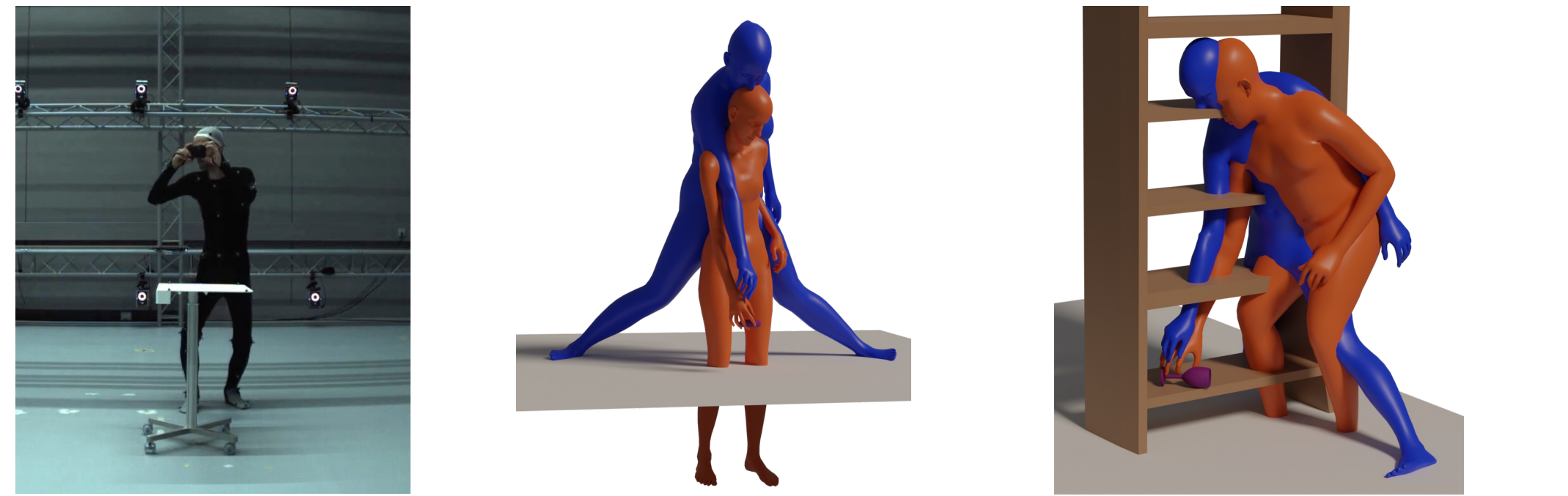# FLEX: Full-Body Grasping Without Full-Body Grasps

