StrataVR: A Unity Based Out-of-Core Pipeline for Interactive Exploration of Multi-Terabyte Volumes in Virtual Reality

Furqaan Nadeem[1], Xinrui Zou[1], Brian Lee[1], Harshad D. Vishwasrao[1], Dorian B. McGavern[2], Raisa Z. Freidlin[1]

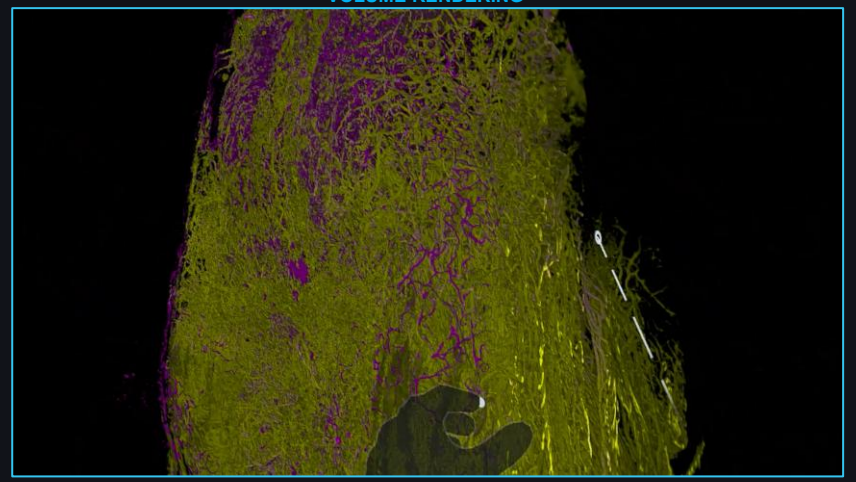
[1]National Institute of Biomedical Imaging and Bioengineering, National Institutes of Health , [2]National Institute of Neurological Disorders, National Institutes of Health

StrataVR is an **open source** method of viewing and interacting with **large** (1 TB+) volumetric datasets in **Virtual Reality** (VR).

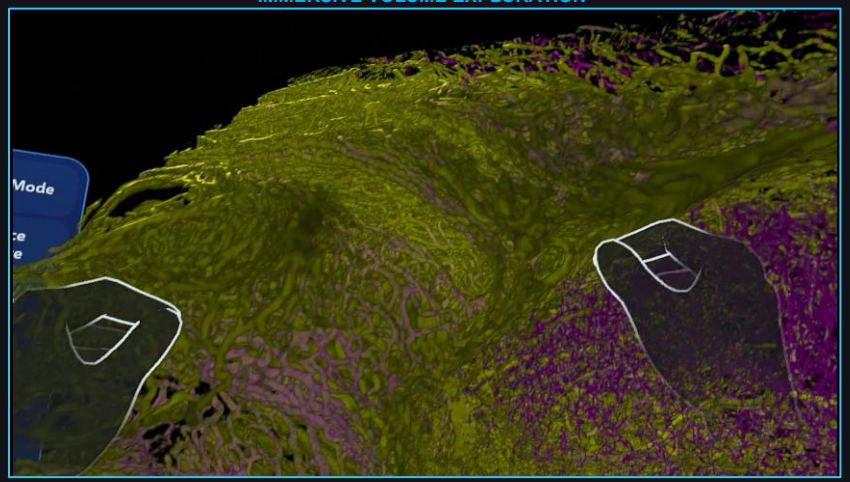
VR visualization of volumetric data offers an intuitive understanding of spatial relationships and allows direct inspection of internal structures, making it a powerful tool for researchers and professionals analyzing complex 3D data.

Large volumetric datasets are often too large to fit in memory, making real-time exploration in Unity and VR difficult. StrataVR divides the volume into manageable multi-resolution bricks and streams only the data needed for the current view.

