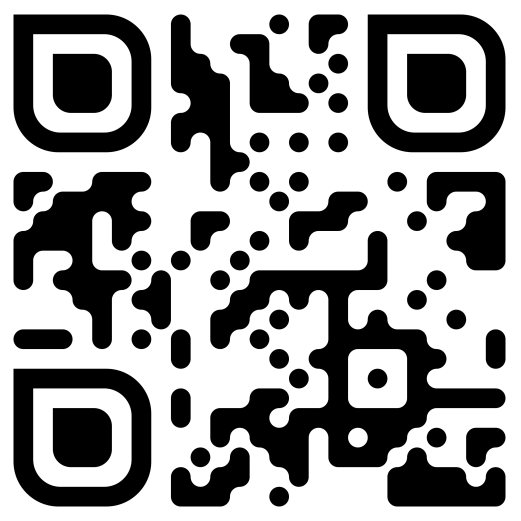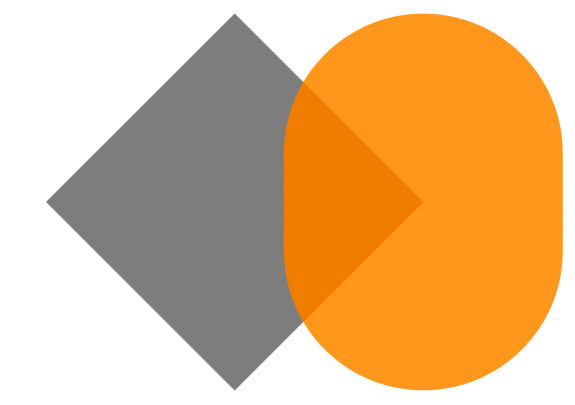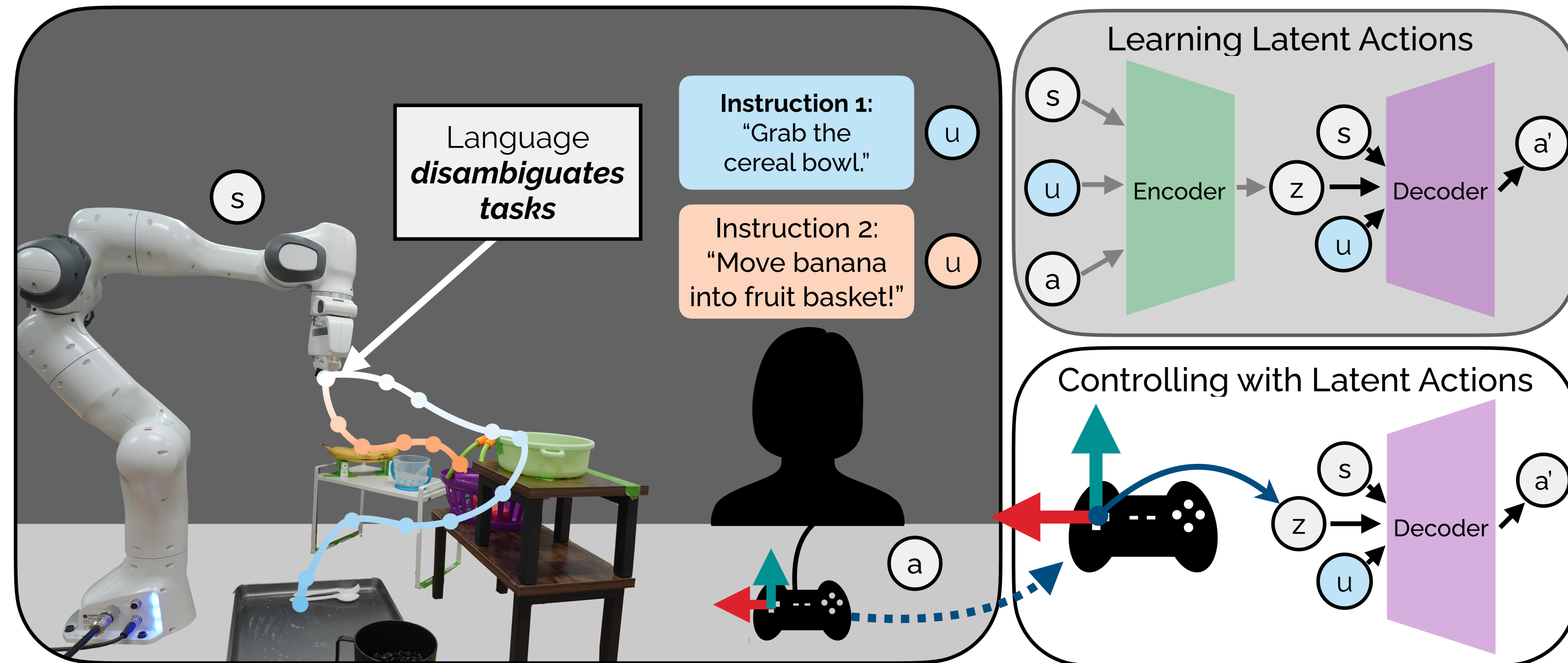# LILA: Language Informed Latent Actions

