

CorNet

Generic 3D Corners for 6D Pose Estimation of New Objects without Retraining

Giorgia Pitteri
University of Bordeaux

October 28th, 2019
5th workshop on Recovering 6D Object Pose

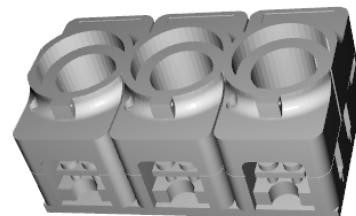
Joint work with: Slobodan Ilic and Vincent Lepetit



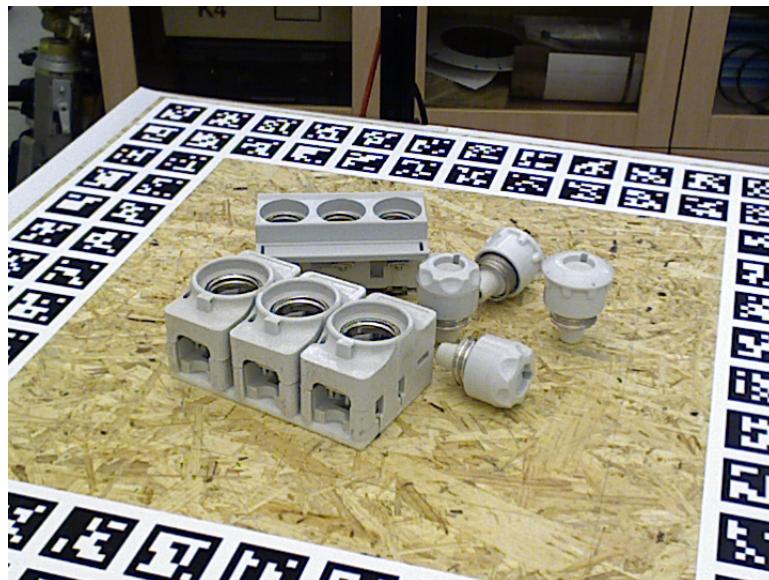
Motivation

Input data

CAD Model of the new object

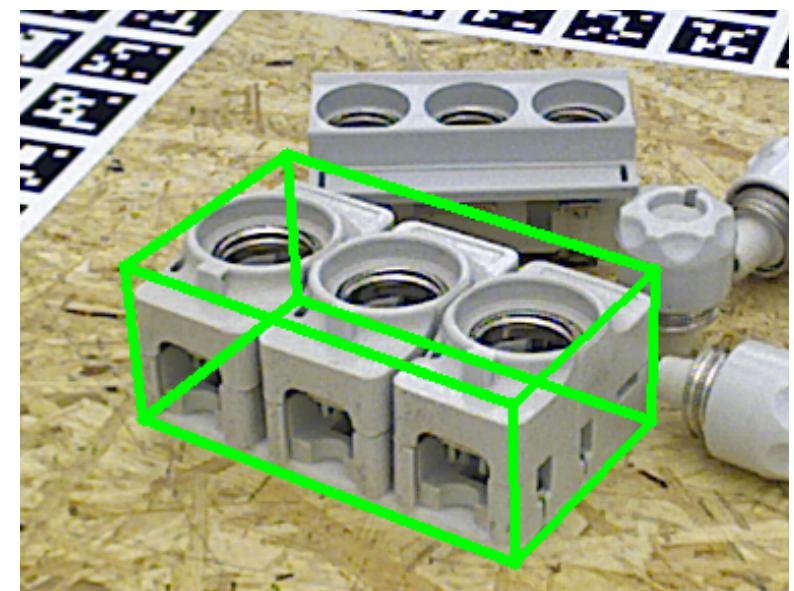


Test image

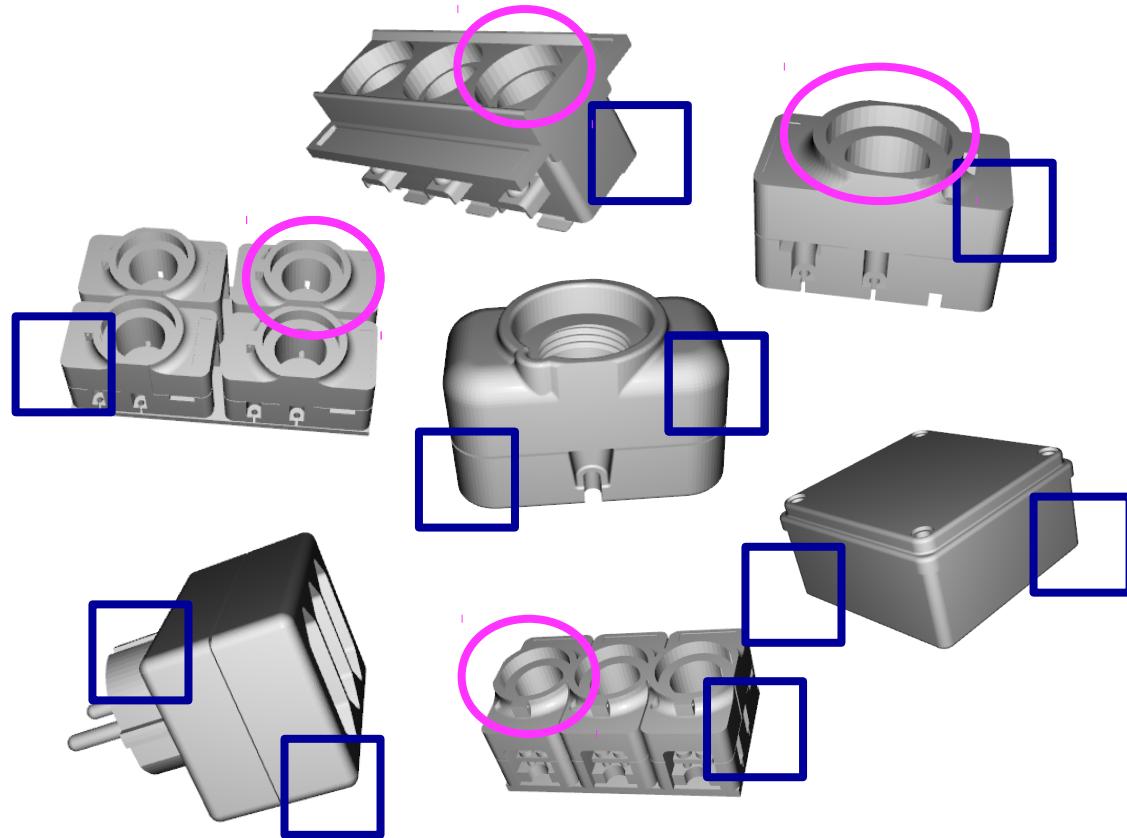


Objective

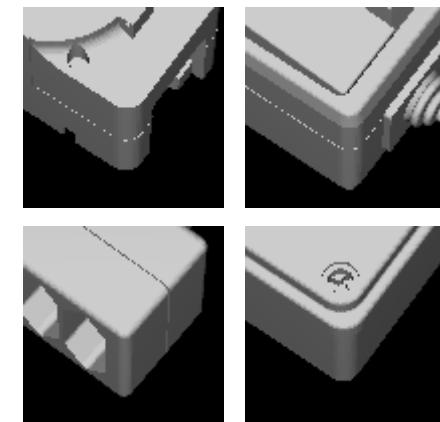
3D Pose Prediction without
training images



