

## Motivation

# Problem statement:

- Teaching <u>dexterous robot hands</u> to perform <u>functional</u> grasps usually needs hours of teleoperation, manual labeling, or pre-scanning object meshes
- We propose Web2Grasp, an approach to enable learning functional grasps using reconstructed Hand-Object Interaction (HOI) data from web images as a rich source of functional object interaction, without relying on costly demonstrations.



**Reconstructed HOI Visualization:** 



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	Wine glass	Tong	Syring
DexGraspNet [1]	0/10	1/10	4/10
DRO [4]	7/10	0/10	2/10
Ours (Web data)	10/10	6/10	7/10

# Web2Grasp: Learning Functional Grasps from Web Images of Hand-Object Interactions

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(a) Collects images of humans grasping objects from the web, (b) uses HOI reconstruction to produce a functional grasp dataset, potentially containing penetrations and unrealistic contacts, (c) Web2Grasp trains a DRO grasping model on the HOI dataset to predict target joint configurations for grasp execution. (d) uses simulation to collect physically feasible grasps to expand the dataset and retrain the model.

# Simulation Results and Real-World Results



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**Proposed Approach** 



# Summary:

- While not all reconstructed HOI data is accurate, many preserve the functional grasp patterns
- Functional grasping models can be trained using reconstructed HOI from web data, without requiring human annotations • In real-world grasps, our method avg success rate 85%, and retain functional grasps

Dataset	Power drill	Pen	Microphone	Phone	Spray bottle	Wine glass	Tong	Syringe	Mug	Sword
Web data	98	92	98	62	74	86	72	64	88	24
Sim aug	92	97	99	80	71	92	94	72	99	55
	Whip	Teapot	Axe	Remote	Torch	Hammer	Whisk	Soap bottle	Writing brush	Average
Web data	8	12	10	92	82	94	20	80	19	61.8
Sim aug	30	99	82	89	96	78	100	82	78	83.4

7/10

10/10



axe

### Simulation Overall Performance and Grasp Visualization:

tong syringe sword

hammer

fire torch

remote

whisk

soap bottle

writing brush