

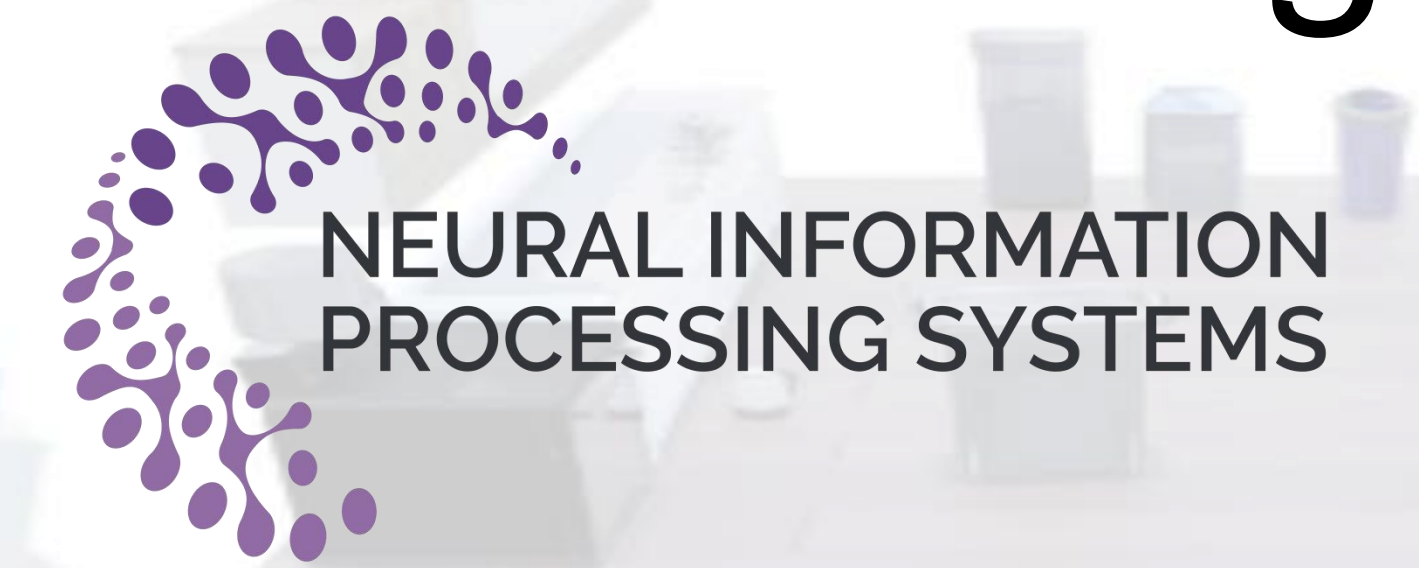


SceneWeaver : All-in-One 3D Scene Synthesis with an Extensible and Self-Reflective Agent

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<https://scene-weaver.github.io/>