Idea



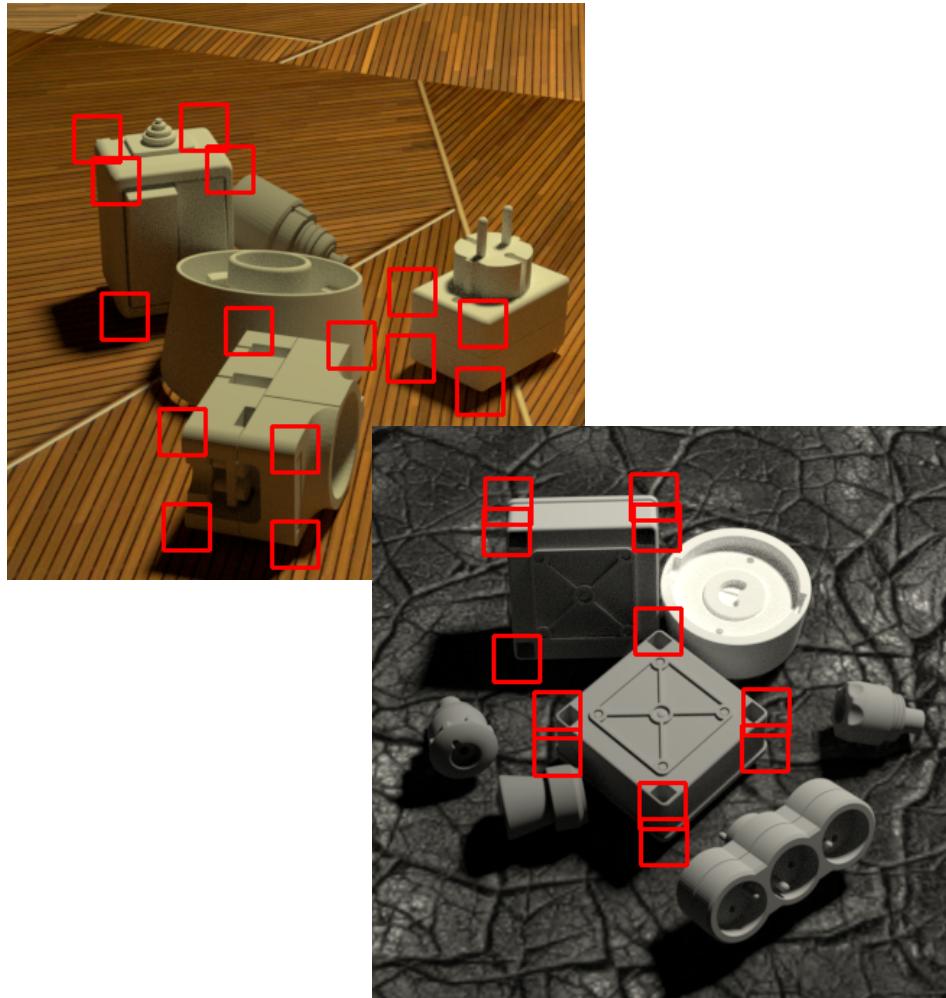
We focus on corners!



