Master Paper Note

Tri Huynh

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1 Current Goal

Create new methods and tools to visualize volumetric space-time data:

- Create interactive 3D tool to visualize and inspect the data: e.g. showing the tracked path with MIP at each time step, allowing users to browse through data by interacting with the tracked path, ...
- Propose some methods to make new visualizations as the summary of the space-time data: e.g. extend curved planar reformation to 4D data, ...

2 Technical Note

2.1 Coordinate Frame

2.1.1 Frenet-Serret Frame

2.1.2 Parallel Transport

2.1.3 PCA Pseudo Side Vector

2.2 Curved Planar Reformation

2.2.1 In 3D Spacial Data

2.2.2 Extension to 4D Space-Time Data

2.3 Volume Rendering

2.3.1 Simple MIP

2.3.2 RFP-Isosurface-Bounded MIP

2.3.3 Newton-based Maxima

2.4 Capabilities of The 3D Interactive System

2.4.1 Building Components

- Teem

- Hale
- CUDA

2.4.2 Functionalities