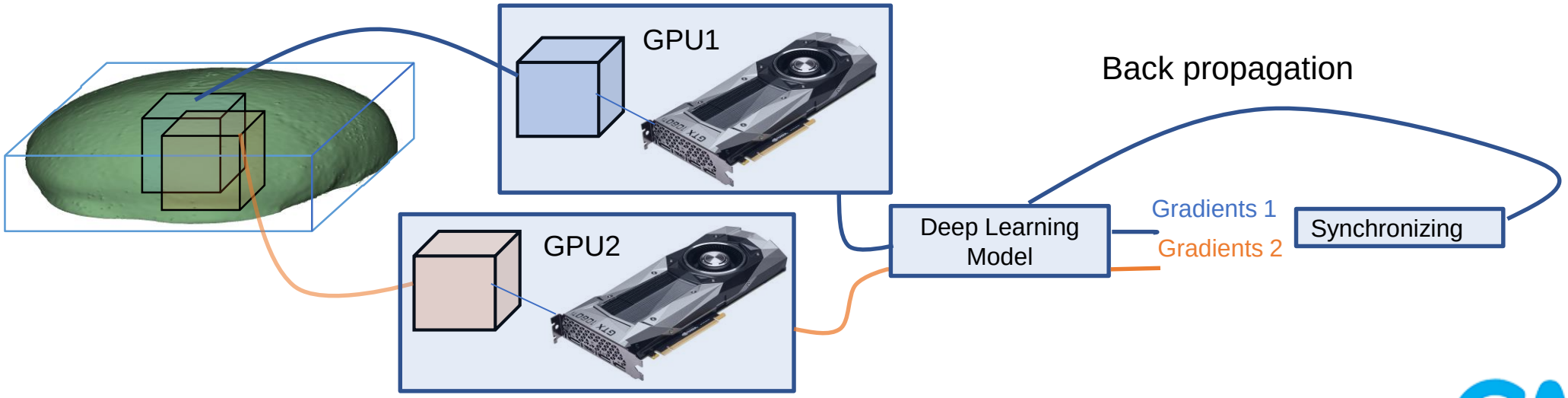
Parallelize Deep Learning on GPUs for Skull Reconstruction

Short description:

Training Deep Learning models with two 3D Patches simultaneously by synchronizing the gradients from two GPUs.

Goal:

Increasing the size of 3D patches during training helps boost deep learning performance especially for reconstruction tasks. However, the patch size is restricted by the limitation of GPU memory. An alternative solution is to use two (or multiple) GPUs and each GPU is responsible for calculating the gradients generated by a 3D patch. The two sets of gradients from two patches and two GPUs are synchronized before the back propagation process when the model parameters are updated. This is equivalent to training the deep learning model using one patch two times larger than what a single GPU can handle and can subsequently improve the deep learning performance.



Keywords: GPUs, Skull Reconstruction, Data Parallelism, Deep Learning

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Biomedical Engineering Students are also welcome!

Clinical additive manufacturing for medical applications