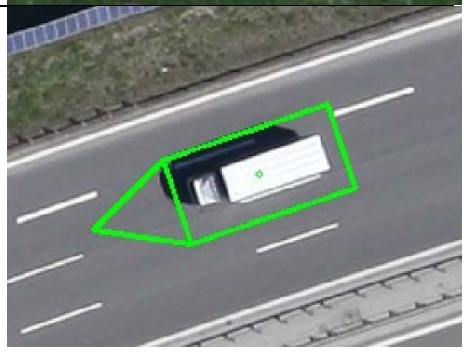
The images

The DLR Munich Vehicle dataset was collected over the city Munich, Germany. Figure 1 shows one of these aerial images. The images were captured from an airplane by a Canon Eos 1Ds Mark III camera with a resolution of 5616*3744 pixels, 50 mm focal length and they are stored in JPEG format. The optical image is taken at a height of 1000 meters above ground, the ground sampling distance is approximately 13cm.

Figure 1: An example image

Vehicle Annotation

Annotated vehicles are categorized into several types, for instance car, truck, bus, etc. The table below lists different types that are included in the dataset.

Type	Sample Filename Trailing	Type ID	Sample
car	pkw	10	
car with trailer	pkw_trail	11	
truck	truck	22	

truck with trailer	truck_trail	23	
van with trailer	van_trail	17	
long truck	cam	20	
bus	bus	30	

Sample File Format

Each image comes along with its sample descriptor files (*.samp). The trailing of the descriptor filename indicates the corresponding type the file contains. Following shows an example from a sample descriptor file, it consists of three parts: **Header**, **Comment** and **Sample Data**.

```
@CATEGORY:GENERAL
@IMAGE:2012-04-26-Muenchen-Tunnel_4K0G0130.JPG
# format: id type center.x center.y size.width size.height angle
0 22 4582 1636 47 23 -147.673860
1 22 3518 1814 41 20 -0.427573
2 22 158 20 23 11 -86.235965
3 22 4384 1828 35 17 -0.511556
```

- **Header**
  Begin with @
  @CATEGORY: The value [POSITIVE|NEGATIVE|GENERAL] indicates this sample descriptor file category.
  @IMAGE: Corresponding image filename

- **Comment**
  Begin with #, usually used to describe the sample data structure

- **Sample Data**
  Each line describes an image object, i.e. a rotated rectangle. It contains 7 fields: **id**, **type center.x**, **center.y**, **size.width**, **size.height** and **angle**.

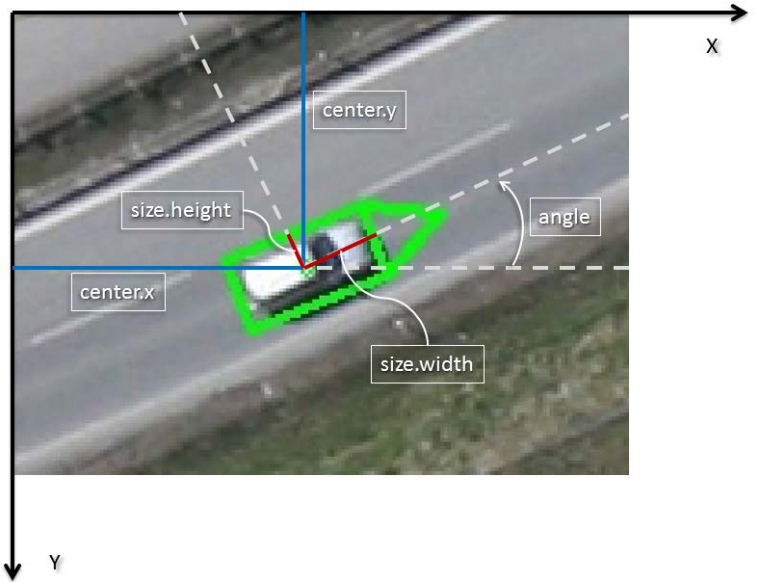


Figure 2: Example image with value overlay

Field	Data Type	Description
Id	int	The order in this sample descriptor file, starting with 0
Type	int	Indicates what class of object it is, 0 is for background, 1 is general object, vehicles on land should be from 2 to 99
center.x, center.y	int	The center x (or y) of the object in pixel coordinates
size.width, size.height	int	Half of the width (or height) of the object in pixels
Angle	float	The angle in degrees of the object in counterclockwise direction. 0 is the x axis, the y axis (upwards) is 90 degree. The range is (-180, 180]