

# BiAssemble: Learning Collaborative Affordance for Bimanual Geometric Assembly

International Conference on Machine Learning (ICML) 2025

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(\* denotes equal contribution)



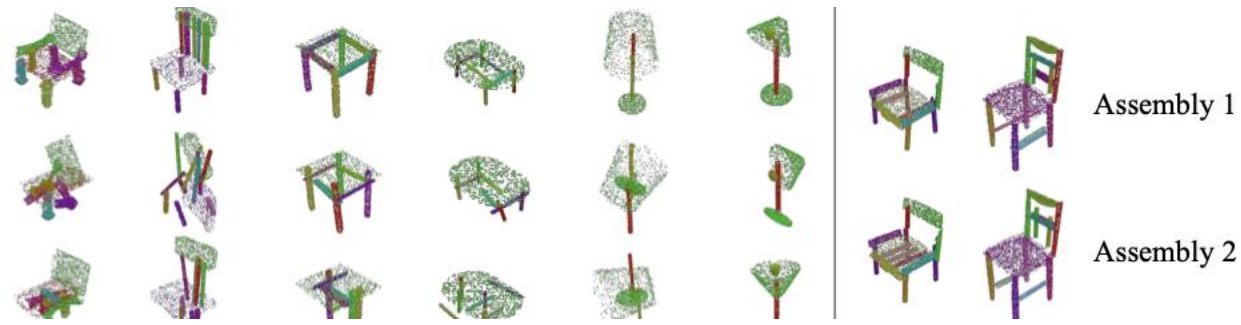
# ICML

International Conference  
On Machine Learning

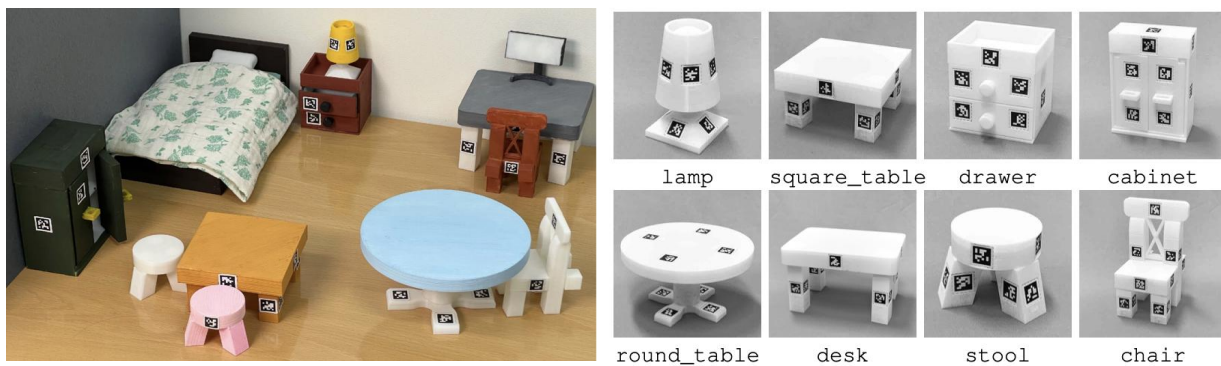


# Performing Geometric Shape Assembly

## Furniture Assembly



Zhan et al., “Generative 3d part assembly via dynamic graph learning”, NeurIPS 2020

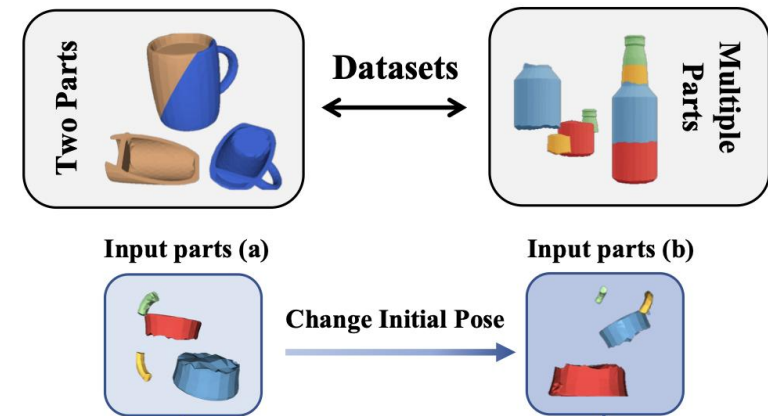


Heo et al., “FurnitureBench: Reproducible Real-World Benchmark for Long-Horizon Complex Manipulation”, RSS 2023

