

Hierarchical Experience Memory

Workflow

BookFlight

1. Open {{App_Name}}
2. Search flight: {{Origin}} to {{Dest}}
3. Select Date: {{Date}}
4. Click Search & Select Flight

Subtask Skill

Input Flight Details

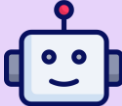
1. Tap "From" bar and Type {{Origin}}
2. Tap "To" bar and Type {{Dest}}
3. Tap "Departure Date" and Scroll to {{Date}}

Failure Pattern

Fix: Ensure date field is not empty.
Pattern: Do not click {{Search_Btn}} before {{Date}} is selected.



Book a flight from San Francisco to NYC on March 15.



MLLM GUI Agent

Guidance

Stratified Group Sampling

Strong Guidance

Prompt: Query + Retrieved Workflow+ Subtask + Failure Pattern

Weak Guidance

Prompt: Query + Retrieved Workflow

No Guidance

Prompt: Query (Pure Exploration)



Dynamic Curriculum

Guidance ↓ as success rate ↑

Semantic Retrieval

Policy Update

Rollout

Self-Evolving Loop

Policy Optimization



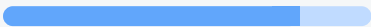
No-guidance bonus

Guidance-aware Reward



Group Advantage Estimation

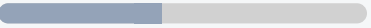
Generated Trajectories Group size = G



✓ R1=0.8



⊗ R2=0.6



⊗ R3=0.2

Experience Abstraction



Successful Trajectories
Extract Plans & Replace "NYC" -> {{Dest}}



Failed Trajectories
Failure Diagnoses to avoid

Memory Update