Purva Tendulkar   Dídac Surís   Carl Vondrick
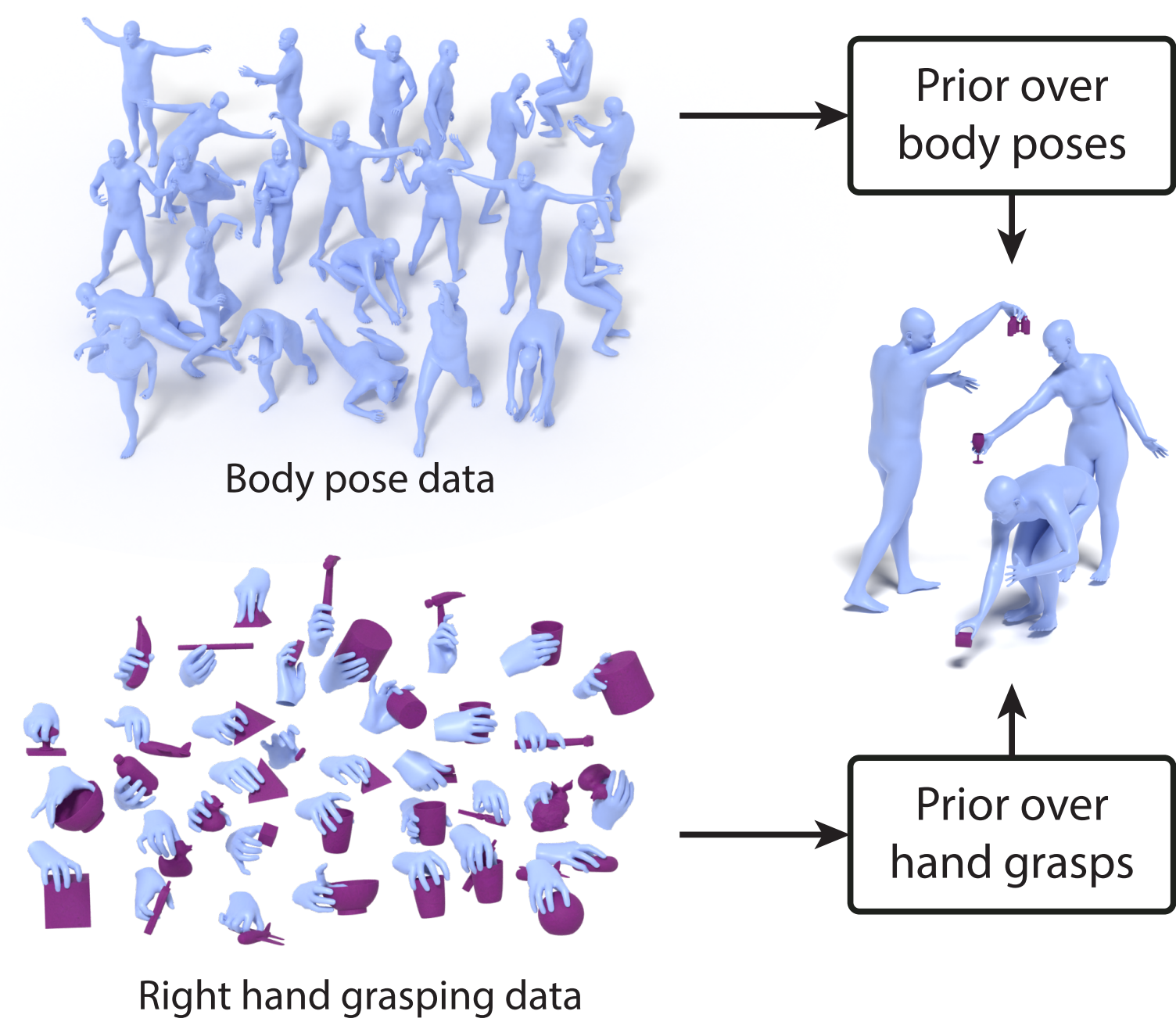
Task and Challenges

Full-body grasping of objects in presence of obstacles.

MoCap Challenges   No Generalization   No Obstacle Consideration

Key Idea

- Full-Body Grasp → Full-Body + Hand-Grasp
- No explicit full-body grasps required for training.

Body pose data

Prior over body poses

Prior over hand grasps

Right hand grasping data

ReplicaGrasp Dataset

Approach

FLEX (**F**ull-Body **L**atent **Ex**ploration) generates a 3D human grasping the desired object, given

