

# Robot Learning with Adverbial Corrections

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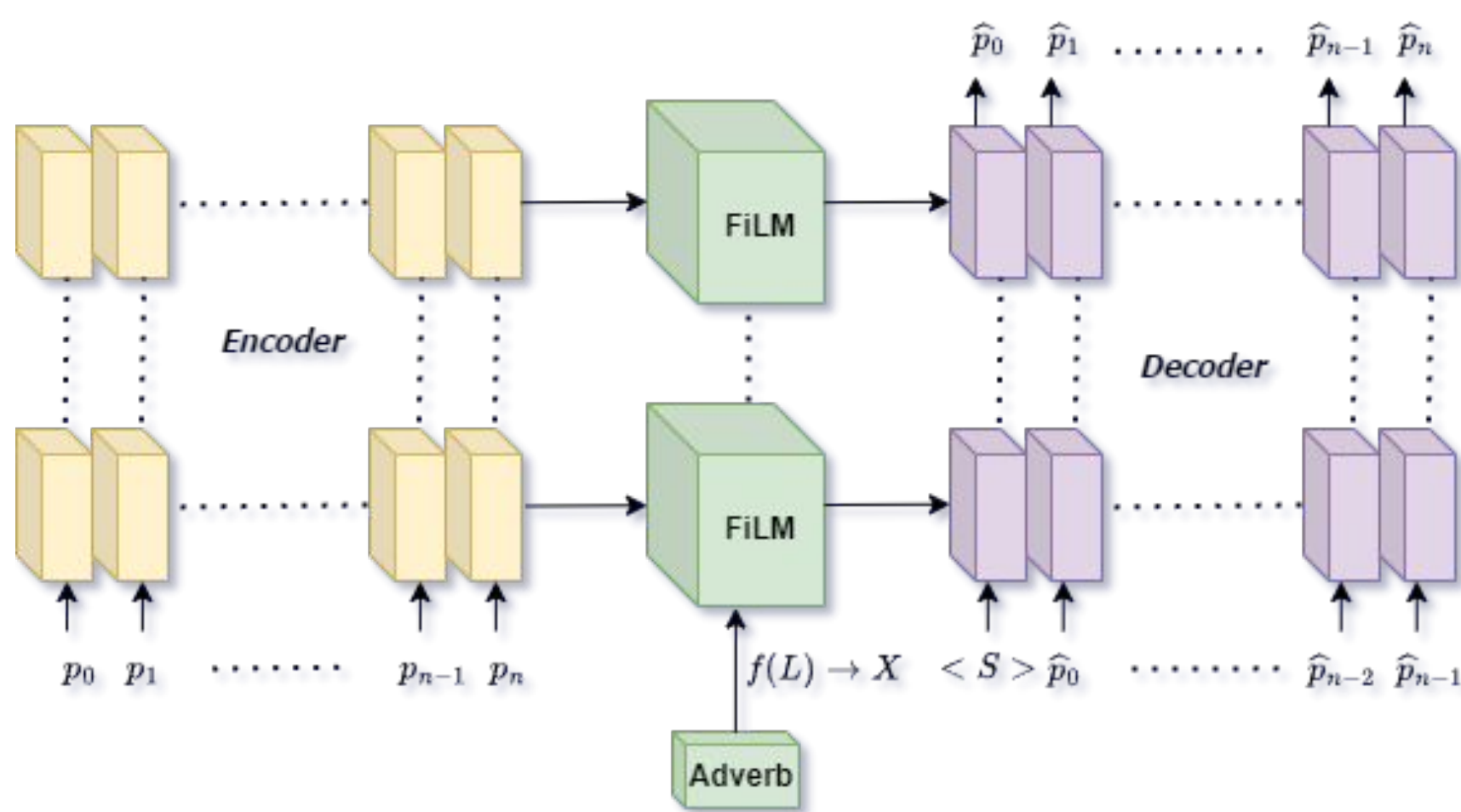