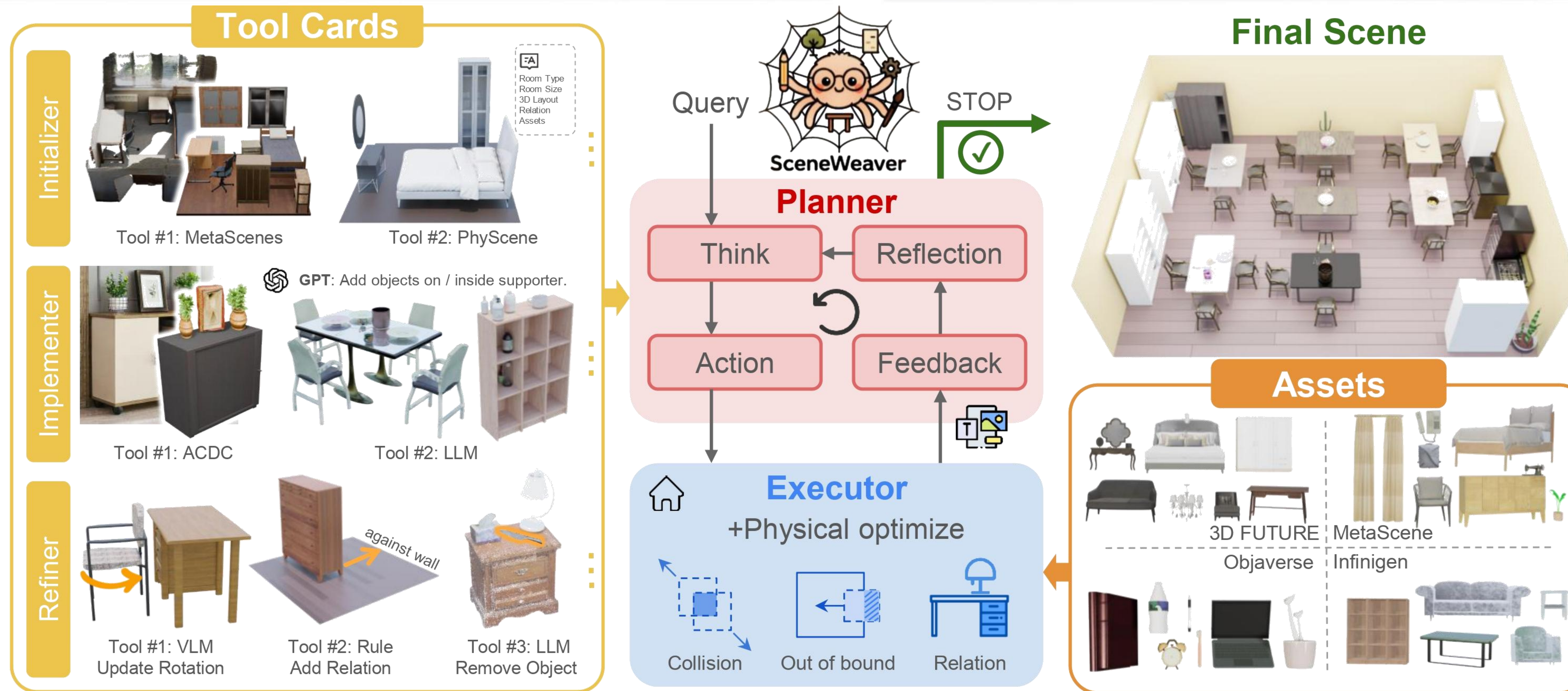
Motivations

- Embodied AI raise **new demand** for scene synthesis: Real + Physical Plausible + Instruction Controllable
- Each generation method has its **pros** and **cons**:
Rule-based : Physical Plausible ✓ Controllable ✗
Data-driven : Real ✓ Controllable ✗
LLMs : Controllable ✓ Physical Plausible ✗
- **How to take full potential of these methods?**

Methodology

- **SceneWeaver**: an agentic framework to enable LLMs to feedback-guided, self-reflective 3D scene synthesis using a diverse set of scene synthesis tools.
- **Standardized Tool Interface**
- **Feedback-driven Self-reflective Planning**
- **Physics-aware Execution of Plans**