1. Pre-trained right-hand grasping model $\mathcal{G}$ that can predict global MANO parameters $\{\theta_h, t_h, R_h\}$
2. Pre-trained full-body pose prior $\mathcal{P}$ that can generate feasible full-body poses θ_b
3. Learnt pose-ground prior which predicts the floor given the human pose θ_b
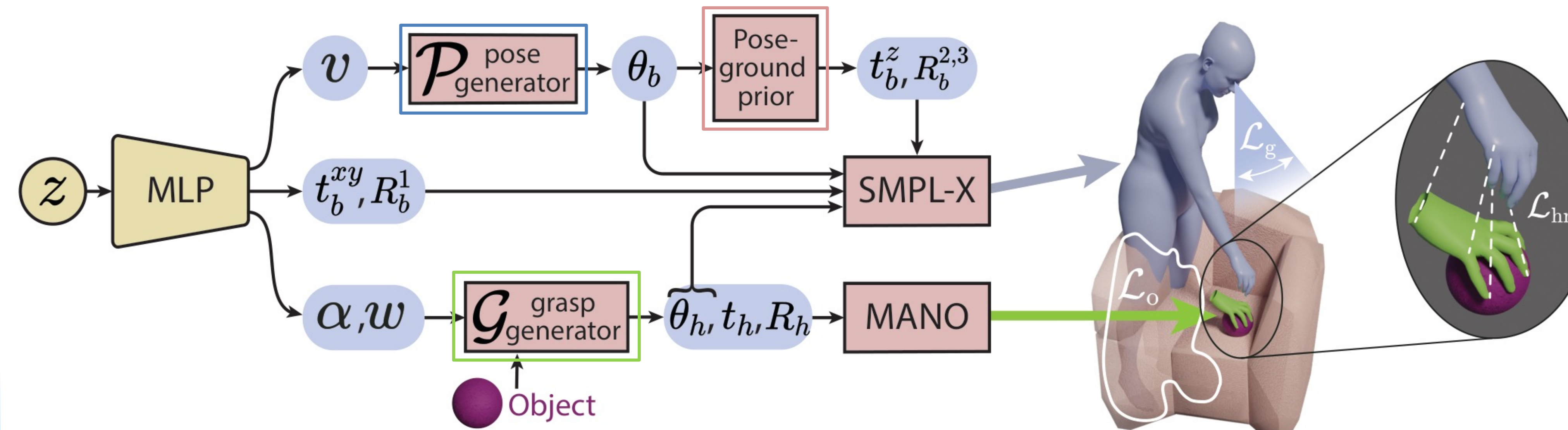
FLEX performs a gradient-based search over hand & body priors to minimize hand-matching and obstacle losses.