## Geometric Assembly



Sellán et al., “Breaking Bad: A Dataset for Geometric Fracture and Reassembly”, NeurIPS 2022



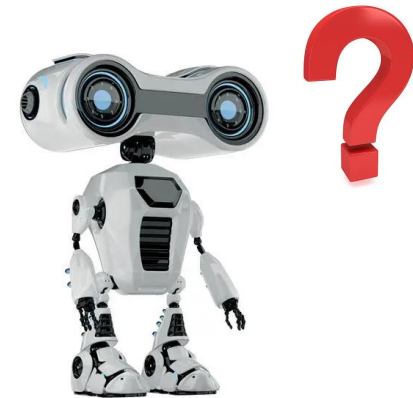
Wu et al., “Leveraging se (3) equivariance for learning 3d geometric shape assembly”, ICCV 2023

# Performing Geometric Shape Assembly

Fractured parts in the real world

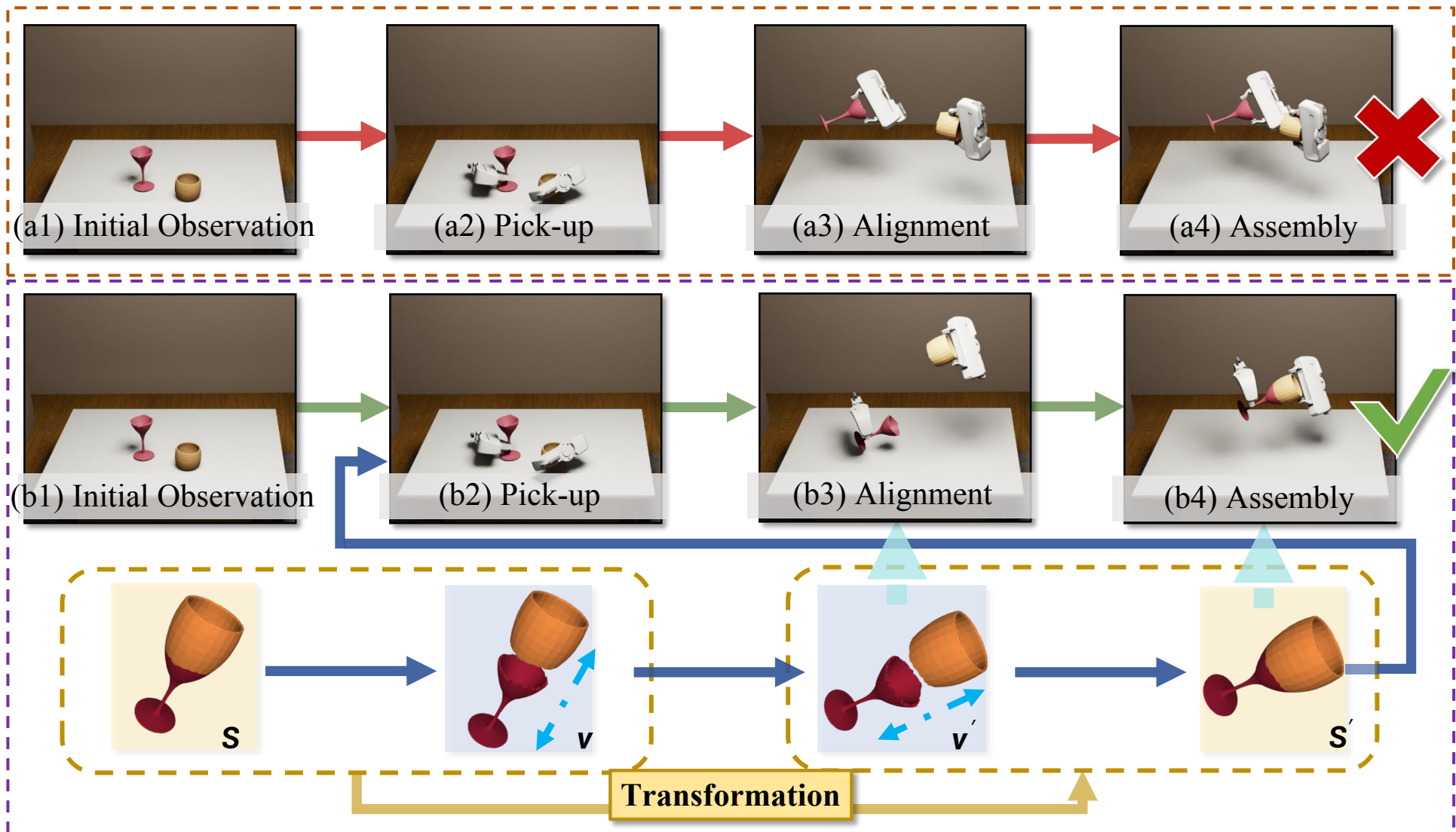


- **Arbitrary Geometries**
- **Long-horizon Action Trajectories**
- **Bimanual coordination**
- ...

