Scivis

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http://kopernik.npac.syr.edu:8888/scivis

REQUIRED SOFTWARE/SYSTEMS: Any computer which runs JDK 1.1.3 or greater (which must be installed)

Scivis is a collaborative, scientific data analysis and visualization tool written in 100% Java. Scivis is a visualization server, and thus data is piped into scivis via API's which we provide for C, F90, and Java. We support 1D, 2D, 3D visualizations. Among some of the key features of scivis are:

1. Animations for all plots.
2. Isosurface, via an isosurface server (written in C, and Java).
3. User-definable filters.
4. Multiple windows on a desktop.
5. Desktop Window Manager.
6. Publication quality plots.
7. White-board features.
8. Contour plots.
9. Vector plots.
10. Collaboration across N-visualization servers.
11. Complex mesh structures to handle visualization output from finite element code.

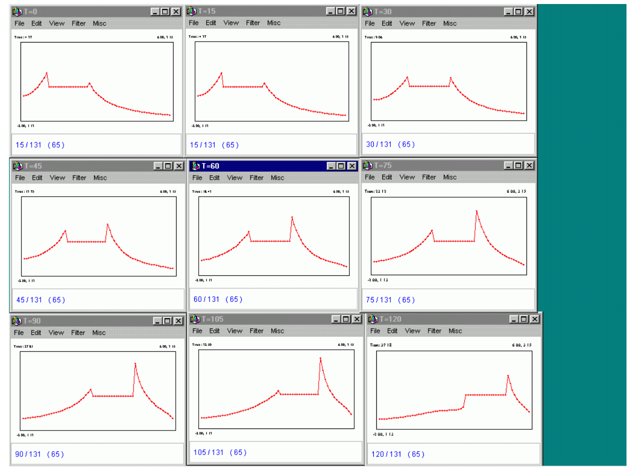
Simulation Server-Vis. Server model

- Simulation servers connect to scivis via. pipes
- These servers send data to scivis via API's which we provide.
- These API's open up temporary connections to Scivis.
- These servers may also read in data from any user format, and then pipe data into scivis

Animations/Buffering of Data

- Each data set that gets sent to scivis is given a unique name. Each data set with a different name is shown in a different window.
- Windows can be merged together, added together, etc.
- All data can be buffered in memory, so that we can animate each window. (Or it can be set so that a window only holds one time slice).

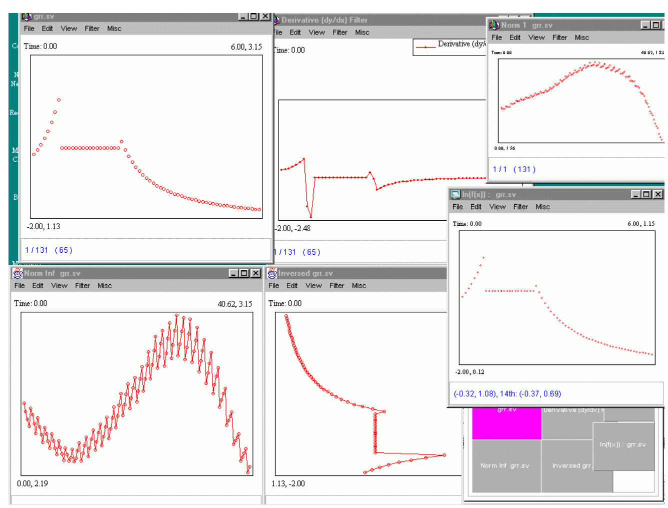
A sample screenshot showing 9 different windows of



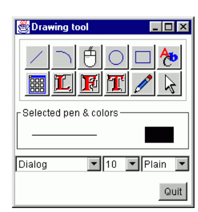
the same grid function at different times (since we can't animate on this paper handout!)

User Definable Filters

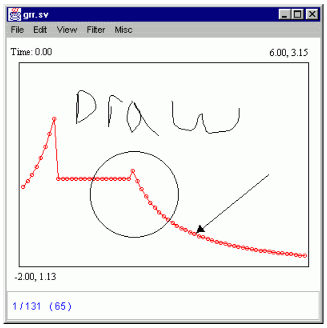
- Each window (1D,2D,3D,vector,etc.) can be filtered.
- Sample filters shown below are derivatives, norms, logs, sorting of data set, etc.
- Also shown below (on the lower right of the figure, is our window manager.
- Filtering of data can either: a. produce a new window, b. replace the original data with the filtered data, c. place the filtered data on the same window as the original data.



White Board Features



- The figure on the right shows the white board menu.
- One can draw, type text, etc.

