

A LIGHTWEIGHT 3D VIEWER: REAL-TIME RENDERING OF MULTI-SCALE 3D SURFACE MODELS

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PROBLEM

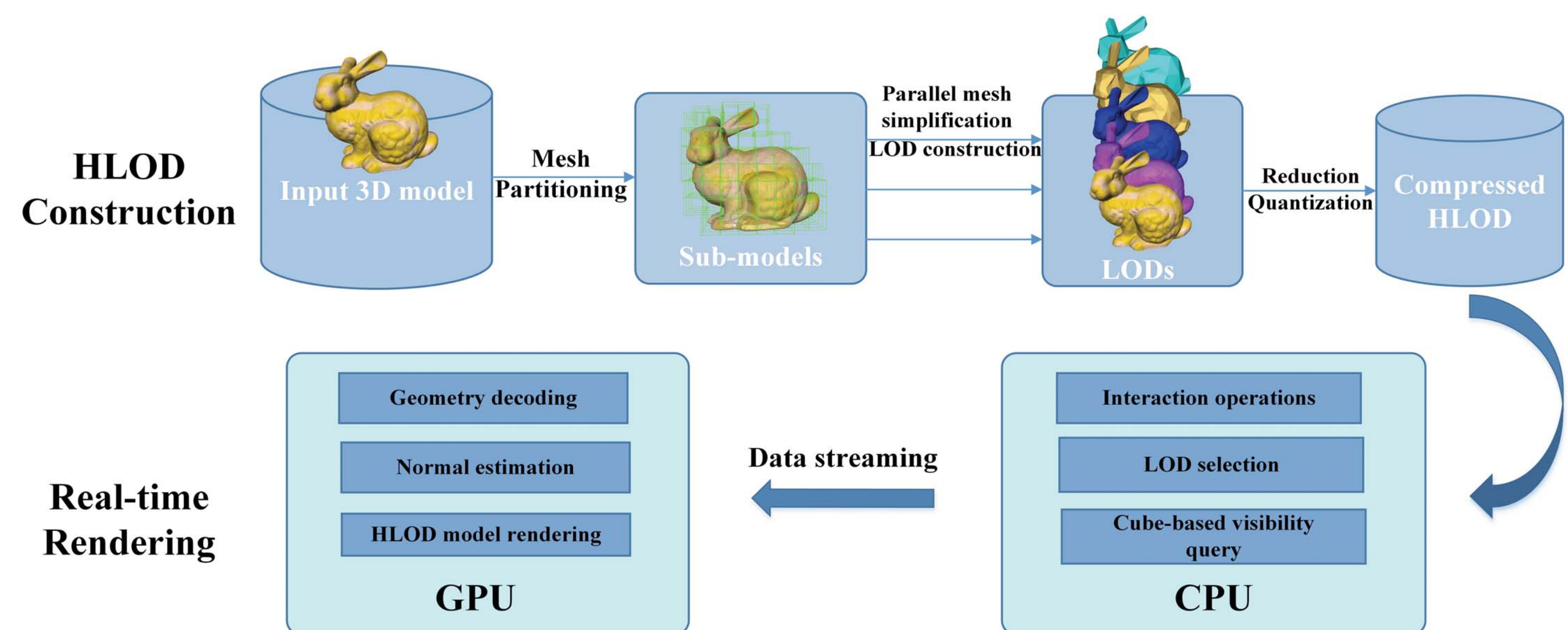
Massive 3D models can often not be rendered in standard 3D viewers due to their size and complexity. Some high end rendering engines propose solutions to this problem, but they require a steep learning curve and high processing power and hardware devices.

MOTIVATION

Build a lightweight 3D viewer for rendering large scale/complexity surface models, which allows users to visualize and check 3D models without large pre-processing times or booting up resource hungry software.

