

Lecture 12 on Apr 15th

Warm-up activity:

Observational data, crump different data to get this false-color of yellow probably not visible by human eyes

Why these objects? Sun, Pluto, voyage1? Voyage1 the furthest man-made object

Gravitational lensing

Family tree of dinosaurs, dashboard

Current world map does not match the pre-historic period of dinosaurs

Information viz

Spacial encoding of information

Spatial data,

Tends to be stored in two formats geometric and volumetric

Polygons are many-sided, normally flat shape, in practice flat are triangles

Points clouds, is the cheapest, polygonal is point cloud with additional information; point cloud is the most efficient way of visualization

Volumetric data,

3d and grid, scalar datatype, stack bunch of scalar filed, 1 float per cell, EXR format with multiple layers

Vector, 3 floats per cell; windy.com shows vertices of hurricanes, earth.nullschool has an option of showing ocean currents, data comes from NOVA

Slide 14, magnetic field of the sun, vector data showing vortex, mathematical operation to transform vector data to scalar representation

Polar grid, rectangular grid, and spherical grid; Quadtree?

Stretch grid, to put more resolution, funnel cloud has more resolution(focus) than the rest of the viz

3 categories of spatial data:

Statistical, star species

Observational, telescope, microscope, anything requires a sensor, motion data

and simulated by computer models, 1st principle data into the best computer can represent, not fake

Render points as a dot, each dot as a circle, slide 17 is a lazar scan

Spirtes, change any image into points to get more effect

Meshing, Find a way to create polygons surface over the point

(Transforming from one data type to another is important)

Polygons, world mapping in the previous lecture

Direct rendering, blueprint schematics of a satellite is given; 3-D scan data, always gathered as point clouds, angstroms turn point clouds into surfaces

Visualizing scalar data,

Slice, data near you would block the ones further, thus brain scan of 3d volumetric is extracted as 2d; giving a sense of overall trend, don't show isolated anomalies people look for

Isocontours to isosurfaces

Tornado and funnel clouds above, direct 3d volume rendering, higher density in front of the camera(visual aspect), more transparent more you can see, carve out the interesting shape

Arrow glyphs represent vectors with arrows

29 another tornado viz, grass on the cloud shows wind at the ground, changes color according to the magnitude of wind; particle evaction, points move through the wind identify downdraft, connect the history and position of points to get a streamline

Yt package

A reminder of part 3