



Generalizable Robot Programming by Demonstration with Distillation Features

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Motivation

Programming by Demonstration (PbD) is an intuitive technique for programming robots by demonstrating the desired behavior. But most existing approaches either require extensive demos or fail to generalize beyond initial demonstration conditions.

Distillation-PbD

Distillation-PbD leverages large scale pre-trained models to both extract salient structure from demonstration videos and to transfer that structure to new scenes.

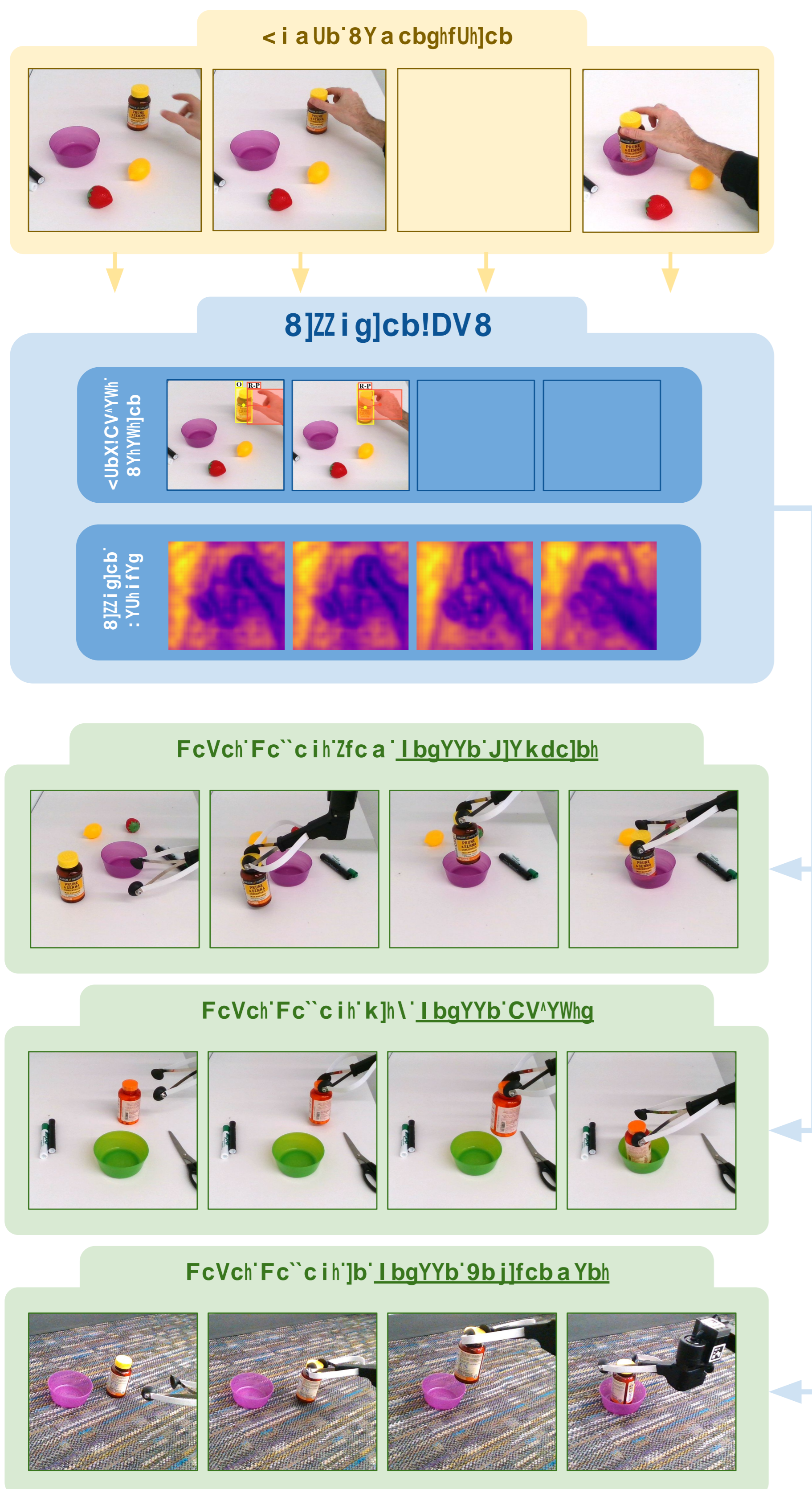


Figure 1. Given just a single observed human demonstration, Distillation-PbD can synthesize robot manipulation programs that adapt to unseen objects, unseen viewpoints, and unseen environments.