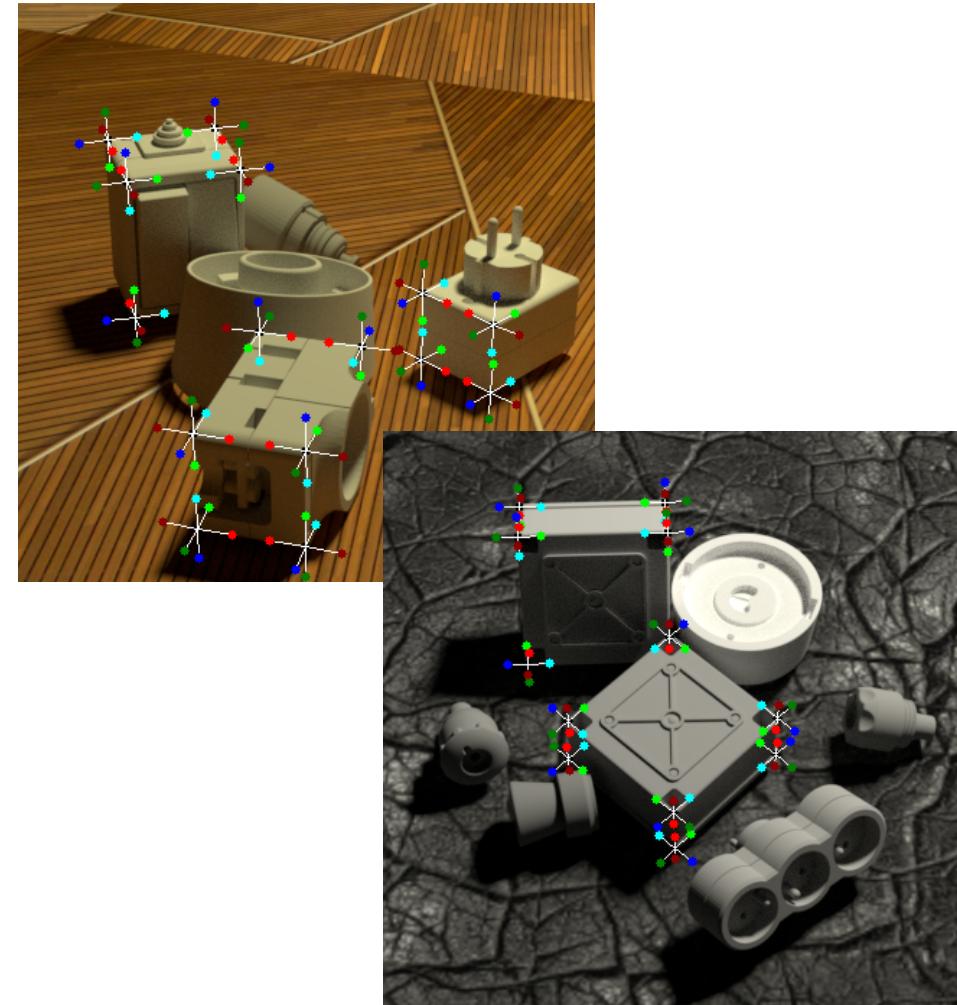
Industrial objects share parts

Training data

We do not only do 2D corners detection

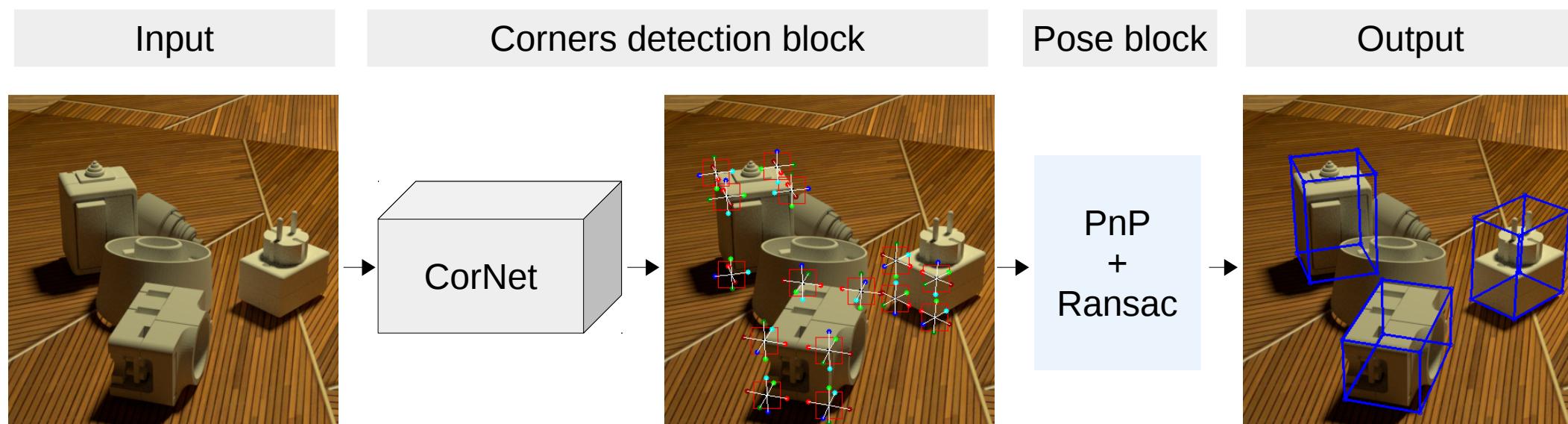


We also do 3D corners pose estimation

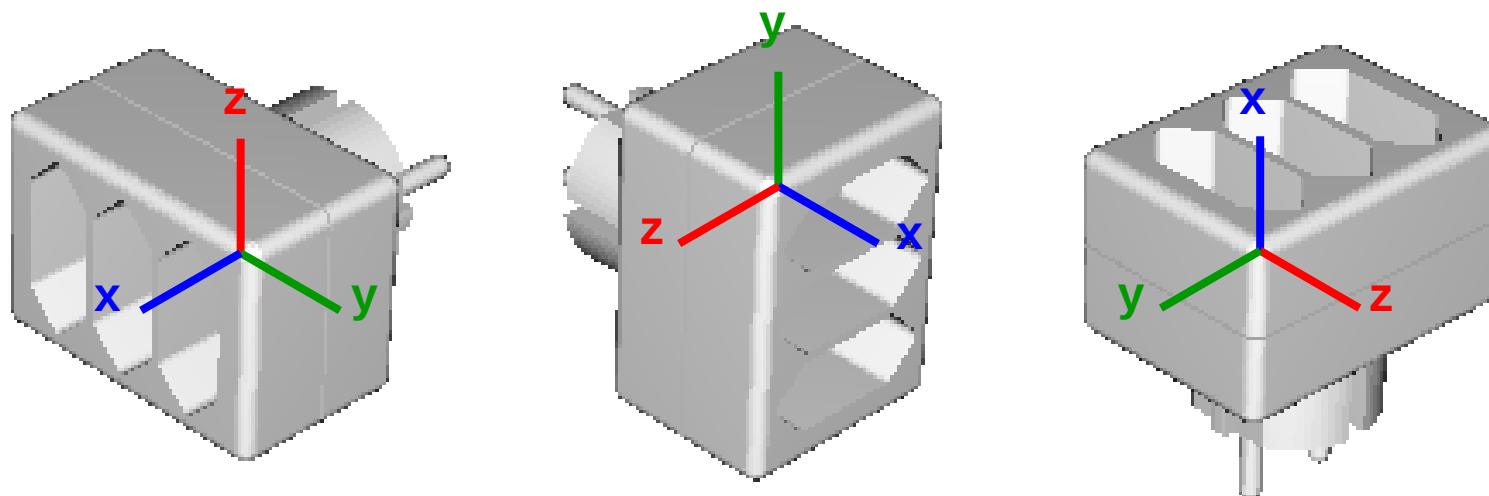


