abstract
In this talk, we address the problem of detection and localization of 3D objects in cluttered scenes. Object exemplars are given in terms of 3D models without any appearance cues. Deformable part-models are trained on clusters of silhouettes of similar poses and produce hypotheses about possible object locations. Objects are simultaneously segmented and verified inside each hypothesis bounding region using the chordiogram descriptor. A final iteration on the 6-DOF object pose minimizes the distance between the selected image contours and the actual projection of the 3D model. While we demonstrated successful grasps based on single images we believe that selection of class and pose could be optimized if we explore the capability of active viewpoint selection. When an initial static detection chase identifies an object of interest, several hypotheses are made about its class and orientation. We plan a sequence of viewpoints, which balances the amount of energy used to move with the chance of identifying the correct hypothesis. We formulate an active hypothesis testing problem, which includes camera mobility, and solve it using a point-based approximate POMDP algorithm. Experiments using a 3D model database and an RGB-D sensor show a significant improvement both in detection and pose estimation. This is joint work with Menglong Zhu, Matthieu Lecce, Cody Phillips, Kosta Derpanis, Nikolay Atanasov, Jerome Le Ny, and George Pappas.

biosketch
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