3D Shape Reconstruction (adopted from an ICCV'17 challenge)

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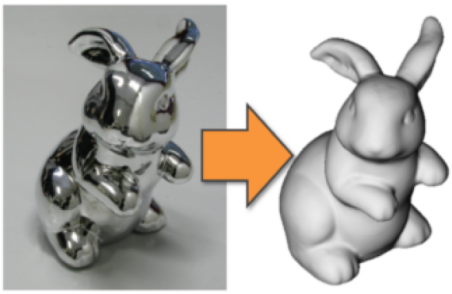

Figure 1: Converting a single 2D image into a 3D shape

1 Introduction

In recent years we have witnessed an explosion in the amount of 3D data that we can generate and store. On one hand, better 3D modeling tools have enabled designers to build 3D models easily, resulting in an expansion in the size of 3D CAD model repositories. On the other hand, commodity depth sensors have allowed ordinary people to conveniently capture their own 3D scans. We need good techniques for leveraging such 3D content, in order to design algorithms that successfully understand our 3D world. However, due to fundamental challenges in dealing with 3D representations and processing, there are still many open research issues. Two key research problems are: (1) 3D shape reconstruction based on a single image, and (2) shape part level segmentation. Existing algorithms are usually evaluated on small datasets with a few hundreds of models, even though millions of 3D models are now available on the Internet. Thanks to the efforts of the ShapeNet [1], we can now use a much larger and varied repository of 3D models to develop and evaluate new algorithms in computer vision and computer graphics. In this track, we focus on the first problem,

aiming to evaluate the performance of 3D reconstruction based on single image on a subset of the ShapeNet dataset.

2 Datasets

In the 3D reconstruction challenge, the task is defined as reconstructing a 3D shape, given a single image as input. We use the ShapeNetCore subset of ShapeNet which contains about 48,600 3D models over 55 common categories. There is a 70%/10%/20% training/validation/test split from this dataset and voxels are used as the output 3D representations.

3 Links

Datasets and evaluation code are available at `https://shapenet.cs.stanford.edu/iccv17/`.

References

[1] A. X. Chang, T. Funkhouser, L. Guibas, P. Hanrahan, Q. Huang, Z. Li, S. Savarese, M. Savva, S. Song, H. Su, *et al.*, "Shapenet: an information-rich 3d model repository," *arXiv preprint arXiv:1512.03012*, 2015.