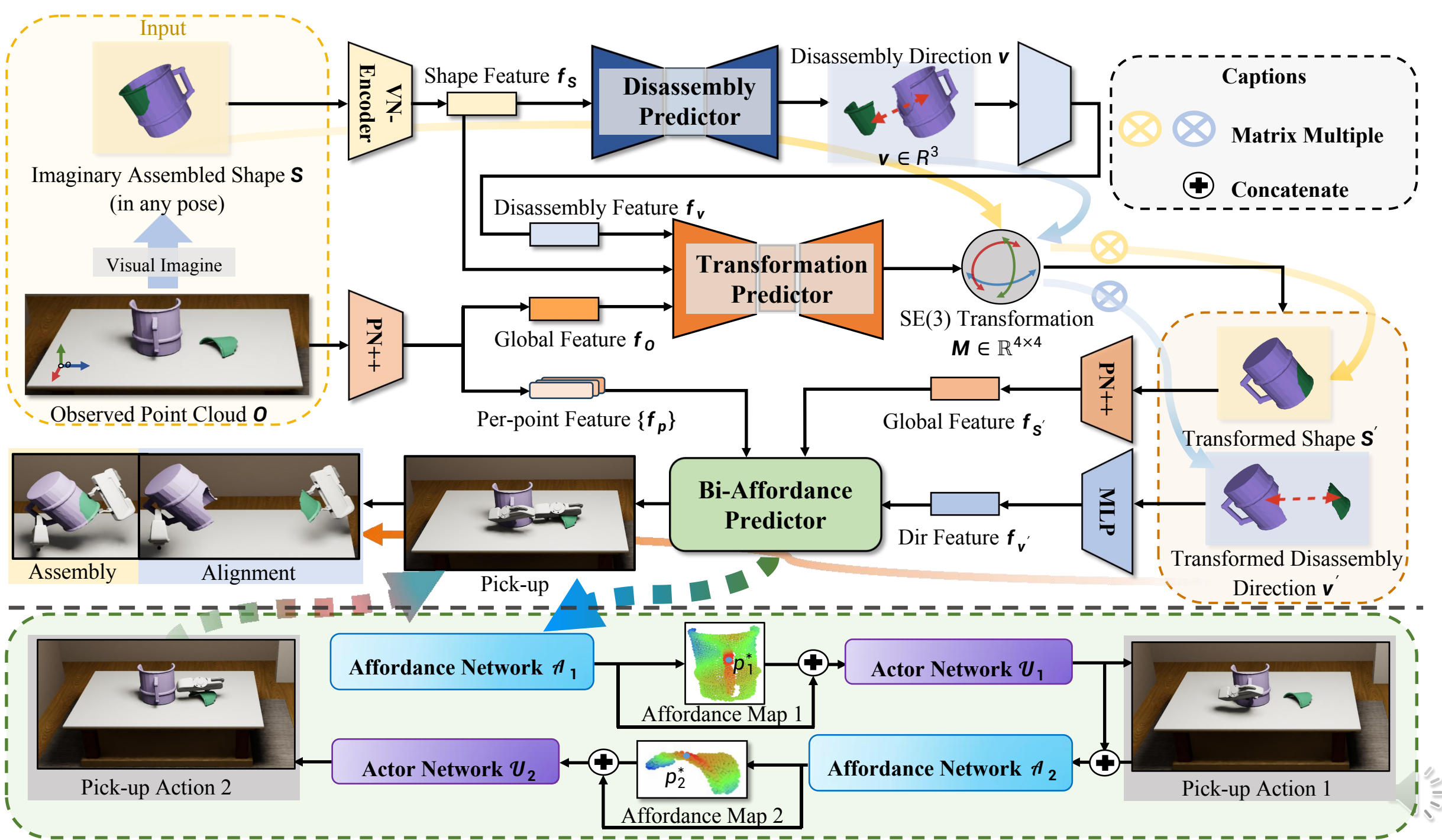


# Learning Assembly from Disassembly

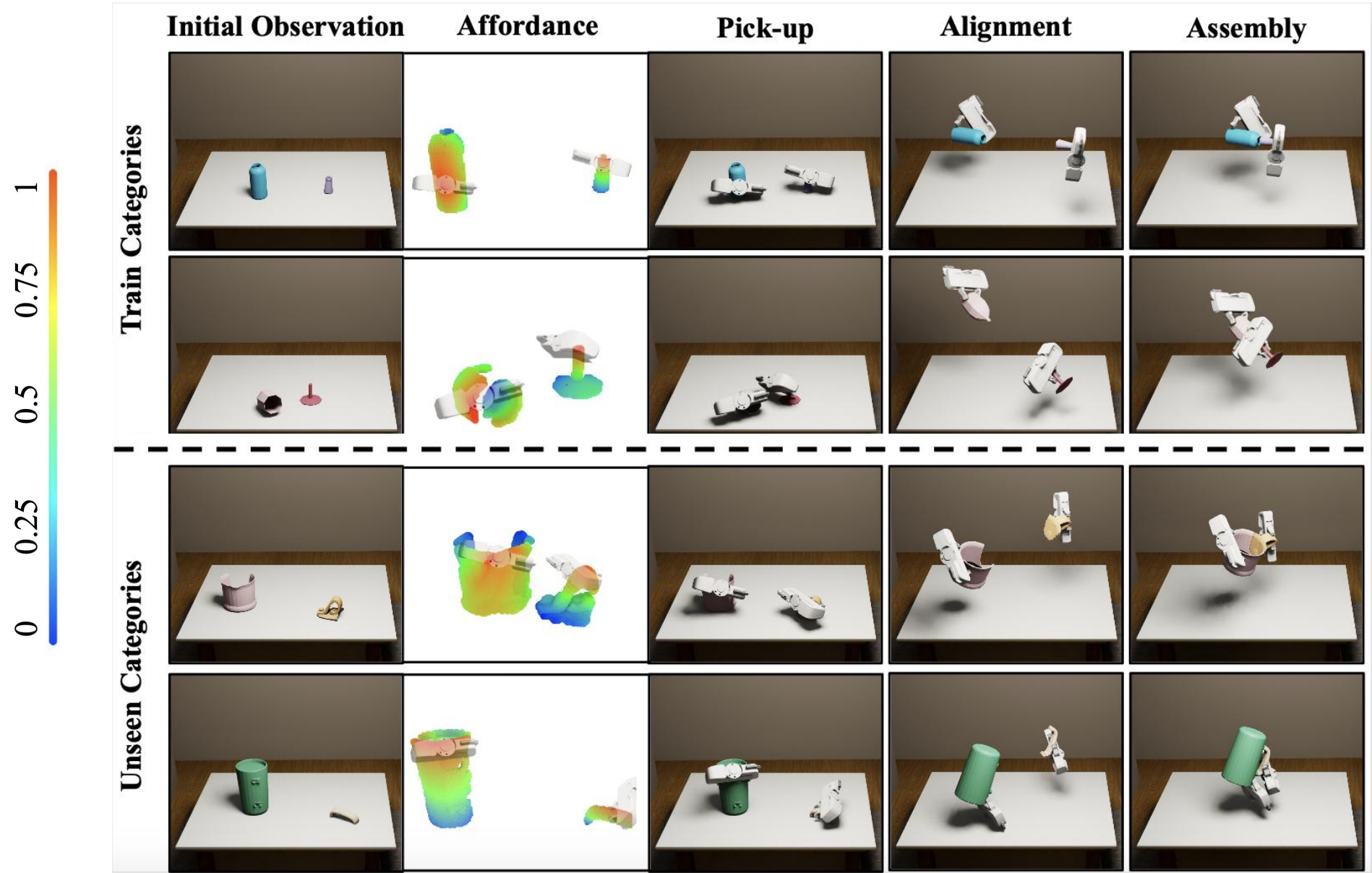
**A. Direct Learning**







# Results of Different Categories



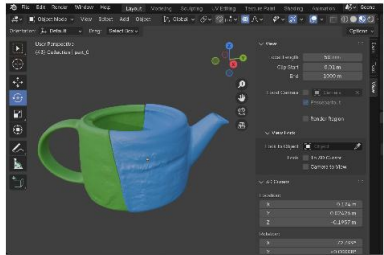
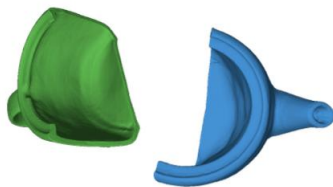


