

Neural-Ink

V5

Realtime Pervasive AI Graphics Pipeline

Built for the future of generative realtime rendering.

■ POWERED BY AMD TECHNOLOGIES

The Problem with Realtime Stylized Rendering

Modern games are dominated by photorealism, while unique stylized rendering pipelines remain expensive, handcrafted, and difficult to scale.

Traditional realtime style transfer systems suffer from:

- ⚡ Flickering and temporal instability
- 📏 Spatial inconsistency
- 🕶️ Poor depth awareness
- 👻 Distracting motion artifacts



Content Image

+



Style Image

=



Neural Style Transfer

Neural-Ink V5 Solution

NEURAL-INK V5
REALTIME PERVASIVE AI GRAPHICS PIPELINE

TEMPORAL STABILITY | DEPTH-AWARE RENDERING | CLOUD-TO-EDGE AI | REALTIME PERFORMANCE

BEFORE AFTER

TRANSFORM ANY WORLD. IN REALTIME.

TRAINED ON AMD INSTINCT™ MI300X

ROCm
POWERED BY ROCm

ONNX
FP16 OPTIMIZED

UNITY SENTIS
GPU INFERENCE

13 - 20 ms
REALTIME LATENCY

POWERED BY
AMD

BUILT FOR THE FUTURE OF GENERATIVE REALTIME RENDERING

The banner features a central image of a medieval village with a vertical line separating the 'BEFORE' (realistic) and 'AFTER' (stylized) versions. The 'AFTER' version has a dark, ink-like aesthetic with a flock of birds in the sky. The bottom section contains technical specifications and logos for AMD, ROCm, ONNX, and Unity Sentis.

Neural-Ink introduces a recurrent depth-aware AI rendering pipeline designed explicitly for temporally stable realtime stylization.

- ✓ Temporal coherence across consecutive frames
- ✓ Optical flow conditioning for accurate pixel tracking
- ✓ Depth-aware rendering preserving scene geometry
- ✓ Recurrent feedback inference eliminating flicker
- ✓ Async GPU inference for zero-bottleneck performance

Cloud-to-Edge AI Graphics Pipeline



1. Training

Datacenter-scale model training utilizing **AMD Instinct MI300X** accelerators, optimized on the ROCm foundation and PyTorch framework.



2. Optimization

Trained weights are optimized and exported to **ONNX FP16**, utilizing specialized compute shader tensor packing for edge devices.



3. Deployment

Realtime execution via Unity Sentis GPUCompute with native **RenderGraph integration** directly in the interactive rendering pipeline.

Achieving Temporal Coherence

Unlike standard frame-by-frame post-processing filters, Neural-Ink uses architectural recurrent mechanisms to ensure perfect visual stability over time.

- ⇒ Optical flow motion vectors guide the network on pixel trajectory.
- ↻ Temporal warping aligns past states with current frame geometry.
- 🌀 Stable frame conditioning propagates historical context dynamically.