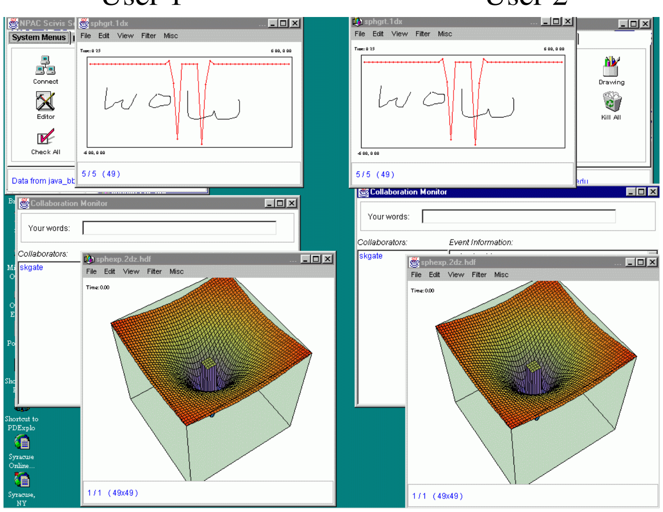


- Shown to the left is an example 1D window where we have drawn an arrow, some free-form text, and a circle.
- These figures can be placed on the window for certain animation times, which can then be useful to point out features of a plot when animating for others.

Collaboration

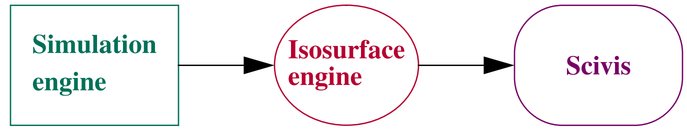
- All features of Scivis are collaborative: animations, filters, whiteboard, choices of how each plot looks.
- We also provide a simple chat window so that users can communicate.
- Shown below is a sample snapshot of a screen with 2 collaborators. The left side of the screen is user 1, and the right side of the screen is user 2. When user 1 rotates the surface plot, this signals the surface plot of user 2 to rotate. When user 1 animates either plot, it animates user 2 plot. When user 2 does anything, (if she/he is a master) then it does the same thing on user 1 command. If user 2 is a slave, then she/he can only watch, and whatever this user does, it does not get communicated to user 1.

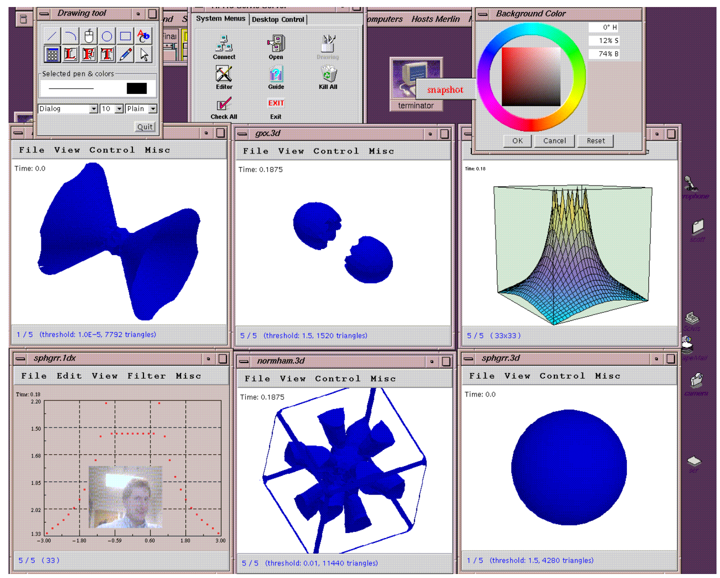
User 1 User 2



3D Isosurface

- Users send scivis 3d data via the `java_ser3d(name,time,bounding_box,grid_function,nx,ny,nz,threshold)` API.
- The scivis isosurface engine, a separate engine from the visualization engine, runs on the users chosen machine, and generates the triangle list.
- The triangle list from the isosurface engine is piped into scivis, the visualization engine. Scivis users can then change the threshold value for any/all time slices, and the triangles are then recalculated on the isosurface engine and the new triangles are sent back to scivis.





Other features/ Future work

Some of the feature that we did not show in this handout, are:

1. GIF and Postscript output. (Presentation quality for 1D now, 2D/3D later.
2. Incorporation of Java 3D (when this becomes available).
3. A repository for user-definable filters so that users can benefit from other users filters.
4. Colormap editors, and more complex color choosers, (so that users can color-code a function according to another function).
5. Cut and paste different window types together (for example, cut and paste a surface plot with a vector plot, with an isosurface plot.
6. Please tell us what you would like scivis to have!

Further questions/comments:

Please direct any further questions/comments to Scott A. Klasky (scott@npac.syr.edu, 315-443-1690)