



PCD:
Policy Contrastive Decoding
for Robotics Foundation Models



Training-free & easy-to-implement



Compatible w/ different kinds of robot policies



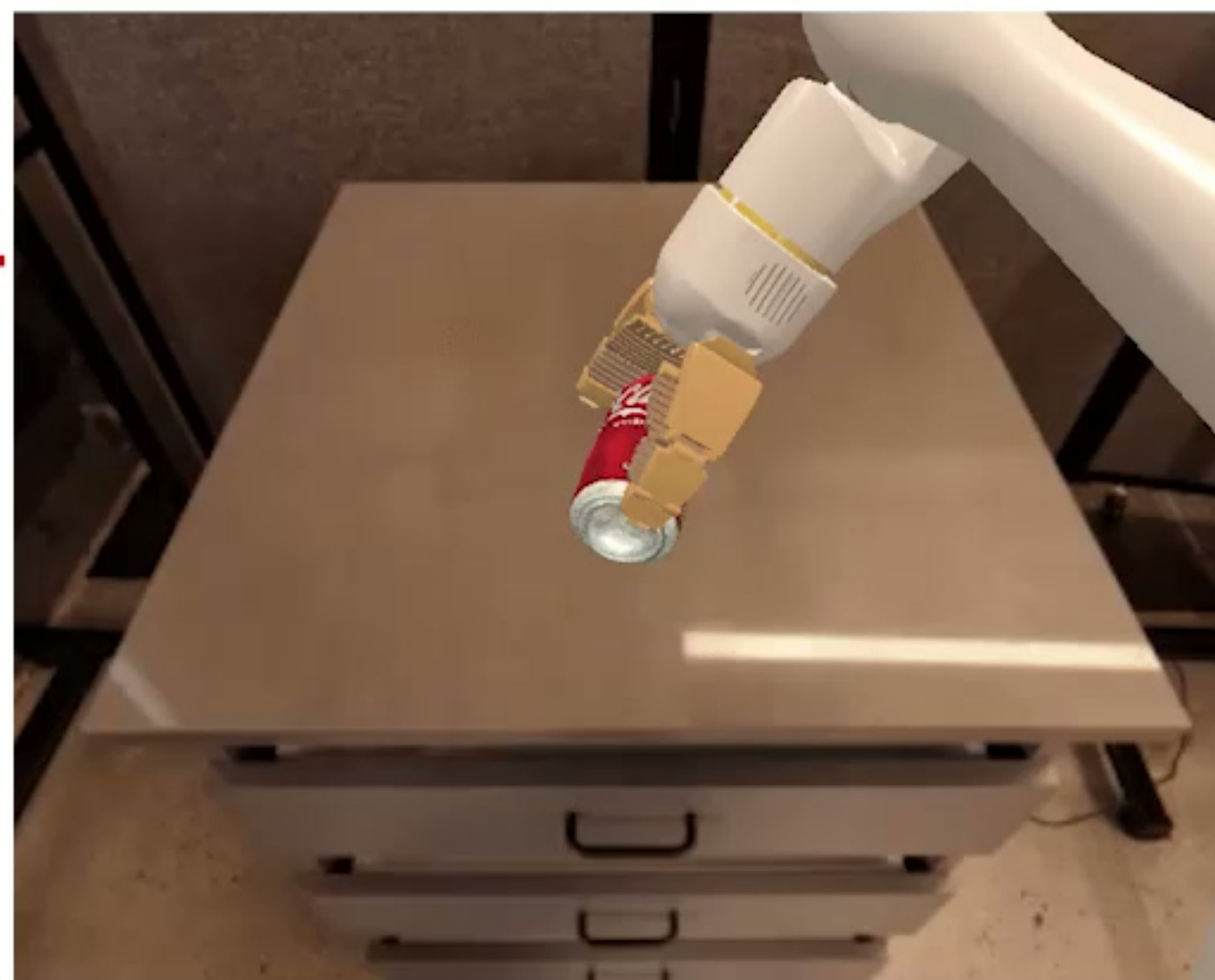
Remarkable performance enhancement

Motivation: Robot policies typically learn **Spurious Correlations** from pretraining trajectories, adversely affecting their generalization capabilities beyond the training data.