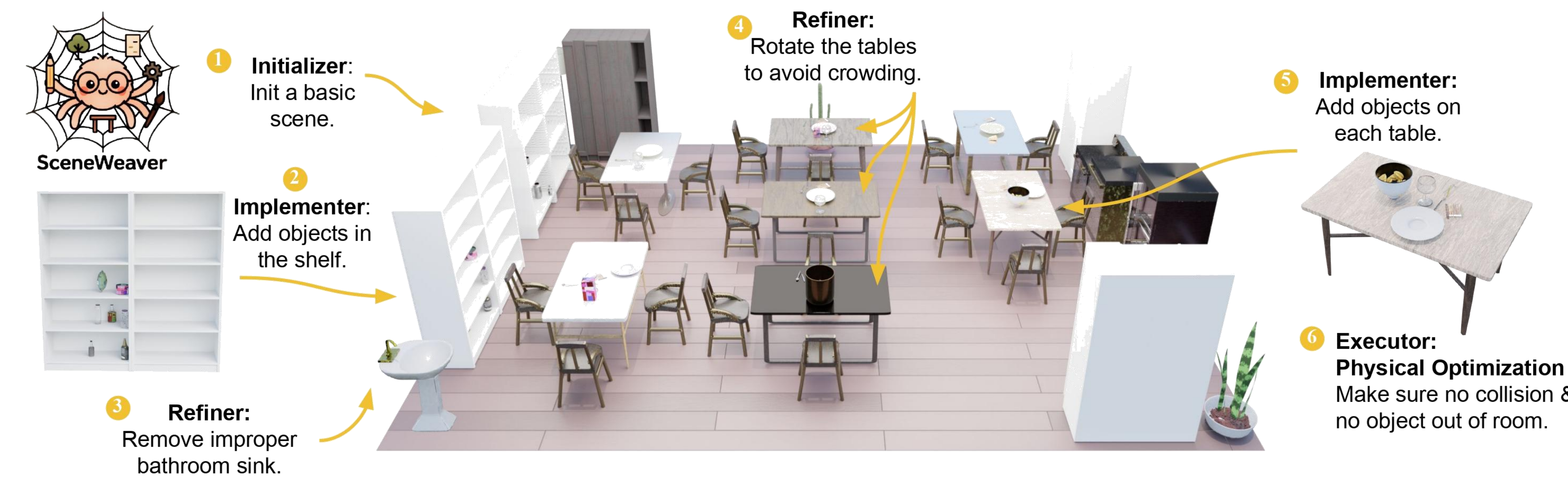
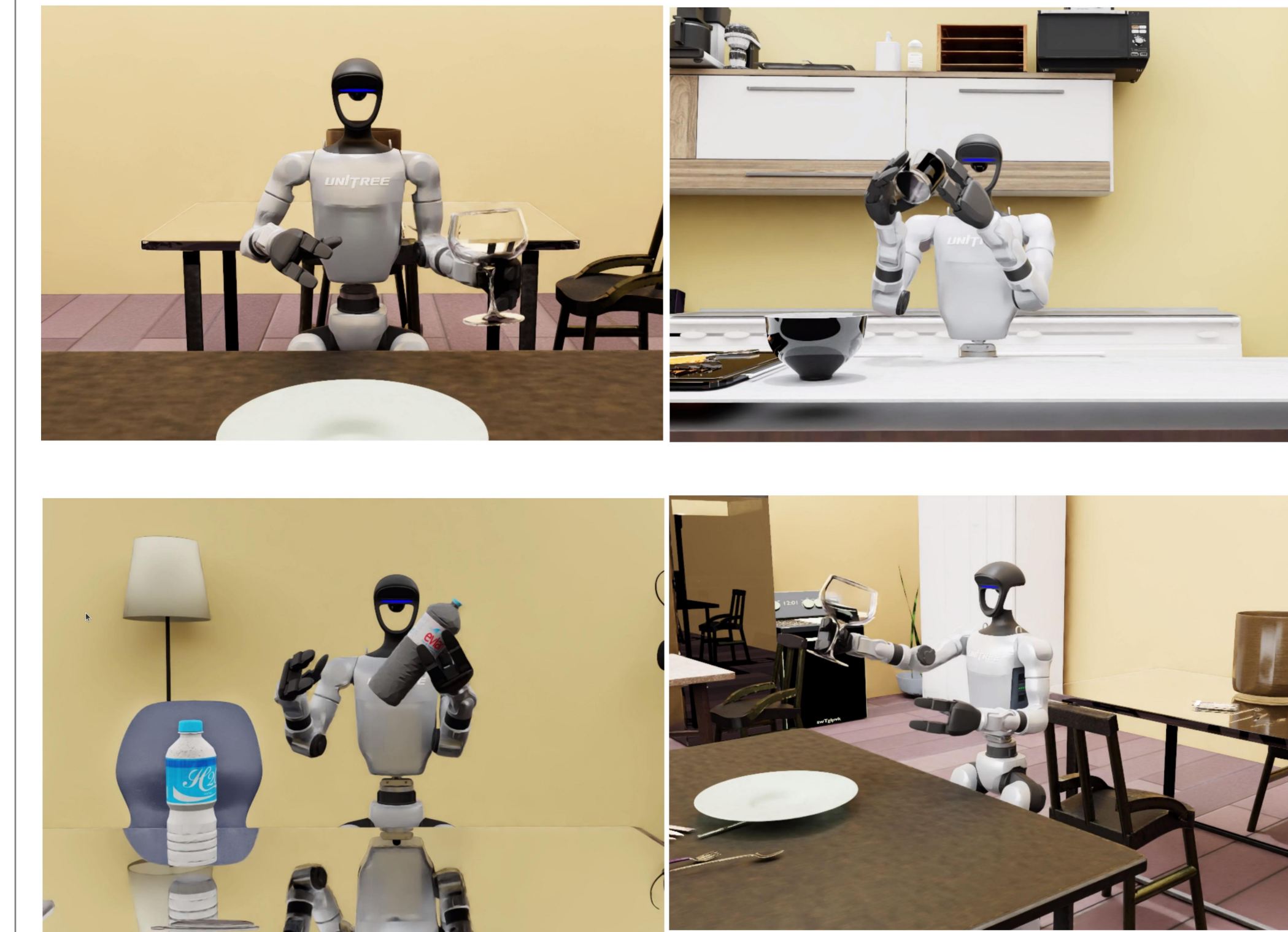
Diverse & Controllable



