A Large-Scale 3D Object Recognition dataset - DTU Orbit (11/05/2019)

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This paper presents a new large scale dataset targeting evaluation of local shape descriptors and 3d object recognition algorithms. The dataset consists of point clouds and triangulated meshes from 292 physical scenes taken from 11 different views; a total of approximately 3204 views. Each of the physical scenes contain 10 occluded objects resulting in a dataset with 32040 unique object poses and 45 different object models. The 45 object models are full 360 degree models which are scanned with a high precision structured light scanner and a turntable. All the included objects belong to different geometric groups; concave, convex, cylindrical and flat 3D object models. The object models have varying amount of local geometric features to challenge existing local shape feature descriptors in terms of descriptiveness and robustness. The dataset is validated in a benchmark which evaluates the matching performance of 7 different state-of-the-art local shape descriptors. Further, we validate the dataset in a 3D object recognition pipeline. Our benchmark shows as expected that local shape feature descriptors without any global point relation across the surface have a poor matching performance with flat and cylindrical objects. It is our objective that this dataset contributes to the future development of next generation of 3D object recognition algorithms. The dataset is public available at http://roboimagedata.compute.dtu.dk/.

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