

The background features a light gray color with several abstract, rounded shapes in white and dark gray. A prominent dark gray rounded rectangle is located in the top left. A large white rounded rectangle with a dark gray circle inside is on the right side. Other smaller rounded shapes are scattered throughout the layout.

Streaming for blender to Unreal Engine with AI

AI-Enhanced Real-time Pipeline



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1. Problem Statement

Inefficiency in Traditional 3D Workflows

Current Workflow Bottleneck:

- Manual Export/Import: Designers must manually export assets to GLB, FBX, or OBJ formats.
- Context Switching: Constant switching between Blender and Unreal Engine breaks creative flow.
- Repetitive Looping: “Modify in Blender → Export → Reload in Unreal” cycle is tedious and time-consuming.



2. Background & Solution

Why Streaming & Generative AI?

Concept: Real-time Streaming

- Direct link between Blender and Unreal Engine eliminates file management overhead.
- “Fast and Clear”: Instant feedback loop for 3D artists.

Integration with 3D Generative AI:

- Integrating AI models directly into the pipeline significantly boosts productivity.
- Automation of asset variation and generation.



3. Related Works

Existing Ecosystems

NVIDIA Omniverse:

- Connectors: Links various DCC (Digital Content Creation) tools like Revit, Maya, and Blender to Omniverse.
- Uses USD (Universal Scene Description) as a central interchange format.
- **Our Approach vs. Omniverse:** Focused specifically on lightweight “Blender → Unreal” direct streaming with AI generation integration.



4. Proposed Method

System Architecture & Implementation

System Components:

1. Blender Source (Sender):
 - Developed in Python (Blender API).
 - Handles mesh data extraction and transmission logic.
2. Unreal Engine (Receiver):
 - Custom Mesh Receiver Actor/Component.
 - Reconstructs mesh data in real-time within the game engine.
3. Debugging & Validation:
 - Used PyVista (Python) for intermediate geometry debugging and visualization.
4. AI Generation:
 - Model: Hunyuan 3D 2.
 - Generates 3D meshes based on prompts/inputs directly within the workflow.



5. Current Status

Implementation Progress

Achieved Milestones:

1. Mesh Streaming:
 - Successfully sending raw mesh geometry (Vertices, Indices) from Blender to Unreal.
2. AI Generation in Blender:
 - Integration of Hunyuan 3D 2 to generate mesh geometry directly inside the Blender environment.



6. Future Roadmap

Next Steps for Full Integration

Upcoming Features:

1. Material & Texture Streaming: Support for PBR materials and texture maps (Albedo, Normal, Roughness).
2. Textured AI Generation: Generating full-textured assets, not just grey-box meshes.
3. Skeleton Generation: Auto-rigging and skeleton generation for dynamic assets.
4. Skeletal Mesh Streaming: Support for streaming rigged characters and animations.