Contribution ID: **31** Type: **not specified**

Region of view tomography

Monday, 9 January 2017 16:20 (20 minutes)

Today, most imaging software pipelines distinguish between (at least) the steps of (1) data acquisition, (2) volumetric reconstruction and (3) visualization and analysis. Those parts are usually treated as separate "modules" with only marginal interaction, e.g., through calibration parameters. In particular, reconstruction is almost always performed on a whole volume, and the reconstructed 3D image is often visualized by 2D slicing or a 3D rendering technique.

We propose a new paradigm where visualization and reconstruction are integrated in the sense that the reconstruction is focused on the region of view (ROV), i.e. the region at which a user is currently looking by means of a visualization tool. For non-iterative methods this means that points outside the ROV can be ignored altogether since the algorithms work point-per-point. In iterative schemes, the "outside" part can be represented with a very coarse discretization, thereby strongly lowering the required computational cost.

The talk introduces the concepts and shows some early results.

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Session Classification: Contributed talks Monday

Track Classification: Lectures