Dataset and code available at <https://github.com/MichaelRamamonijsoa/SyntheT-Less>

Framework



Corners Pose ambiguities (I)



The same corner can look the same under 3 different poses
=

Three possible permutations of control points

Corners Pose ambiguities (II)

- **Inference:** permuting the 2D reprojections of control points by the permutations Σ_1 and Σ_2
- **Training:** we define the following cost function inspired by [1]

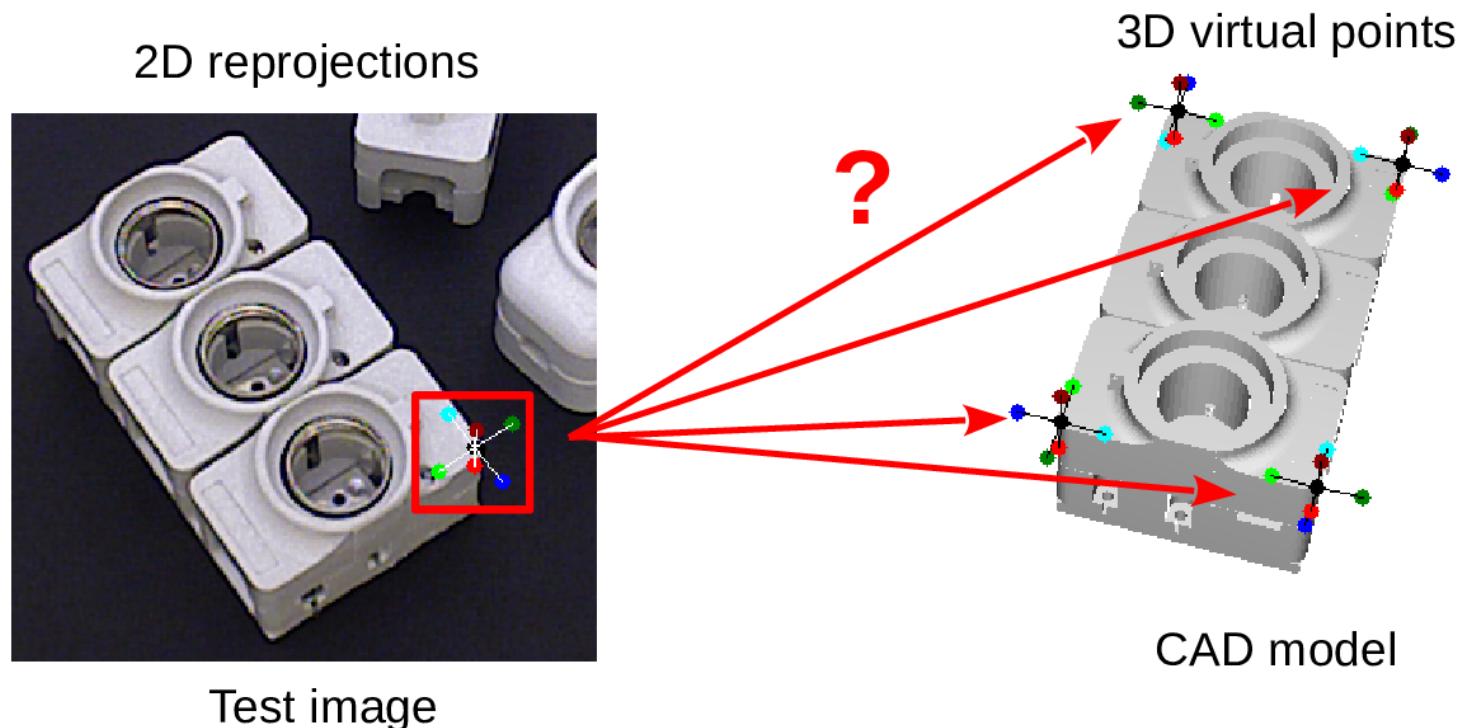
$$loss = \min_{\Sigma \in \{I_d, \Sigma_1, \Sigma_2\}} \|P^{gt} - \Sigma(f_\theta(I))\|$$

