

Explicit Occlusion Modeling for 3D Object Class Representations

Supplementary Material

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1. 3D Deformable Geometric model

The 3D deformable wireframe model (for the car class) that we use for the second layer is shown in Fig. 1. In our current implementation the topology of the wireframe is pre-defined (manually defined for each object class, similar to [1, 3, 2]) and its vertices are chosen manually on the 3D CAD models. Please refer to Sec. 3.2 of our paper for discussion of how this model is used in our system.

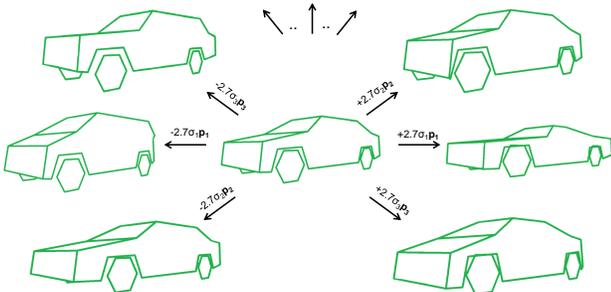


Figure 1. Coarse 3D wireframe representations of car. Modes of variation along the first three principal component directions.

2. Local part appearances

We render 3D CAD models (see Fig. 2), and extract patches around the annotated part locations (shown as green boxes). These patches are then encoded with densely sampled shape-context descriptors, and used to train a multi-class Random Forest as discussed in Sec. 3.1 of the paper.



Figure 2. Non-photorealistic renderings for local part shape detector training. Green boxes denote positive training examples.

3. Complete set of part configuration detectors

We have a set of 118 part configuration detectors which are single-component DPM detectors trained over annotated training images, and discussed in Sec. 3.1 of our paper. Fig. 3 shows one of the training exemplars for each of these part configurations.

4. Complete set of occlusion masks

In our experiments we use a set of 288 occlusion masks, which are all shown in Fig. 4. Please refer to Sec. 3.3 of the paper for a detailed discussion.

References

- [1] Y. Xiang and S. Savarese. Estimating the aspect layout of object categories. *CVPR 2012*.
- [2] M. Z. Zia, M. Stark, B. Schiele, and K. Schindler. Detailed 3d representations for object recognition and modeling. *PAMI*, 2013.
- [3] M. Z. Zia, M. Stark, K. Schindler, and B. Schiele. Revisiting 3D geometric models for accurate object shape and pose. *3dRR 2011*.



Figure 3. Individual examples for each of 118 part configurations used in our experiments.

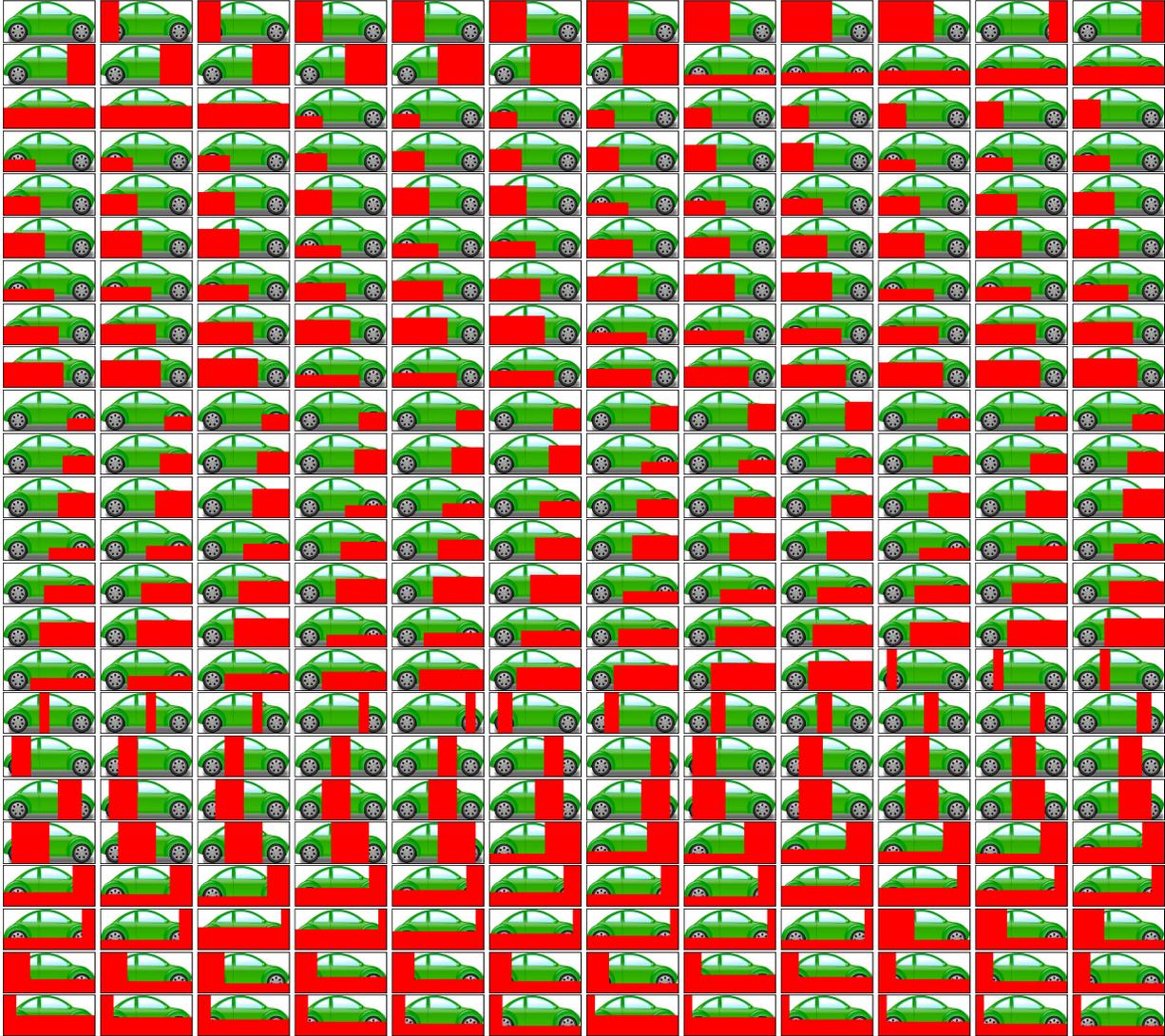


Figure 4. Complete set of 288 occlusion masks used in our experiments.