Key Insights

- Searching in the latent space of the hand-grasping model $\mathcal{G}$ allows full-body obstacle consideration.
- We penalize *all* vertices in the connected components of the resulting body graph other than the largest one.
- The ground position can be predicted from the body pose. This removes 2 DoFs from the optimization.
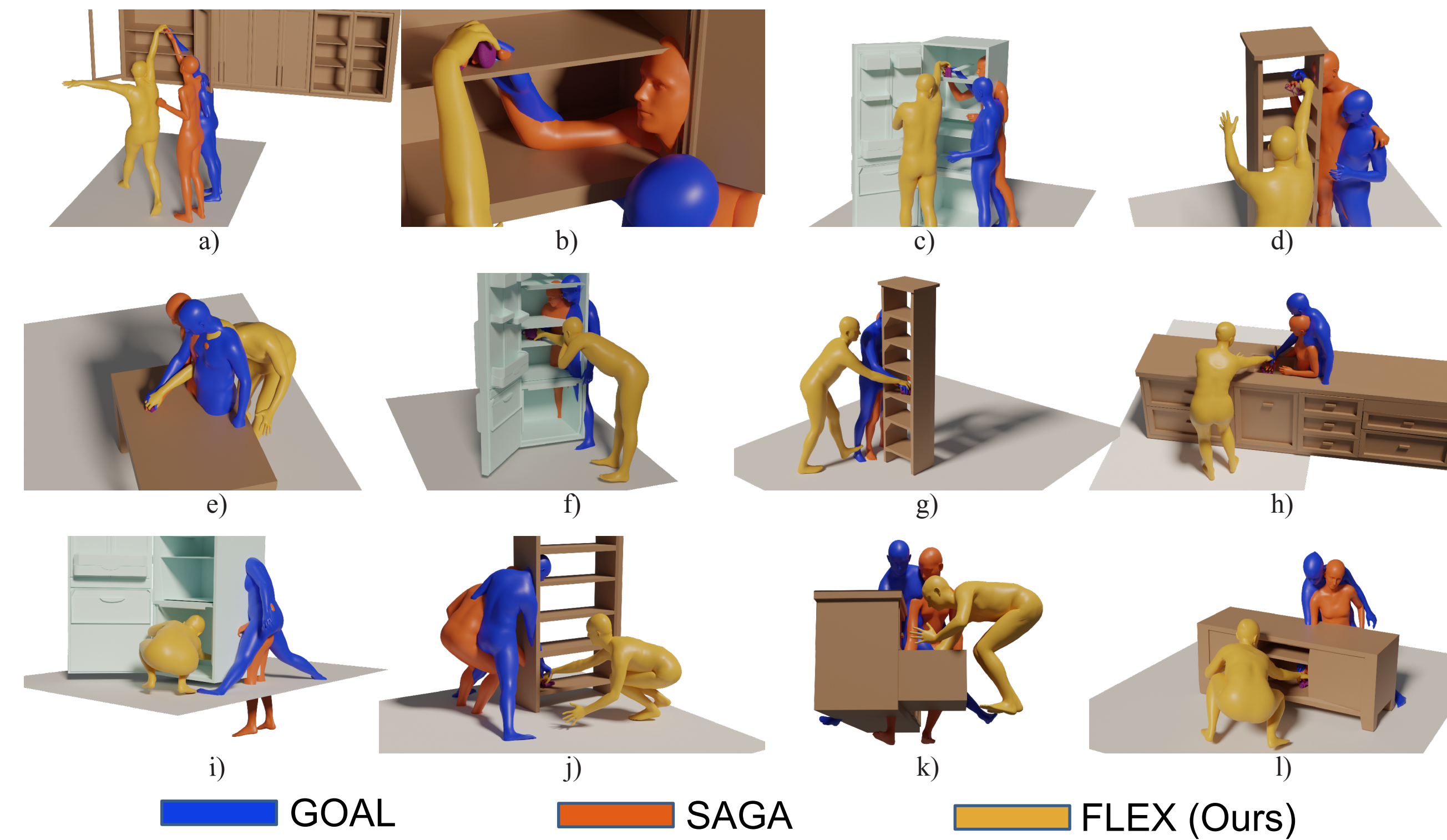