**Siddharth Karamcheti\*, Megha Srivastava\*, Percy Liang, Dorsa Sadigh**

**Latent Actions:** Low-dimensional, task aware controllers for high-dimensional robots under shared autonomy.

**Problem:** Disambiguation in multi-task environments; *can natural language help modulate low-dimensional control?*
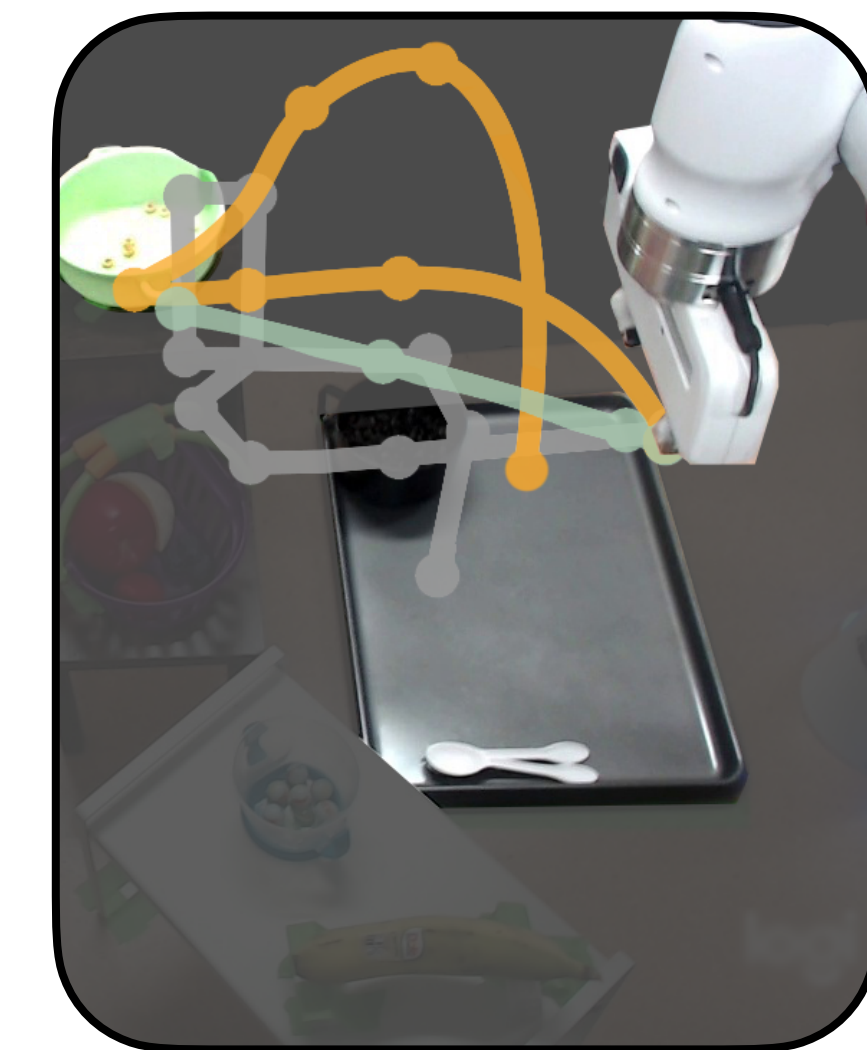