Change drawer
handle position



Success rate: 16% ↓



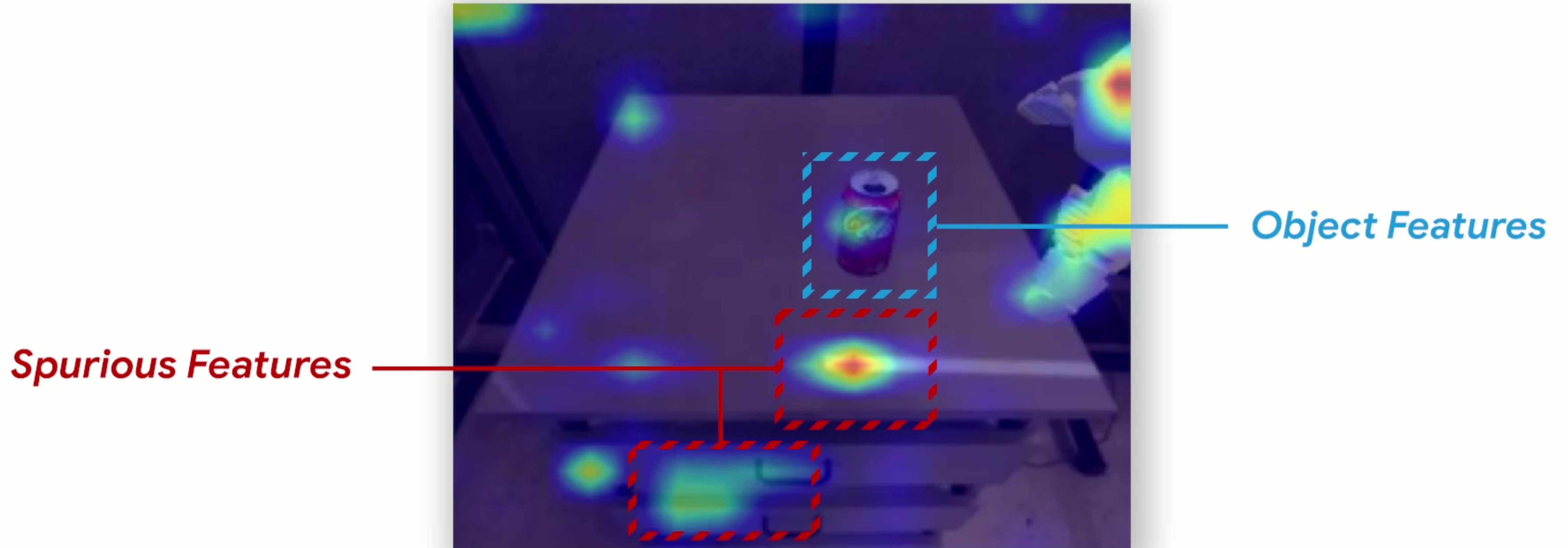
Instruction: pick coke can
Success rate: 25%