three possible permutations ground truth control points locations in 2D predicted control points locations in 2D

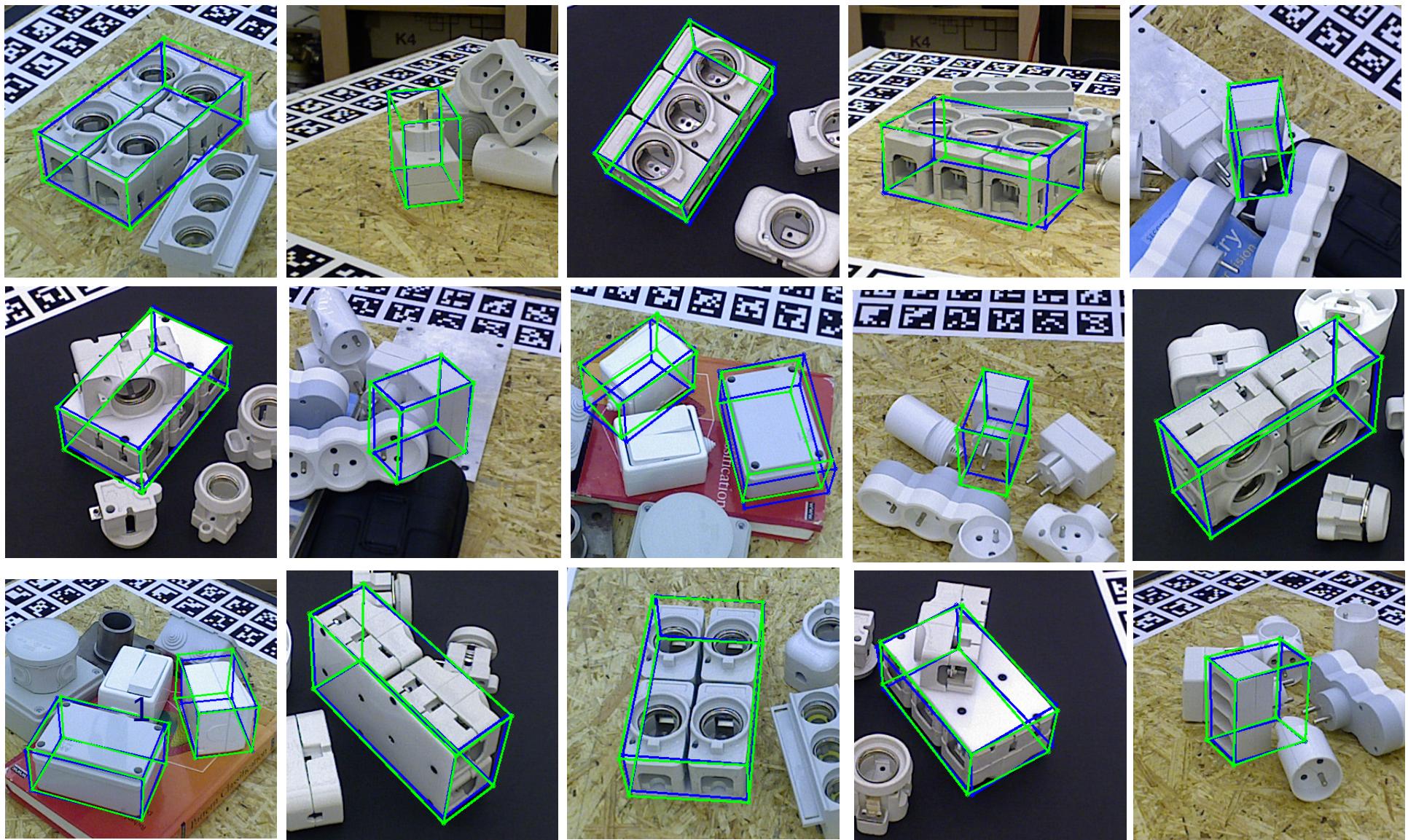
[1] F. Manhardt, D. M. Arroyo, C. Rupprecht, B. Busam, T. Birdal, N. Navab, F. Tombari, *Explaining the Ambiguity of Object Detection and 6D Pose from Visual Data*, ICCV '19