PIPELINE

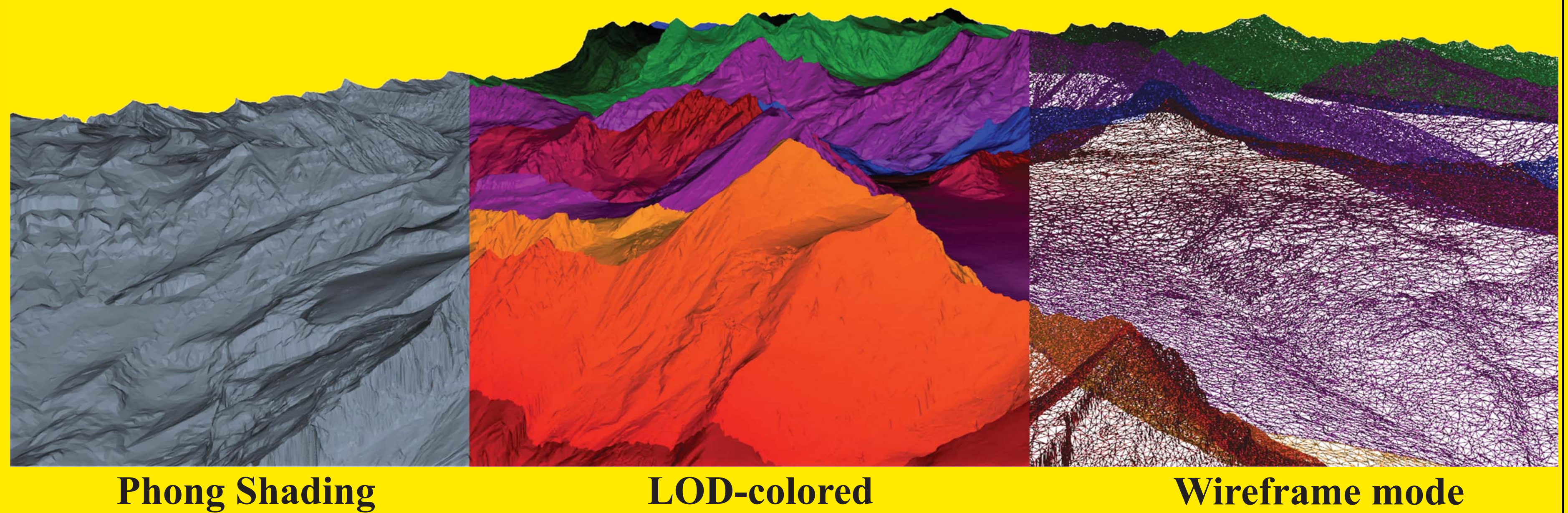
Our viewer includes two major parts: HLOD construction and real-time rendering. Along with some optimization techniques for efficient renderings, such as vertex quantization.



KEY FEATURE

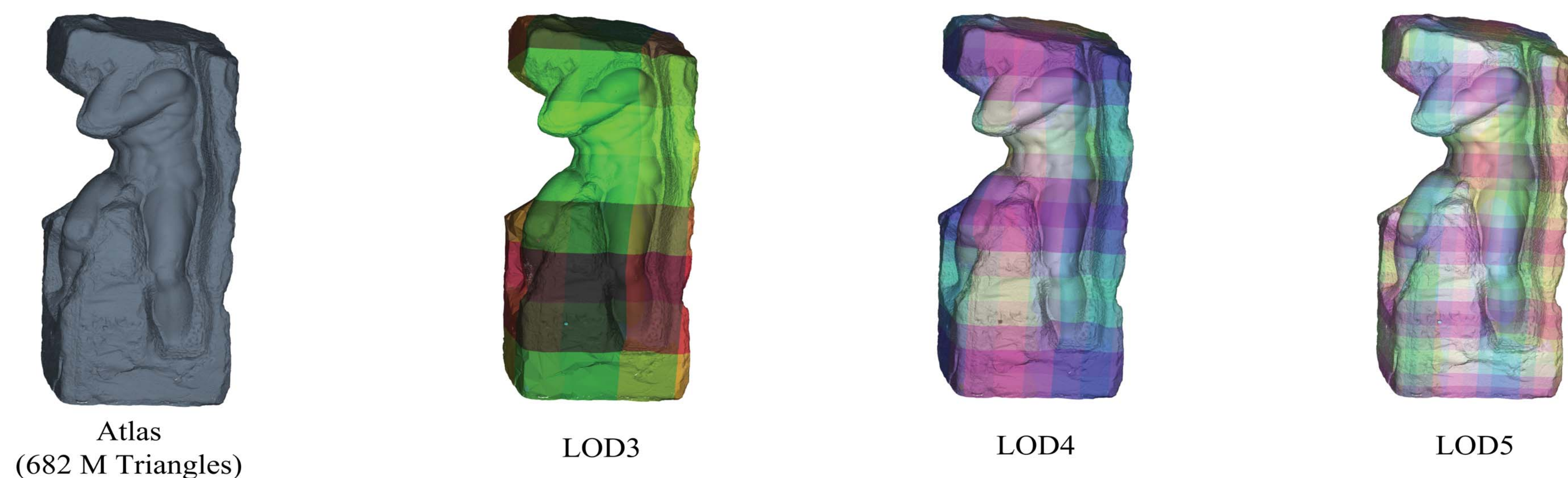
A child-parent relation between vertices of successive HLODs meshlets that:

- (1) is compatible with parallel preprocessing.
- (2) allows for a viewpoint dependent vertex interpolation that ensures a no crack and no popping property.



HLOD construction

Our construction implementation (starting from standard mesh file formats) achieves competitive levels of the order of 1 million input triangles per second per core.



RESULTS

Real time Rendering

Rendering result at 170 fps on a desktop without discrete GPU



REFERENCE

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- [2] Anass Nouri, Christophe Charrier, and Olivier Lézoray. 2017. Technical report: Greyc 3D colored mesh database. Ph. D. Dissertation. Normandie Université, Unicaen, EnsiCaen, CNRS, GREYC UMR 6072.
- [3] Rui Li. Multi-scale simplification and visualization of large 3D models. (PhD Thesis in preparation).

ACKNOWLEDGMENTS

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