1 NCSA Collage - An Overview

Overview

In this chapter we describe some of the concepts and features of NCSA Collage. Each feature is briefly described with detailed information supplied in subsequent chapters. New terminology is also introduced to describe the concepts used in the application.

Data Display Capabilities

Using computers to gather information has given researchers the ability to collect an almost endless stream of data. To help analyze the data, researchers need to view information in different ways to gain insight into the data they've collected. NCSA Collage provides several means of displaying data for analysis:

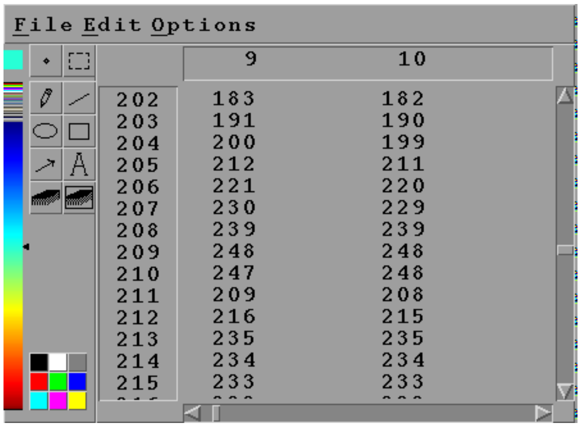
- Viewing data as a spreadsheet
- Viewing data as a raster image
- Viewing multiple raster images as an animation sequence

Scientific Data Spreadsheets Display

Scientific floating-point data can be displayed in a spreadsheet window. Scientific floating-point data is often referred to as *scientific data sets* or SDS. Raster images can be rendered from the data to allow you to view a visual representation of data.

NOTE: In this version of NCSA Collage, mathematical manipulations on the data are not supported.

Figure 1.1 Spreadsheet Window

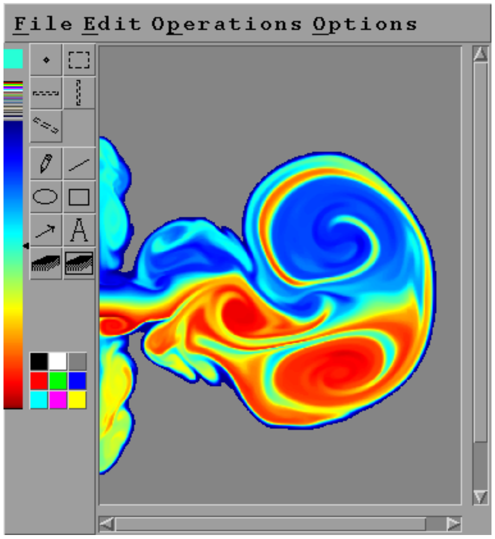


	9	10
202	183	182
203	191	190
204	200	199
205	212	211
206	221	220
207	230	229
208	239	239
209	248	248
210	247	248
211	209	208
212	216	215
213	235	235
214	234	234
215	233	233

Raster Images Display

Raster images are bit-mapped images whose rows of pixels are displayed from left to right using three 8-bit numbers to represent each pixel. Raster Images can be displayed and magnified. Standard format graphic images can be displayed or images can be generated from spreadsheet data.

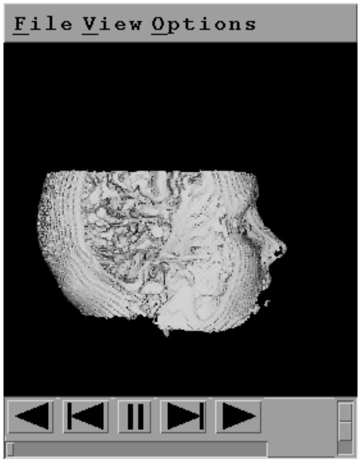
Figure 1.2 Raster Image Window



Animation Display

Multiple raster images can be viewed as animation sequence. Basic controls allow you to start, stop, forward, reverse, and adjust the speed of the image animation.

