Object Recognition using constraints from Primitive Shape Matching

Abstract:
In this paper, an object recognition and pose estimation approach based on constraints from primitive shape matching is presented. Additionally, an approach for primitive shape detection from point clouds using an energy minimization formulation is presented. Each primitive shape in an object adds geometric constraints on the object's pose. An algorithm is proposed to find minimal sets of primitive shapes which are sufficient to determine the complete 3D position and orientation of a rigid object. The pose is estimated using a linear least squares solver over the combination of constraints enforced by the primitive shapes. Experiments illustrating the primitive shape decomposition of object models, detection of these minimal sets, feature vector calculation for sets of shapes and object pose estimation have been presented on simulated and real data.

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