Neural Appearance for Real-Time Graphics

6 Month Internship – La Forge, Ubisoft Bordeaux

Neural rendering is an emerging field at the intersection of computer graphics and machine learning. It explores how neural networks can be used to represent, compress, and reproduce complex visual phenomena that are difficult to capture with traditional techniques [1].

While neural methods have demonstrated impressive quality in offline rendering and research prototypes, their integration into real-time systems remains challenging. Open questions include performance optimization on modern GPUs, balancing neural representations with analytic models, and ensuring controllability for artists and technical directors.

Neural methods have shown impressive results to represent high-quality material appearance [2, 3]. Recently, we proposed a hybrid approach [4] that combines traditional microfacet BRDF with neural correction that better fits game engine constraints. Recent work [5] showed that diffusion models can help generate richer materials. But challenge remains, both with real-time neural rendering system and data creation pipelines that are to build.

The goal of this internship is to investigate neural appearance techniques in the context of real-time graphics. During the internship, the student will survey recent advances in the field, identify key limitations in existing methods, and implement experimental prototypes. The work is exploratory in nature, with emphasis on deriving insights that can inform future research and potential integration into real-time rendering systems.

Supervision

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References

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[2] T. Zeltner et al., "Real-Time Neural Appearance Models". SIGGRAPH (2024).
[3] A. Weidlish. "Bridging the Gap Between Offline and Real Time with Neural Materials". Siggraph Courses (2025)
[4] De Oliveira et al., "Hybrid Neural-Microfacet BRDF Model for Real-Time Rendering". EGSR (2026)
[5] Yu et al. "Toward Richer Material Generation via Procedural Data Enhancement" SIGGRAPH (2026)