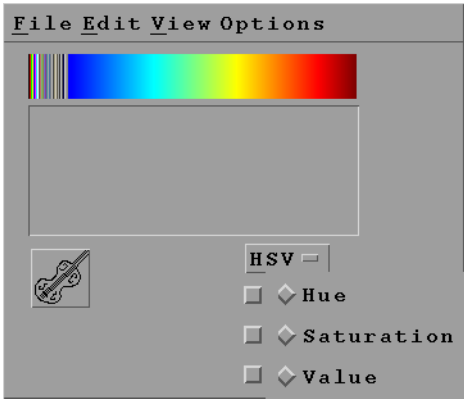
Figure 1.3 Animation Window



Color Table Display

Color tables, or *palettes*, are used to display color renderings of raster images by mapping the raster image data to a particular color in the color table. Color tables can be displayed and manipulated in the Palette Editor window.

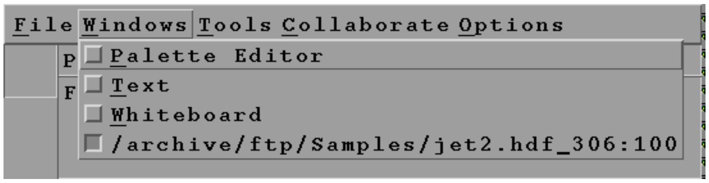
Figure 1.4 Palette Editor Window



Display Management

Loading large amounts of data in the forms of spreadsheets, raster images, animations, and color tables may present a problem when too many windows are open at the same time. To alleviate viewing multiple windows, windows may be closed and reopened later. When a window is closed the window is merely hidden, but the data is not deleted from memory. A list of hidden windows is maintained by NCSA Collage. To reopen a hidden window and display the data that it contains, you select the data title from the list of hidden windows.

Figure 1.5 Example List of Hidden Windows in the Window Menu


File Windows Tools Collaborate Options
Palette Editor
Text
Whiteboard
/archive/ftp/Samples/jet2.hdf_306:100

Data Associations

NCSA Collage provides the ability to recount dependencies between data objects. These dependencies are created through the use of *associations*. Associations are automatic links between data objects. When one data object is manipulated, the associated data object is automatically manipulated in the same manner.

During data analysis, associations allow you to see the affect of your changes on associated data. When you perform data analysis in NCSA Collage, you highlight an area of data to examine. Once an area is highlighted, the corresponding area in the associated data is also highlighted. For example, when you highlight an area on a rater image, the associated spreadsheet data for that area is automatically highlighted. This association allows you to view the numeric value of data that is graphically displayed in a raster image.

The associations in NCSA Collage are:

- A raster image to a scientific data set
- A color palette to a raster image

Associations are automatic in NCSA Collage and cannot be disabled.

Raster Images and Spreadsheets

Raster images can be generated from spreadsheets and spreadsheets can be generated from raster images. When either data object is generated, an association is automatically created between the data objects. Highlighting an area of data in one object will highlight the corresponding area in the other object.

Color Tables and Raster Images

A raster image is also dependent on the color table used to display it. Whenever the colors in a color table change, any raster image dependent on that color table also changes instantaneously to display the new colors of the color table. Color tables may be edited in the Palette Editor window.

Data Analysis Tools

To examine data values and generate graphs, NCSA Collage provides several data analysis tools. You examine an area of data by highlighting it. The process of highlighting an area of data is called *selection*. Examining data values, generating X-Y graphs and histograms plots are possible from selections within the spreadsheet or raster image.

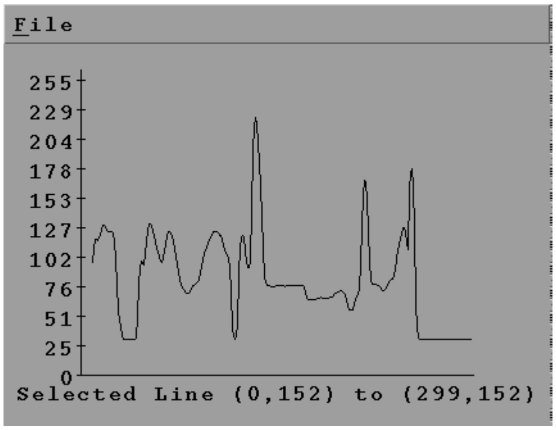
Point Selection Tool

By selecting a point in a raster image, users can quickly locate the value of that point in the associated spreadsheet. Likewise, by selecting a point in a in a spreadsheet, users can quickly locate the position of that point in the associated raster image.