Change light
position

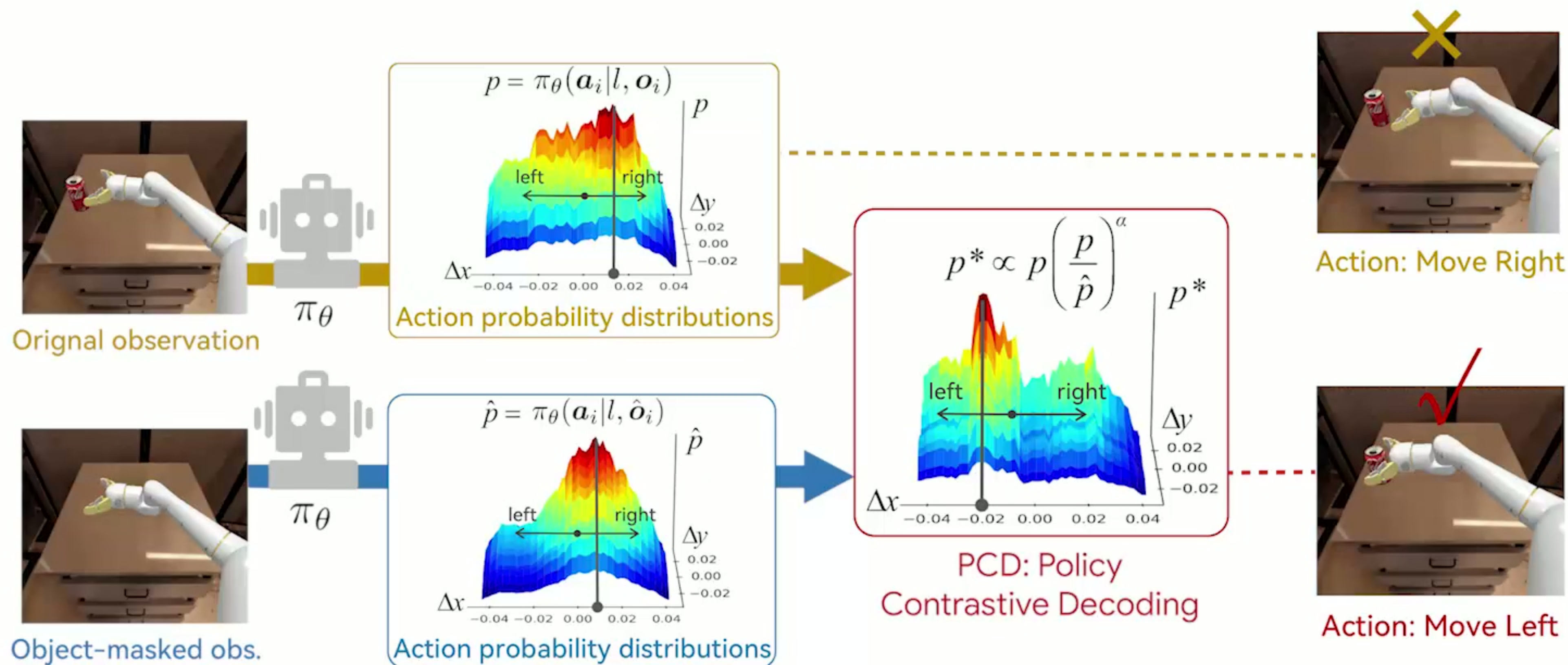


Success rate: 17% ↓

Motivation: Robot policies typically learn **Spurious Correlations** from pretraining trajectories, adversely affecting their generalization capabilities beyond the training data.



Our Solution: Policy Contrastive Decoding (PCD)

