

Volumetric Shape Super-Resolution

Bachelor's Thesis / Master Project / Master's Thesis

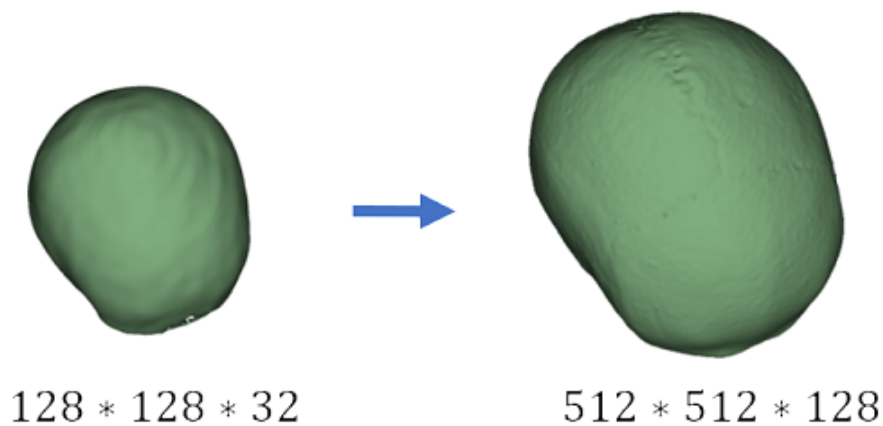


Figure 1: Reconstructing a high-resolution skull from a low-resolution input and filling in geometric details.

Description:

Image super-resolution refers to the process of upscaling a low-resolution image to higher-resolution and restoring the semantic details unseen in the low-resolution image. Similarly, volumetric shape super-resolution refers to upscaling a 3D volumetric shape (e.g., from $128 \times 128 \times 32$ to $512 \times 512 \times 128$) and filling in geometric details. Data-driven approaches have been prevalent in super-resolution and the widely adopted deep learning architectures for this task are encoder-decoder, and generative adversarial networks (GAN). Template-based approaches are another choice for volumetric shape super-resolution, which search for the closest templates from some candidates to synthesize a high-resolution output.

Objective:

- Familiarize with the concept of super-resolution
- Implement super-resolution on skull data

Qualifications:

- Proficient in python coding
- TensorFlow / PyTorch

Note: Biomedical Engineering Students are welcome!

Contacts at ICG:

Jianning Li
jianning.li@icg.tugraz.at

Jan Egger
egger@icg.tugraz.at