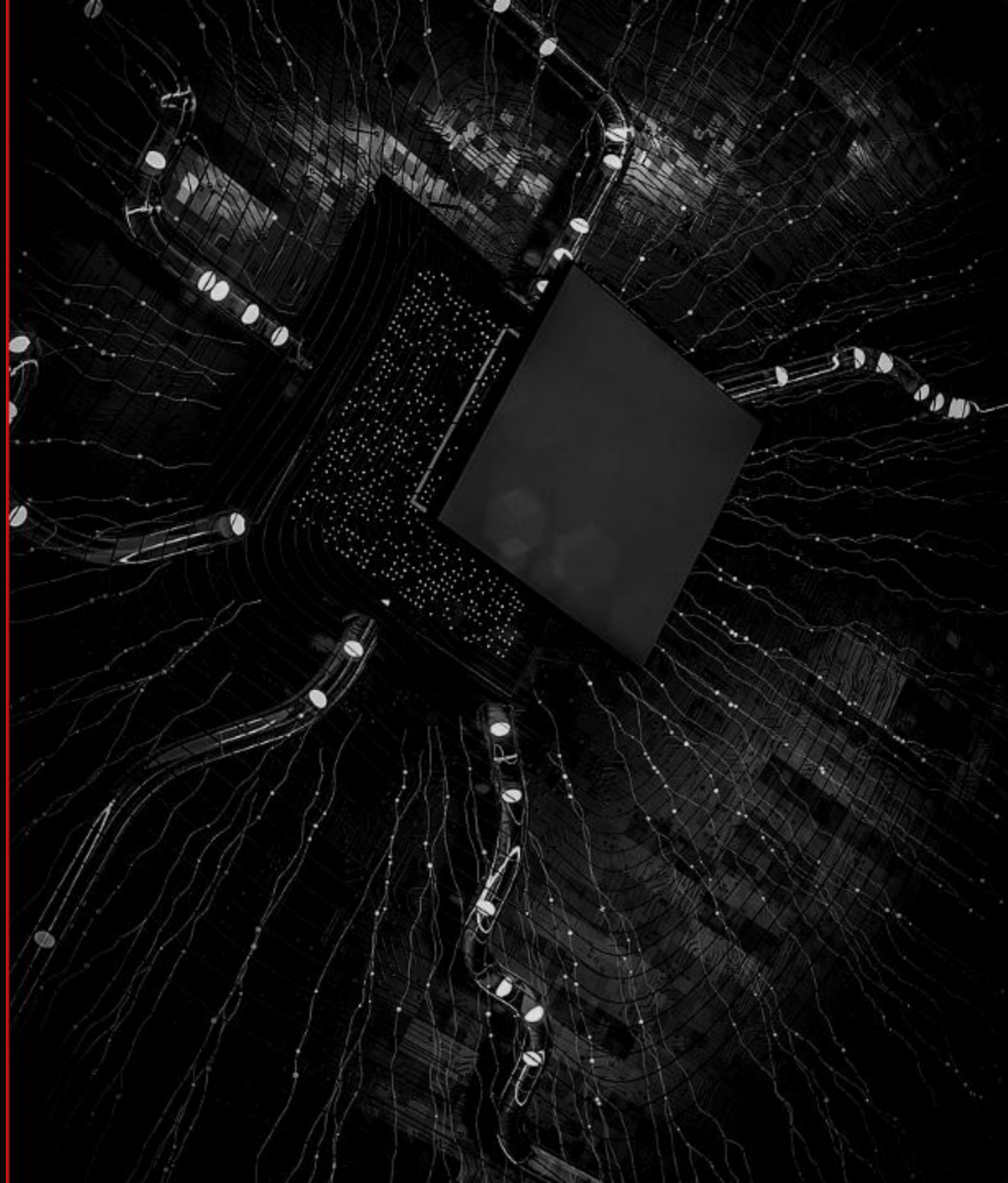
Result: Significantly reduced flickering and flawless visual consistency.



Realtime GPU Inference

Neural-Ink achieved realtime inference latencies between **13 ms and 20 ms** during live gameplay tests on consumer hardware.

- 🎮 Hardware target comparable to AMD Radeon RX 6000-class GPUs.
- ▶️ Asynchronous GPU execution ensures rendering thread is never blocked.
- 🎮 Perfect for realtime interactive rendering targeting 60+ FPS.



Cross-Scene Generalization



Primary Domain: Viking Village

The model was trained primarily on specific Viking Village sequences, establishing its strong temporal robustness and baseline stylization parameters.



FPS Environments

Neural-Ink successfully generalized to entirely different realtime environments, proving its spatial consistency and scene-independent stylization capabilities.

Pervasive AI Graphics Ecosystem



Datacenter Scale

Massive dataset generation and model training powered by scalable AMD Instinct architecture in the cloud.



ONNX Optimization

Streamlined cloud-to-edge workflow ensuring models are lightweight, fast, and hardware agnostic via ONNX.







Consumer Hardware

Generative rendering becomes a native, performant layer of future interactive graphics systems on edge hardware.

Future Applications

The stable realtime AI stylization pipeline opens doors to massive disruptions in multiple creative and interactive industries.

-  **Immersive XR Experiences:** Stable realtime neural rendering for virtual reality.
-  **Stylized Games:** Unique visual aesthetics without manual asset authoring.
-  **Interactive Media:** Dynamic visual storytelling and generative visual effects.
-  **AI-Assisted Creators:** Powerful tools for indie developers to achieve AAA styles.



Neural-Ink

V5

Built for the future of pervasive generative graphics.

- ✓ Realtime AI rendering
- ✓ Temporal stability
- ✓ Cloud-to-edge deployment

■ POWERED BY AMD TECHNOLOGIES