Initializer: Real2Sim - MetaScene

Initializer: Model - PhyScene

Initializer: LLM - LayoutGPT

Description: Using GPT to generate the foundamental scene.
Supported Room Types: Any room type.
Use Case 1: Create a foundational layout.
Strengths: Align well with user demand. Adaptive to complex user requirement. Flexible with respect to room design and customization.
Weaknesses: Less spatial rationality.
Input: roomtype, ideas to init the scene.

Implementer: 2D guided - Architect

Implementer: LLM - GPT

Implementer: 2D guided - ACDC

Description: Use image generation and 3D reconstruction method to add objects into the current scene.
Use Case 1: Add **a group of** small objects on the top of a large furniture, such as table, cabinet, and desk.
Strengths: Real. Accurate in rotation. Excellent for adding a group of objects with inter-relations.
Weaknesses: Can not add objects on the wall or ground.
Input: Ideas to add objects.

Refiner: LLM - Remove Object

Refiner: LLM&Rule - Add Relation

Refiner: VLM - Update Rotation

Description: Use VLM Model to adjust rotation.
Use Case 1: Fix incorrect object orientations, such as a bed facing the wall or a chair turned away from a desk.
Use Case 2: Improve spatial organization by aligning objects more naturally with the room structure.
Strengths: Improve the visual and functional coherence. Identify misaligned items and suggest better orientations.
Weaknesses: Does not move or add/remove objects.
Input: Ideas to update rotation.

Task description: You are a **scene designer**, an expert agent in 3D scene generation and spatial optimization. Your mission is to iteratively design and refine a scene.

User demand: Design me a laundry room.

Available Tools: Initializers, Implementers, Refiners.

Memory of step t-1
1. Planning ideas
Correct the rotation of washing machine.
2. Tool Selection & Execution Results
Refiner: VLM - Update Rotation. Success.
3. Scene Representation
Rendered image and layout.
4. **Reflection** score & suggestion
Object number: 8, Collision: 0, Out of room: 0.
Real: 8, Functional: 7, Layout: 8, Completion: 5.
The lack of decor or daily supplies makes the room feel unfinished.

Plan for step t:
1. **Analyse** reflection of step t-1, check if previous problems have been solved. The rotation problem has been solved.
2. Find the most serious **problem** to solve in this step.
The completion score is low. Add laundry objects in the shelf.
3. List appropriate tools with 0-1 **confidence score**, and choose **one tool** for this step. Use **Implementer: LLM: GPT** to add objects.
4. Clearly explain the **expectation** and suggest next steps.
Objects should be added into the shelf. If success, evaluate the layout and proceed to finer adjustments. If not, try another strategy with a different tool.