Pose Block

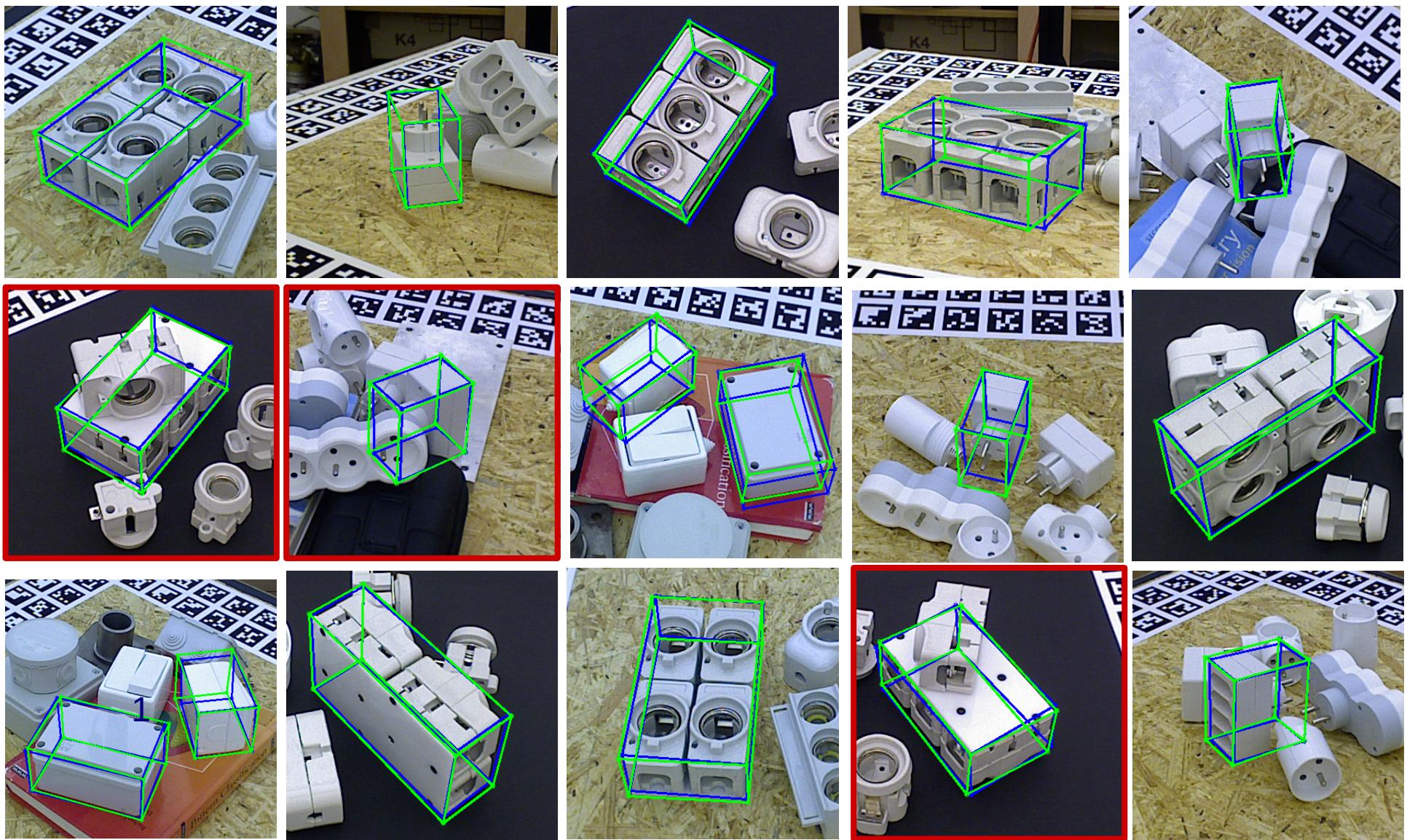
- RANSAC-like pose estimation algorithm by using a PnP algorithm from 2D-3D correspondences



Qualitative Results



Qualitative Results



Thank you!