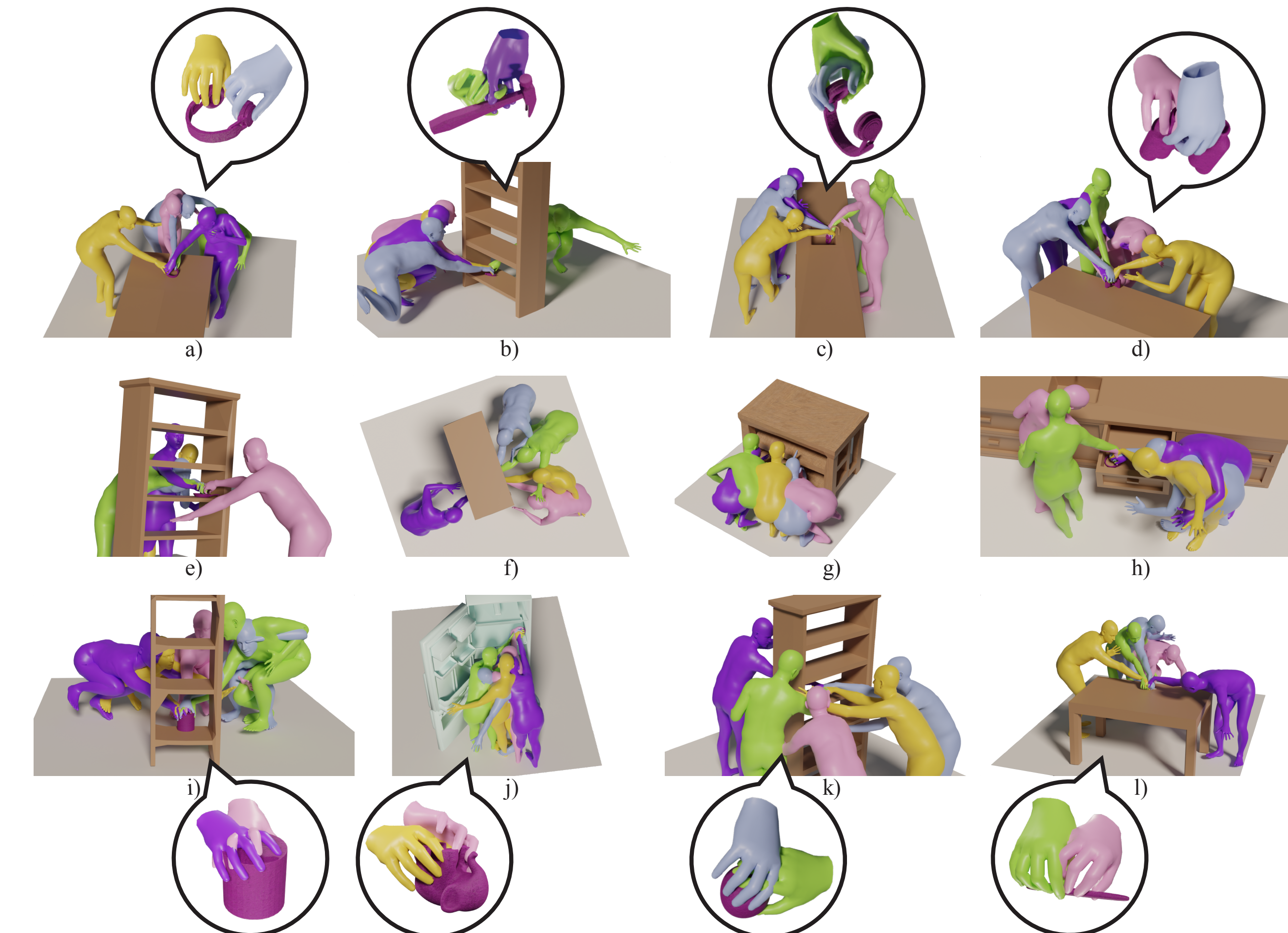Hand-grasp search
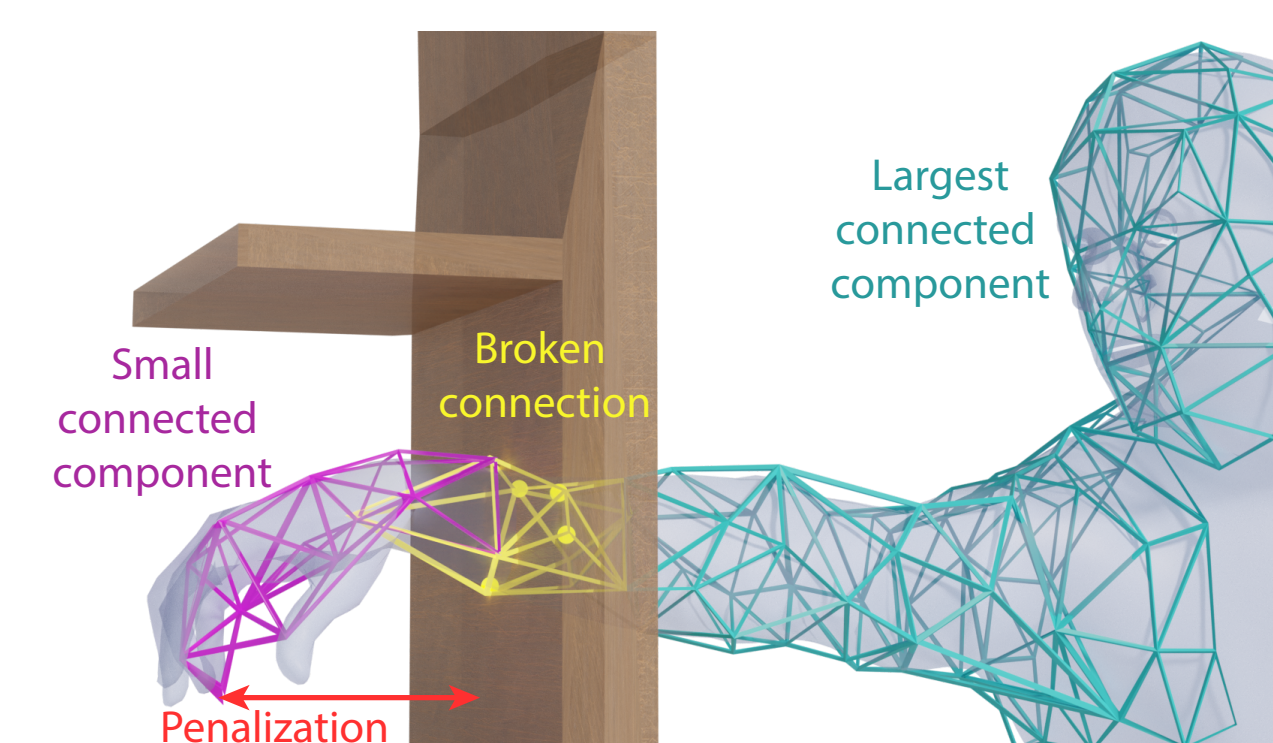
Obstacle avoidance loss