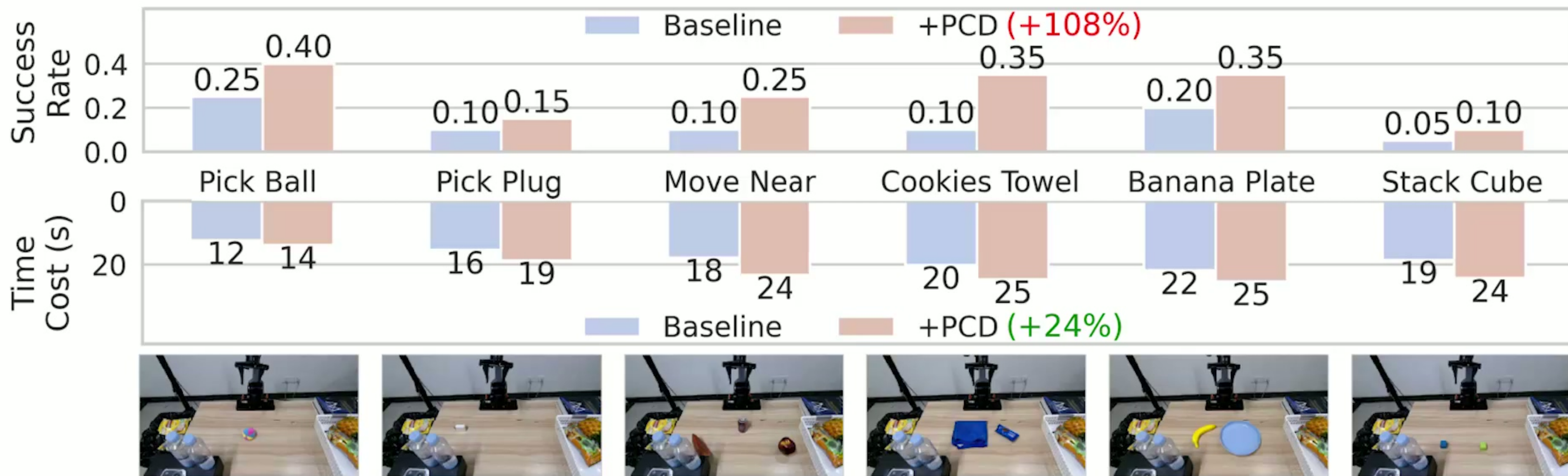


PCD redirecting the policy's focus toward object-relevant visual clues by contrasting action probability distributions derived from original and object-masked visual inputs.

PCD can be used as a ***plugin*** to improve both ***autoregressive*** and ***diffusion-based*** policies.



PCD significantly improves the state-of-the-art policy π_0 across a wide range of tasks, with minimal addition computational cost.