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 { Get the code and supplementary video:


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Distillation-based Appearance Transfer



Figure 2. Distillation features are used to transfer appearances across novel viewpoints, novel objects, and novel scenes.

Real World Robot Evaluation



Figure 3. We evaluate using a Stretch RE2 robot

- { 14 real world manipulation tasks
- { 5 visually distinct environments
- { Average success rate: 83%

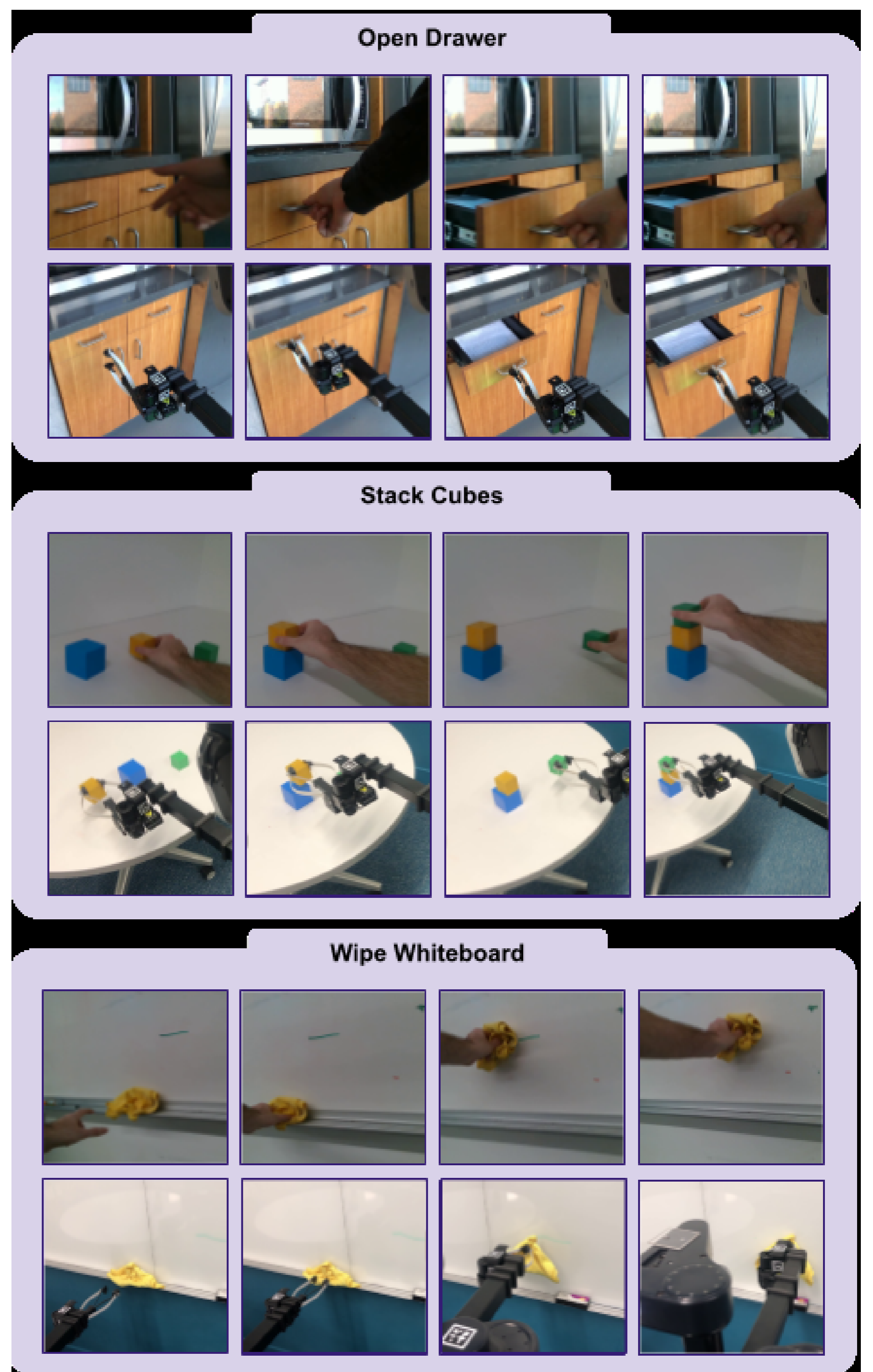


Figure 4. Representative human demonstrations and robot executions.