VOLUME RENDERING

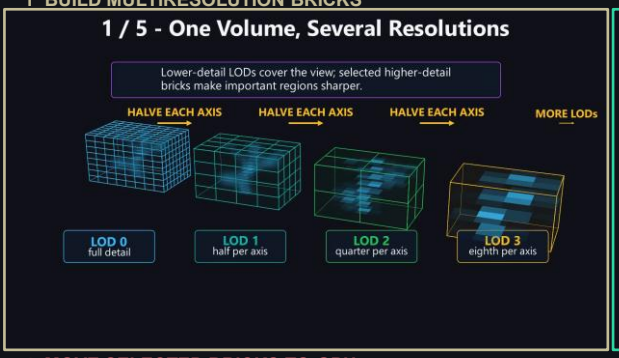


IMMERSIVE VOLUME EXPLORATION

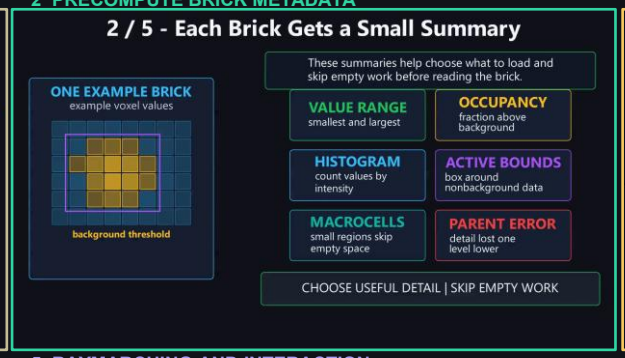


The StrataVR Out-of-Core Bricked Volume Pipeline

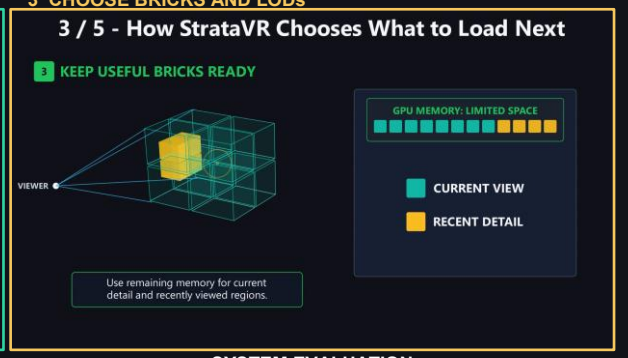
1 BUILD MULTIRESOLUTION BRICKS



2 PRECOMPUTE BRICK METADATA



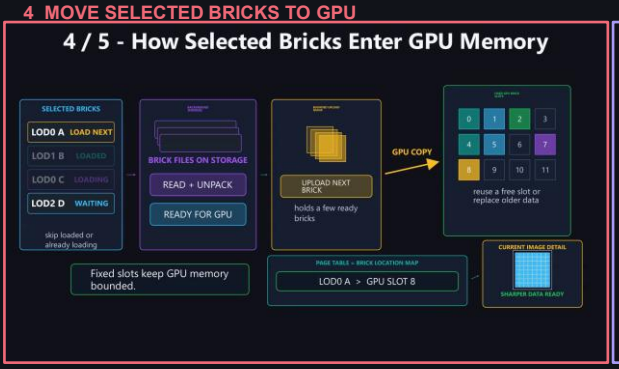
3 CHOOSE BRICKS AND LODs



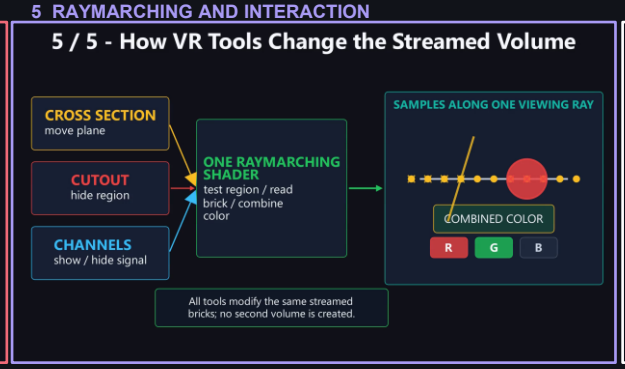
SPATIAL CLIPPING TOOLS



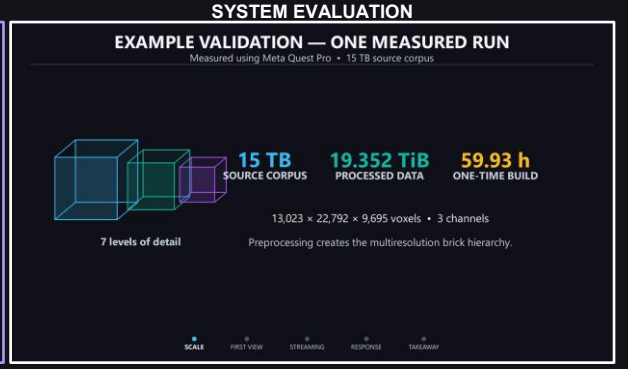
4 MOVE SELECTED BRICKS TO GPU



5 RAYMARCHING AND INTERACTION



SYSTEM EVALUATION



MORE DEMO VIDEOS

StrataVR