# Real-World Benchmark

## A. Scan Pipeline

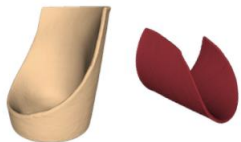
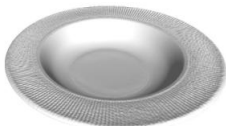
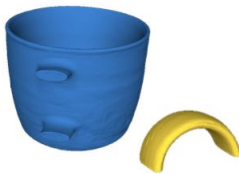
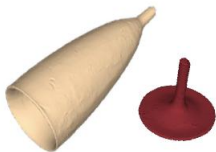


(a) A teapot on the table



(c) Scan results

## B. Real-World Benchmark



(a) Whole Shape

(b) Broken Parts

(a) Whole Shape

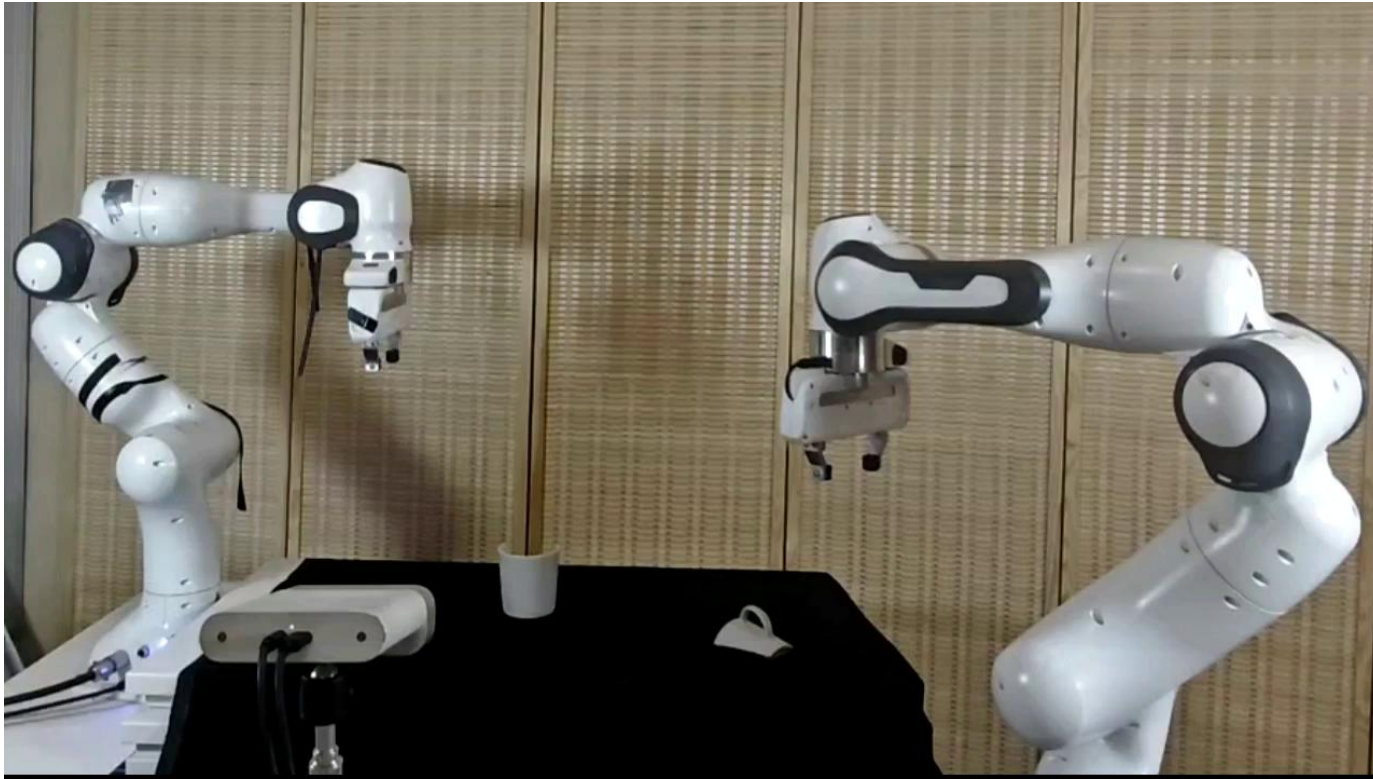