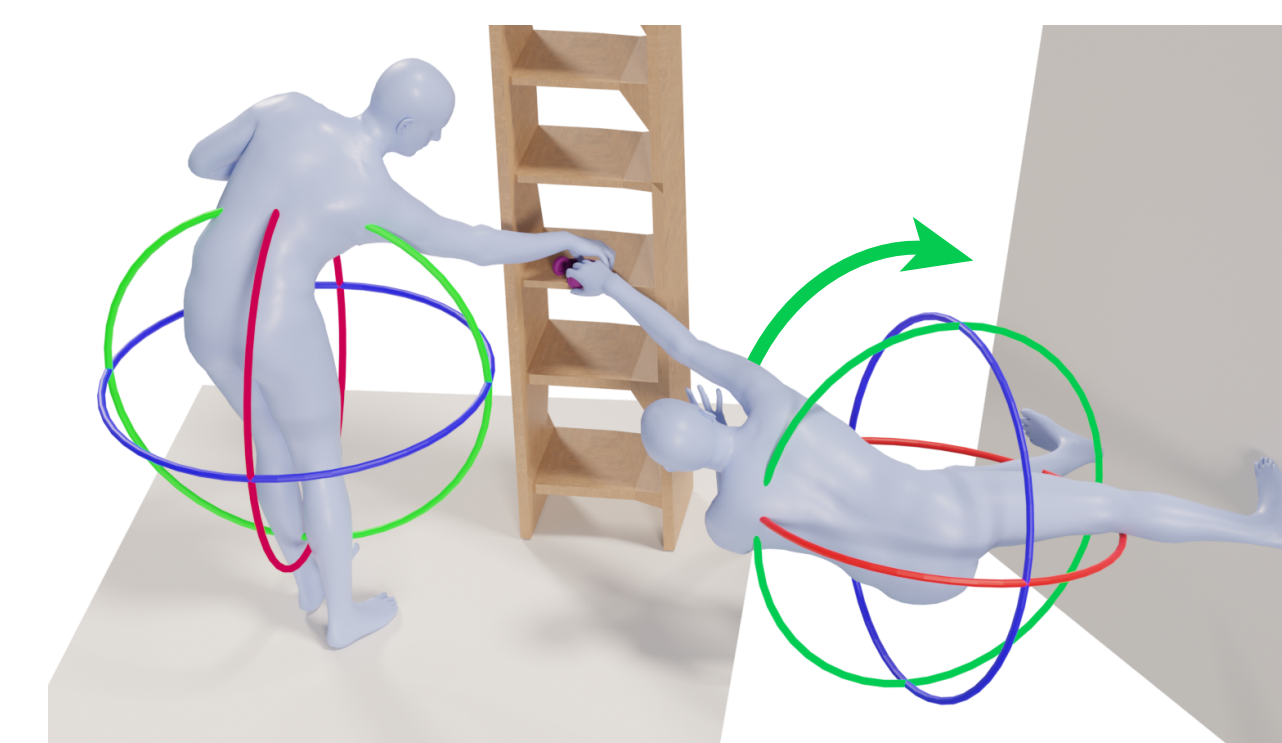
Pose-ground Prior

Comparison Results

GOAL   SAGA   FLEX (Ours)

Diversity Results

All humans are samples from FLEX