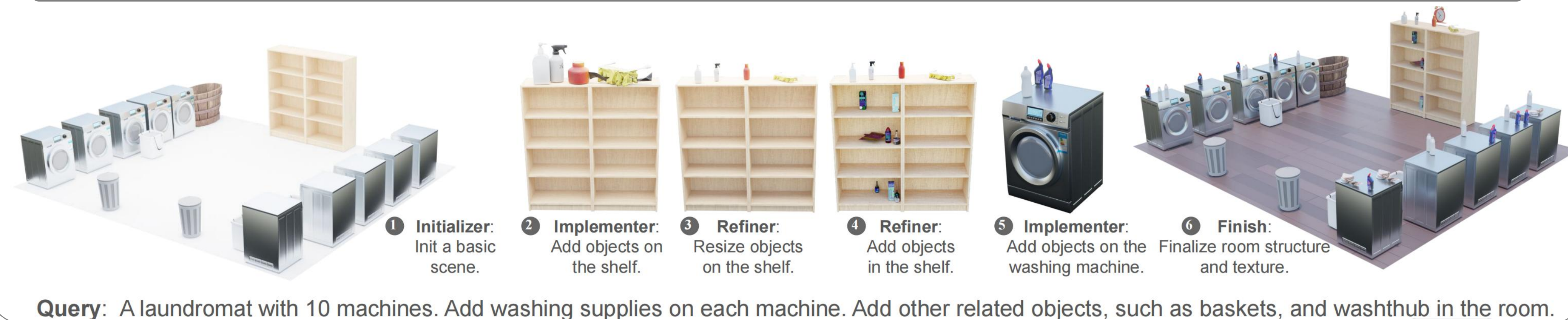
Intermediate Steps



Robot Interaction in Simulation



Iterative Refinement



Outperform Other Methods

Method	Average							Method	w/ I-Design	w/ Holodeck	w/ LayoutGPT
	#Obj	#OB	#CN	Real.	Func.	Lay.	Comp.				
LayoutGPT	7.3	0.7	0.7	6.0	6.1	5.8	3.7	Preference	94.30%	91.40%	87.40%
Holodeck	22.3	0.0	3.9	7.7	7.5	6.2	5.2	Diversity	95.60%	98.90%	90.00%
I-Design	14.3	0.7	0.1	7.1	7.0	6.2	4.7				
Ours	36.5	0.0	0.0	8.8	9.4	7.7	8.0				