## Motivation

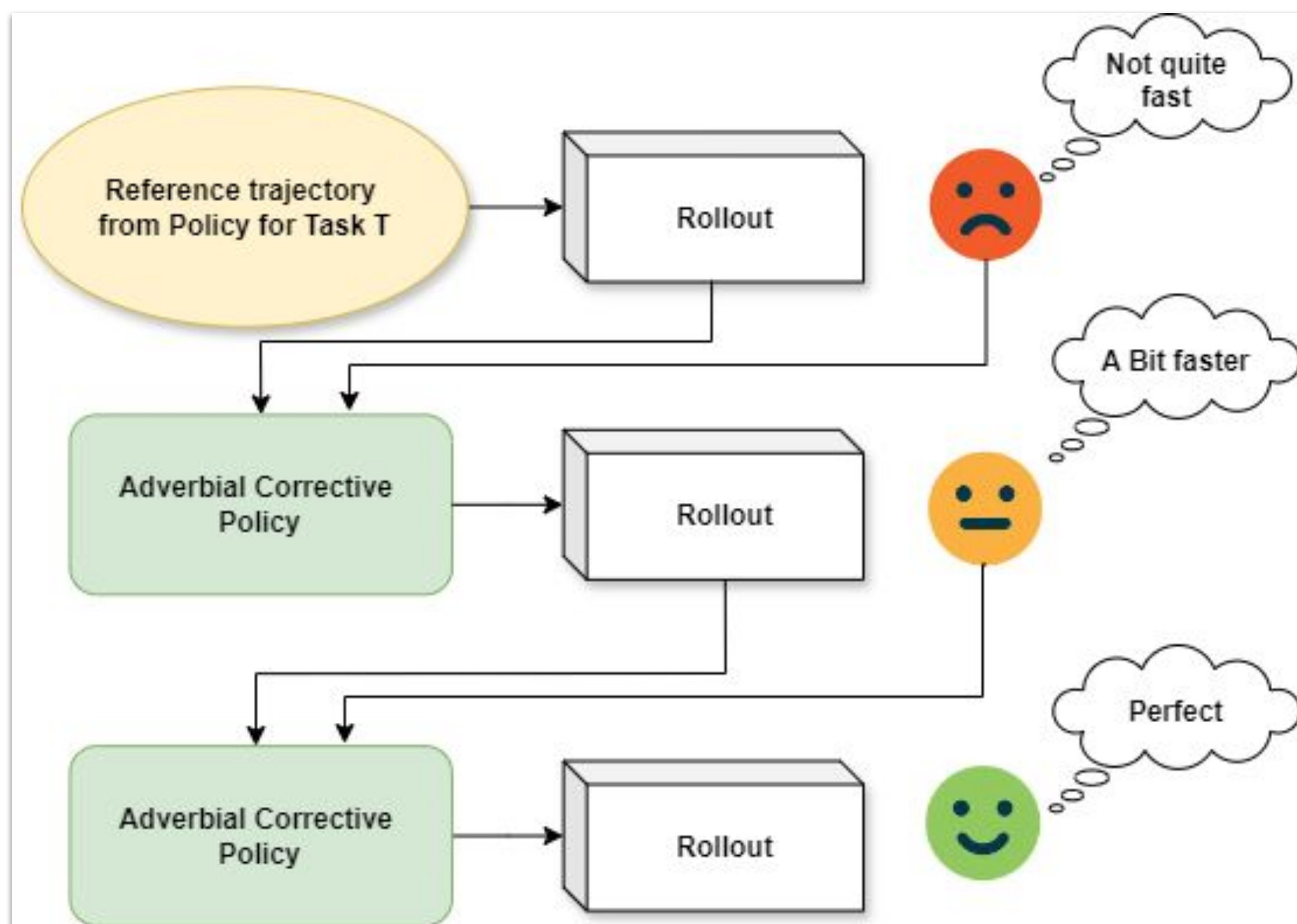
Human instructions may convey semantic nuances that robots find challenging to learn at a granular motion level. This research proposes a framework using adverbial corrections, aiming to bridge the gap between human intent and robotic execution.

