

Category-Based Task Specific Grasping

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Our approach

Probabilistic approach for task-specific stable grasping of objects with shape variations inside the category.

- ▶ Belongs to the category of grasp synthesis by comparison methods.
- ▶ Does not require a construction of the large training dataset.
- ▶ Does not require full 3D models for new objects
- ▶ Accounts for all training objects in the category during optimization, which assures better generalization.

General framework

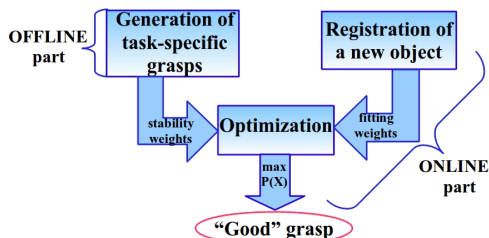


Figure: General framework

- ▶ Model grasps are generated in simulator.
- ▶ Partial point cloud from a single RGB-D image is used in registration.
- ▶ Task-specific grasps are represented by weighted density functions.
- ▶ Numerical optimization is performed.

Experimental results



Figure: Columbia Grasp Database mugs models

- ▶ Training and testing models are from Columbia Grasp Database (categories “mugs” and “tools”).
- ▶ The method outperforms the classical approach based on applying the grasp of the most similar object in a database.
- ▶ The method can generalize for the objects of other subcategories, which share shape similarities with the class in the training set.
- ▶ The approach is currently being validated on a KUKA LBR4+ with a Barrett Hand.