Language *disambiguates tasks*

**Instruction 1:** "Grab the cereal bowl."

**Instruction 2:** "Move banana into fruit basket!"

Learning Latent Actions

Controlling with Latent Actions

**User Study:** Successful task completion and user-preferred control with *15 demonstrations!*

End-Effector Control    Imitation Learning    **LILA**
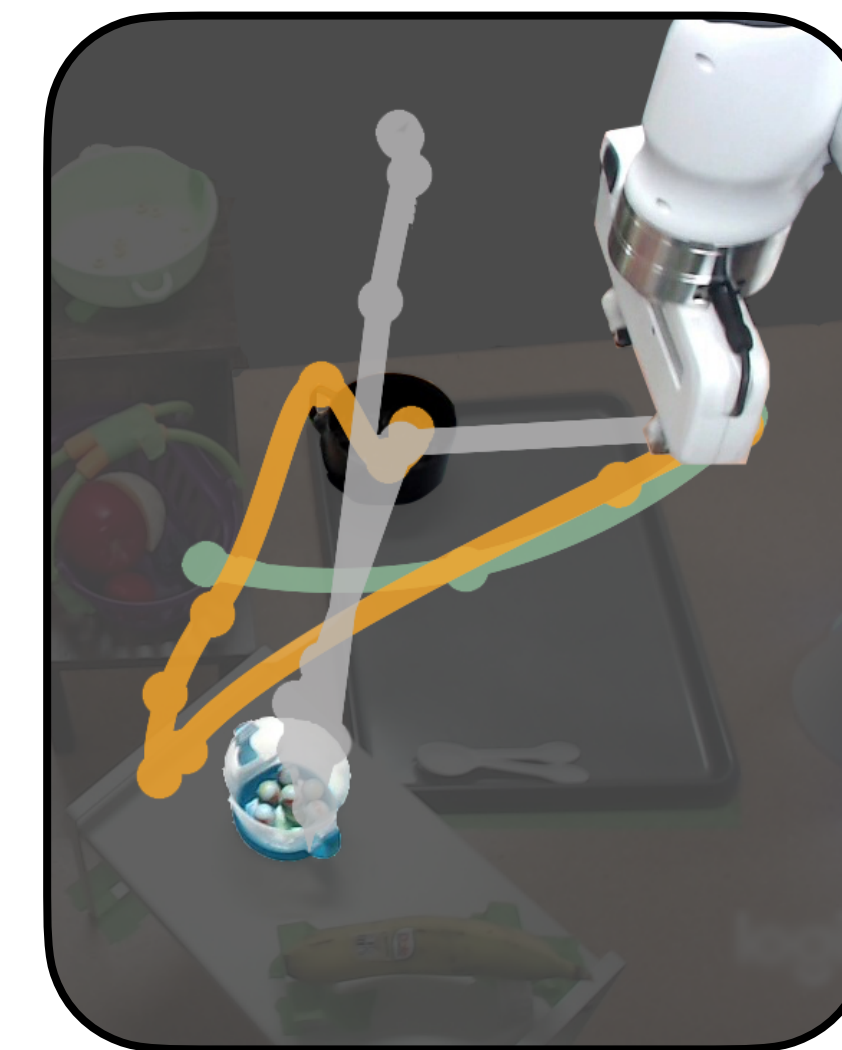
pour cup

*"pour the cup with blue handles into the black cup"*

pick cereal

*"grab the cereal bowl and put it on the tray"*

pick banana

*"put the banana into the basket"*

**Obtains 2x the success rate of baselines!**

Disambiguation

Multi-Task Training Demonstrations

1 DoF

Standard Latent Actions

Language-Informed Latent Actions

"Higher"

"Lower"

**LILA Decoder**

$\mapsto a'$

$+ \beta$

$h \times \gamma$

$z$

FiLM

**Training Exemplars**

"Put the banana away"
"Pick up the bowl"

**Distil-RoBERTa** *w/ Mean Pooling*

Sim. Search

**Distil-RoBERTa** *w/ Mean Pooling*

*"Grab the cereal bowl"*