## Research methods

- Behavior Cloning with seq2seq frameworks as inspiration.
- Conditioning of adverbial feedback with FiLM layers.



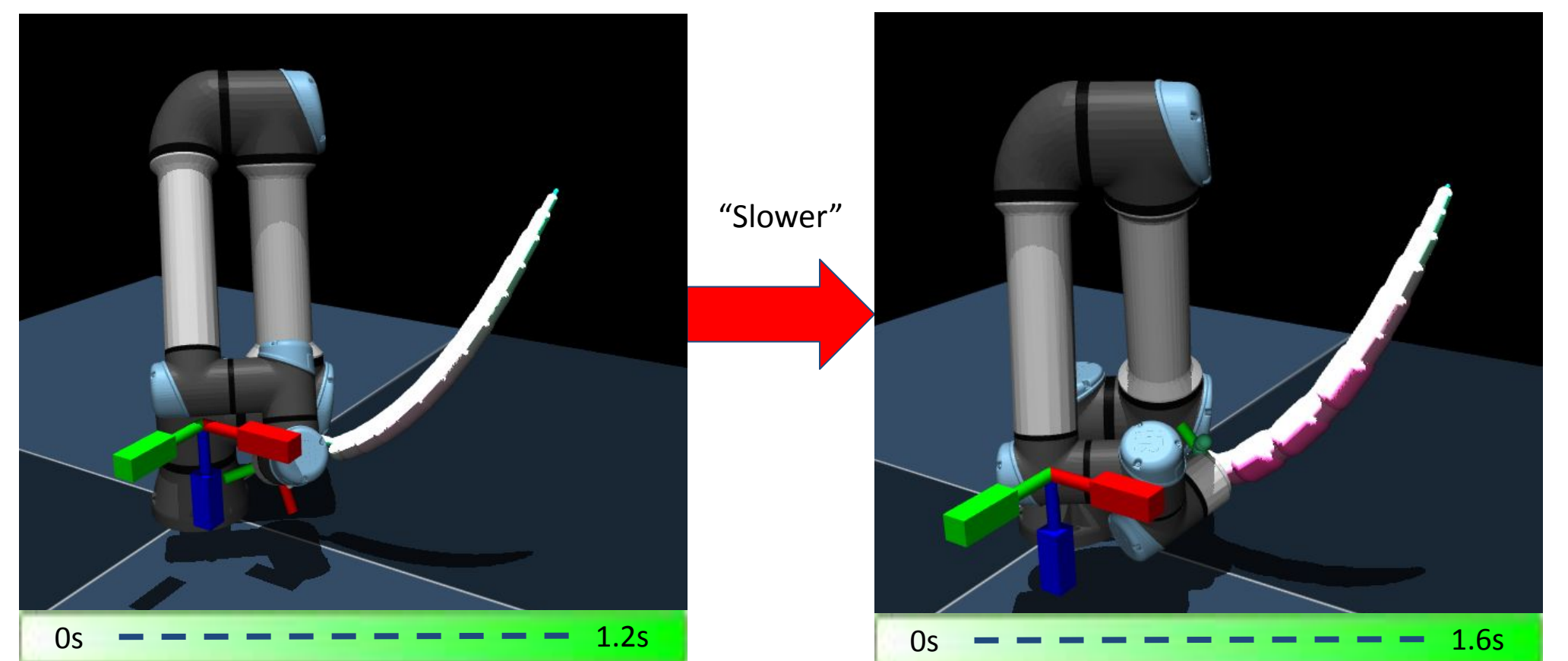
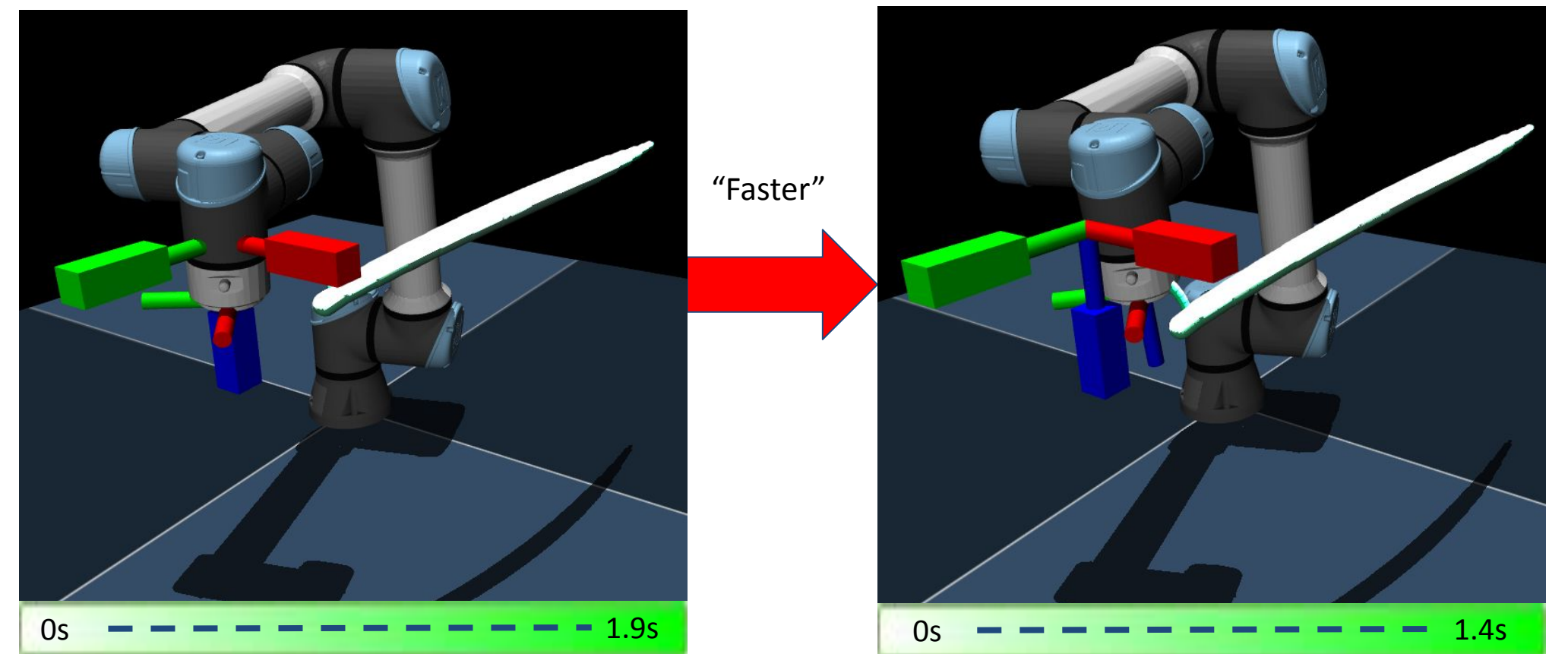
With iterative corrections guided by human feedback, we refine robot trajectory rollout to align with our preferences and effectively reaching a motion that matches our true intent.



We anticipate that by training a general policy capable of building on a reference trajectory, we can extend its prowess across diverse policies that work on different tasks.

## Findings and progress

Trained an LSTM Encoder-Decoder network on a UR5e robot domain over a large distribution of reaching tasks with “faster” and “slower” adverbial feedback.



## Challenges

- Dataset generation: required a large amount of motion trajectories in the robot workspace for reference and modified trajectories, for each adverb embedding.
- Trouble tracking terminal state of reference trajectories in corrective rollouts.

## Results

Robot config	MAE Traj Error
1-dof robot	0.71 ± 0.34
2-dof robot	0.87 ± 0.70
UR5e robot	2.13 ± 1.33

## Acknowledgements

- [1] Co-Reyes, John D., et al. "Guiding policies with language via meta-learning." arXiv preprint arXiv:1811.07882 (2018).  
 [2] Spiegel, B.A. and Konidaris, G., 2021. Guided Policy Search for Parameterized Skills using Adverbs. arXiv preprint arXiv:2110.15799.