

I. Selective Intervention

Small model propose first!



Task context



Goal



Scene

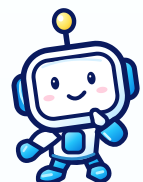


History

Skill state K_t ω_1 ω_2

...

Small model proposes an action



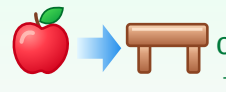
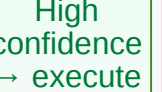
?

 a_t : place apple on tableConfidence $c = 0.18$

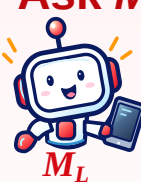
0

 γ

1

Execute with M_s High confidence
→ execute

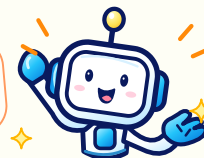
Execute the proposed action

Ask M_L for intervention

Low confidence → Intervention

II. Trajectory-Aware Intervention-to-Skill Induction

Turn intervention into reusable skill!



1 Localize intervention

Small model (M_s)

place directly

VS

Large model (M_l)

heat apple first

Localized proposal–intervention contrast

2 Ground with execution evidence

Before intervention



apple



After intervention



apple is hot

Observed local effect

3 Identify the procedural residual

Completed task trajectory τ_t 

get apple



open microwave



heat apple (intervention)



verify hot



place on table

Procedural residual:
heat before placement

4 Form a reusable skill

Induced skill ω_4

Procedural skill

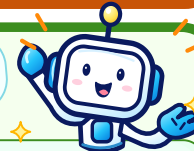
When: transformation required before placement**Do:** obtain → transform → verify → place**Check:** transformed + placed ✓

A reusable skill for future tasks!

III. Streamwise Skill Evolution

Skills persist, guide later tasks, and are refined by new evidence

Skills evolve with new evidence!

1 Updated Skills K_{t+1}  ω_1 ω_2 ω_3 ω_4

...

Skills available after task t

New skill is added!

2 Apply on a related task $t+1$ 

Heat and place the mug in the cabinet



Reuses the learned skill!

3 Incorporate later evidence

evidence (on $t+1$)

ADD



RETAIN



REVISE

Update skills with new evidence

4 Evolved Skills K_{t+2}  ω_1 ω_2 ω_3 ω'_4 ω_5

...



Less repeated large-model assistance