Research Internship (M2)

Ubisoft La Forge (Bordeaux)

Real-time Neural Appearance for Video Games

In recent years, there have been significant advancements in the field of Neural Rendering. More specifically, recent works have demonstrated the ability of these techniques to effectively represent the material properties of 3D objects using a set of *neural textures* and a *decoder network*. However, despite this progress, these methods often overlook the issue of storage size as he learned neural features are usually stored in an uncompressed format. This makes the memory footprint of neural materials quite large making them unpractical for real-time applications. This becomes especially evident when we consider the memory capacity of mainstream hardware devices.

Our aim is to leverage the power of neural rendering techniques to encode complex, high-quality materials commonly seen in film production. However, the real challenge lies in enabling the decoding of these materials in real-time while significantly reducing the storage requirements of the neural textures.

Our goal is to find a solution that strikes a balance between the richness of the materials we can represent and the practical constraints of real-time rendering, all while ensuring a manageable storage size for neural textures.

[1] Tewari, Ayush, Justus Thies, Ben Mildenhall, Pratul Srinivasan, Edgar Tretschk, Wang Yifan, Christoph Lassner et al. "Advances in neural rendering." In *Computer Graphics Forum*, vol. 41, no. 2.
[2] Zeltner, Tizian, Fabrice Rousselle, Andrea Weidlich, Petrik Clarberg, Jan Novák, Benedikt Bitterli, Alex Evans, Tomáš Davidovič, Simon Kallweit, and Aaron Lefohn. "Real-Time Neural Appearance Models."
[3] Vaidyanathan, Karthik, Marco Salvi, Bartlomiej Wronski, Tomas Akenine-Möller, Pontus Ebelin, and Aaron Lefohn. "Random-Access Neural Compression of Material Textures."

Qualifications

- You are a last year student at an engineering school or university research master.
- You have skills in machine learning.
  Knowledge of computer graphics is a plus.
- Your level of English allows you to work in an international team and to communicate easily with non-French speakers.

Supervision

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