(b) Broken Parts



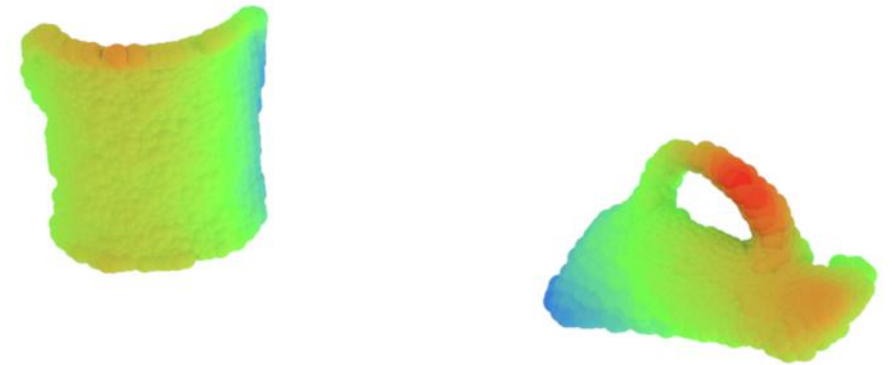
# Real-world Experiments



## 1. Mug



## Affordance



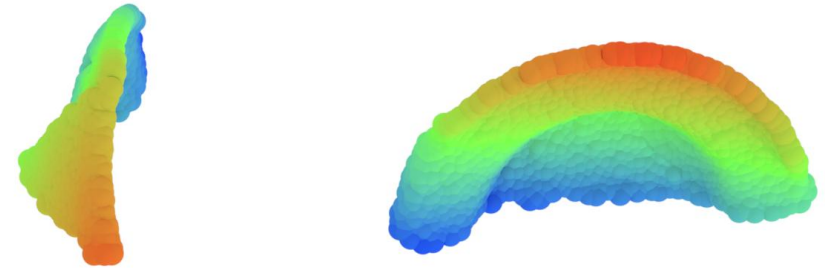


# Real-world Experiments

## 2. Plate



## Affordance

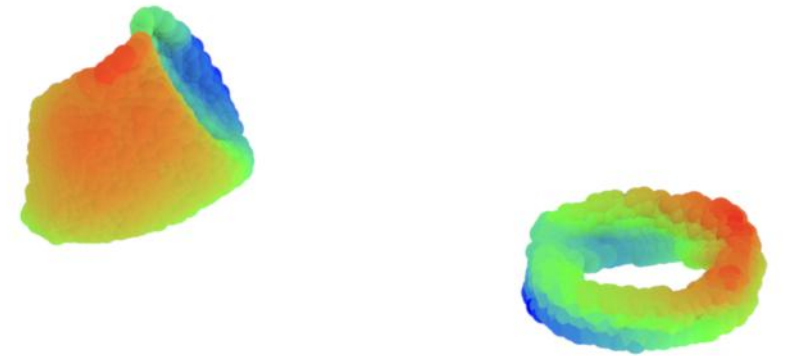


# Real-world Experiments

## 3. Teacup

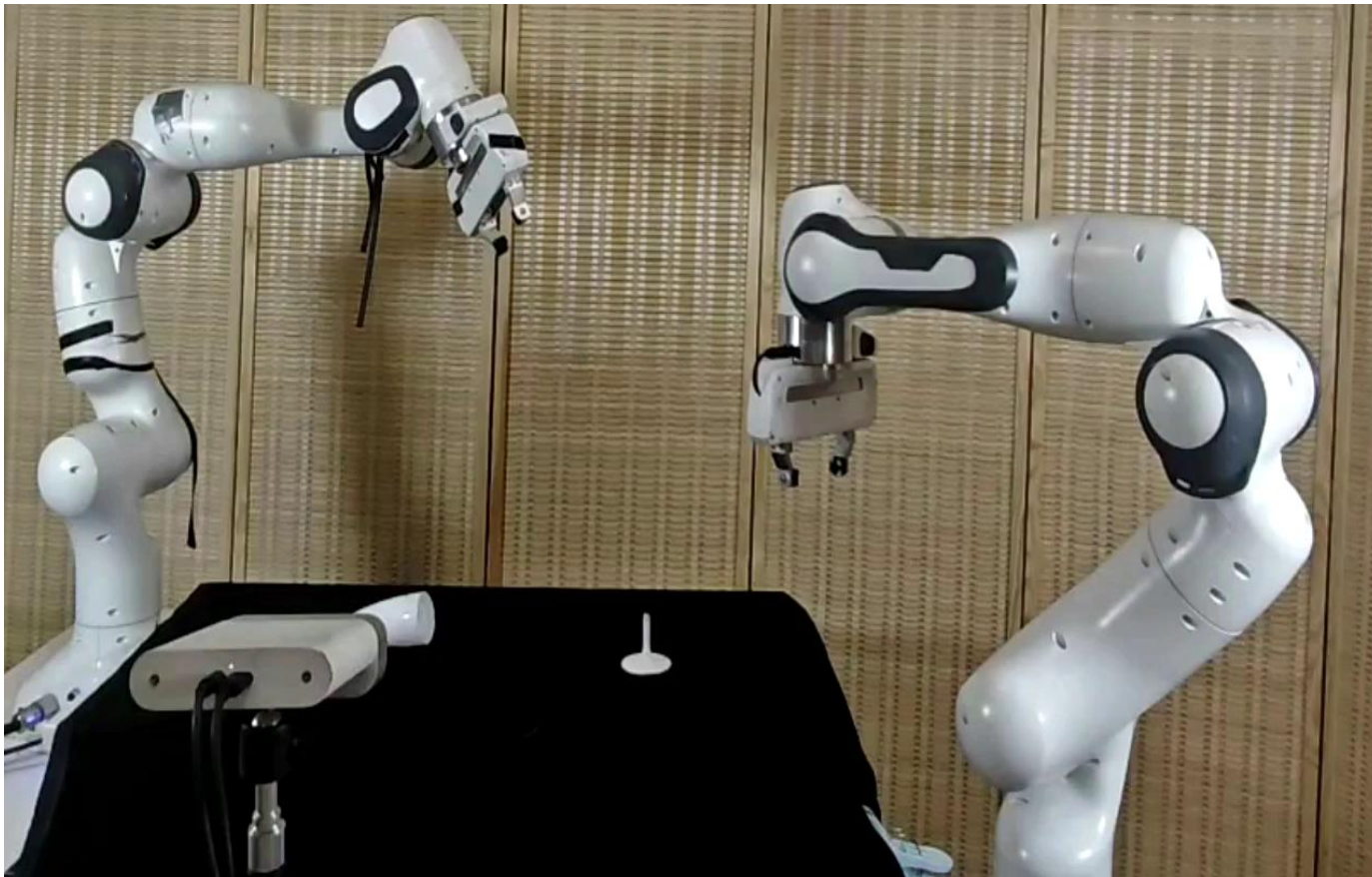


