Advanced techniques for visualizing large, complex data

Hands-on Sessions

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Four Software Prototypes

1. View-dependent streamline visualization
2. Sketch based streamline and particle trajectory visualization
3. An animation framework for volume visualization
4. Network analysis and visualization

Manual, guides are in
http://vis.cs.ucdavis.edu/CEA_SummerSchool/
## Schedule

### 6/14
- Introduction and Interactive Demo

### 6/15, 6/16, 6/21
- Three tasks

### 6/23
- Presentation of results and findings (optional)
Tasks

• Playing with different streamline visualization methods
• Making a volume visualization animation using AniViz
• Exploring network/multidimensional data using netzen

Using your own datasets?
Presentation of Results and Findings

• Images and videos
• Your comparative study
• Your opinions and thoughts
View-dependent streamline visualization

- cd ~/viewdepvis/
- source profile
- ./VectorFieldVolumeRendererCUDA [dataname]
View-Dependent Streamlines for 3D Vector Fields

Stéphane Marchesin, Cheng-Kai Chen, Chris Ho, and Kwan-Liu Ma

Using streamlines…

Perfect streamlined shape in perfect streamlined flow.

Nascar

Fuel Economy, Hypermiling, EcoModding News and Forum – EcoModder.com – aerohead’s Album: Book illustrations - Picture

Tecplot – Plot Gallery - Streamline Plot - Nascar
Problems in 3D

Air flow around a car

Supernova
Our results

Air flow around a car

Supernova
View-Dependent Streamlines for 3D Vector Fields

- Volume rendering
- Streamline visualization
- Different streamline generation methods
- View-dependent
Live Demo
Sketch based streamline and particle trajectory visualization

- cd ~/sketch/line_show
- ./cxvolme
A Sketch-Based Interface for Classifying and Visualizing Vector Fields
Jishang Wei, Chaoli Wang, Hongfeng Yu, Kwan-Liu Ma

Sketch Based Streamline Visualization

• An interactive, intuitive sketch-based interface
• A way to search for flow features of interest
• Visualization the distribution of the flow features
• A way to create more concise visualization
Live Demo
An animation framework for volume visualization

- cd ~/anivis/
- source profile
- ./VisKitPro
AniViz

• An animation framework
  – Presently support volume data visualization
  – Making animations while exploring the data
  – Highly interactive
  – Making sophisticated animations not possible with conventional key frame approach

Live Demo
Network analysis and visualization

- cd ~/netzen/
- ./netzen

Examples in

~/netzen/Demo.txt
Network analysis and visualization

• netzen
• Interactive analysis and visualization system
• Network visualization, parallel coordinates, scatterplots, ... etc.
• Consisting of several advanced features
• Open source software
Demo

64 individuals with blue tooth device
→ Each individual is a node in a graph
→ If two devices are closed to each other, there will be an edge between two nodes.
Live Demo