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Pick Ball

Pick Plug

Move Near

Cookies Towel

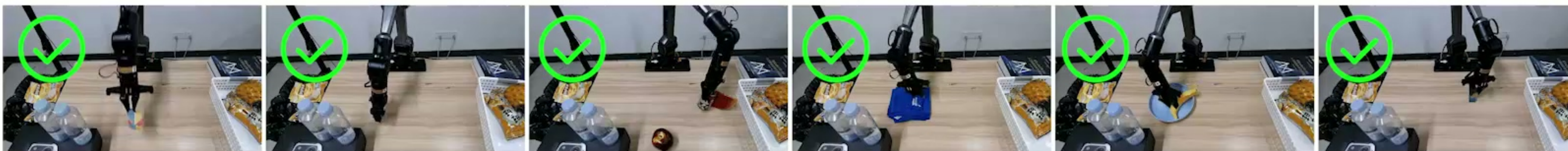
Banana Plate

Stack Cube

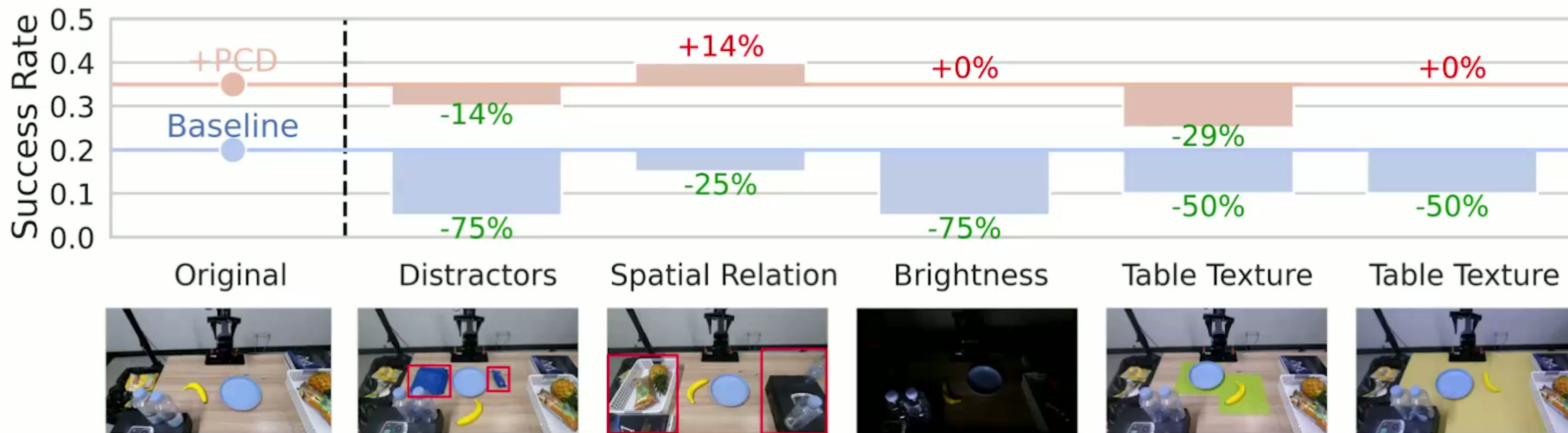
Baseline



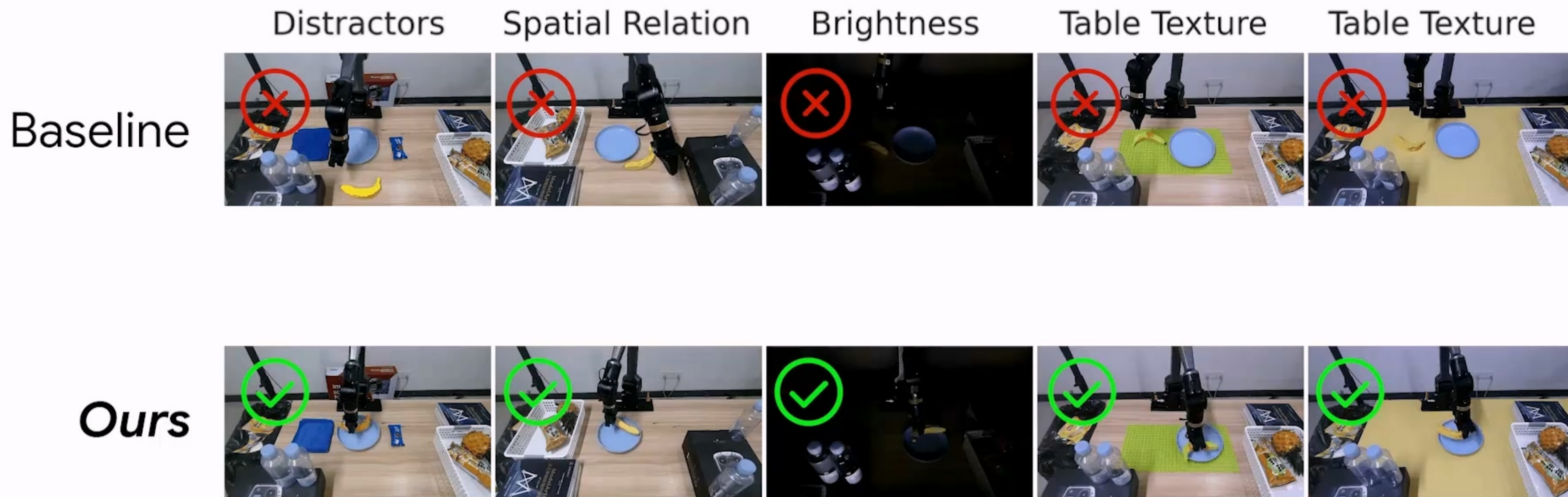
Ours




PCD is robust to various kinds of ***spurious correlations***.



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Our paper and code are available!

Project Homepage:
<https://koorye.github.io/proj/PCD>