## Affordance

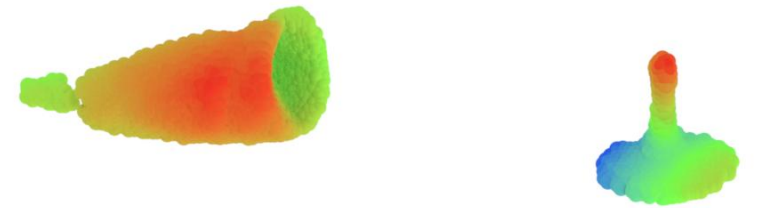


# Real-world Experiments

## 4. Wineglass



Affordance





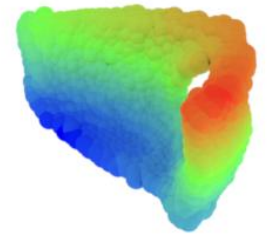
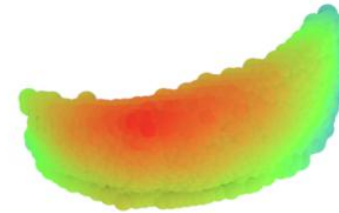
# Real-world Experiments



## 5. Bowl



## Affordance



# **BiAssemble: Learning Collaborative Affordance for Bimanual Geometric Assembly**

[Audio Included]

Thank you for Watching!