Line Selection Tools and X-Y Graphs

By selecting a line in a raster image or spreadsheet, X-Y graphs can be generated. Horizontal, vertical, or arbitrary lines may be selected.

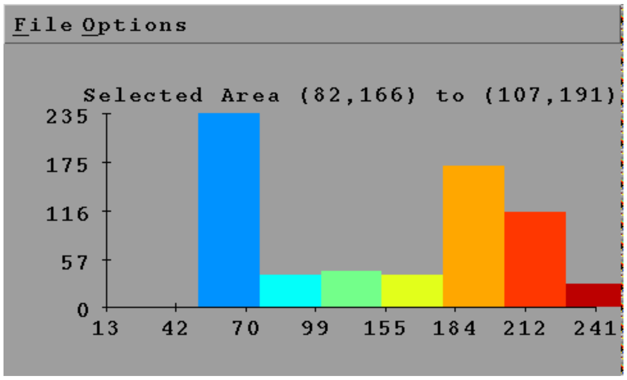
Figure 1.6 X-Y Graph



Area Selection Tool and Histogram Plots

By selecting an area of raster images or spreadsheets, histogram plots can be generated.

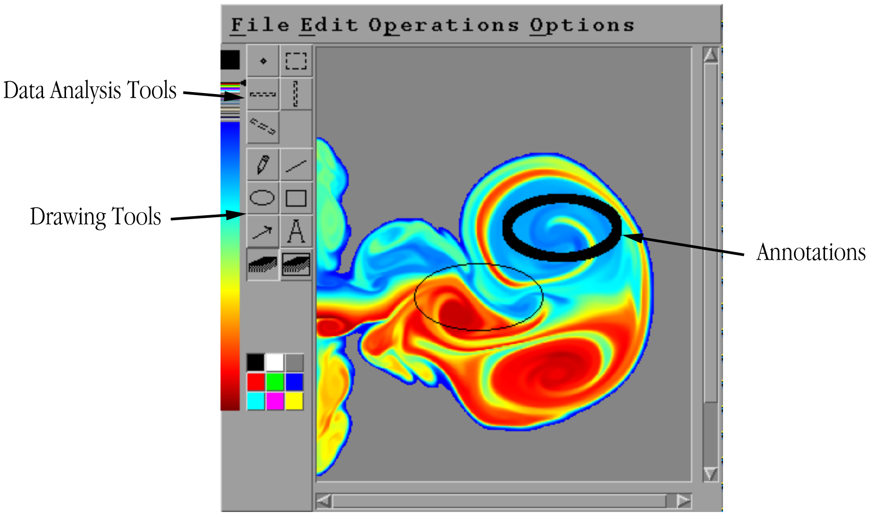
Figure 1.7 Histogram Window



Drawing Tools

A collection of drawing tools is available for *annotation*, or doodling. Annotations are performed on an *overlay layer* that is displayed on top of the data. The overlay layer is a separate display layer that allows you to annotate areas of interest without modifying the data displayed underneath.

Figure 1.8 Data Analysis Tools, Drawing Tools and Annotations


File Edit Operations Options
Data Analysis Tools
Drawing Tools
Annotations
A

Drawing tool capabilities include:

- Freehand, straight, and arrow lines
- Ellipses
- Rectangles
- Text
- Eraser
- Area eraser
- Color choice for the drawing tools
- Line width options for the drawing tools

Data File Support

NCSA Collage supports the following file types:

- HDF (Hierarchical Data File) for spreadsheet data, raster images, and color tables
- GIF (Graphic Interchange Format) for raster images
- XWD (X Window Dump) for raster images
- ASCII Text

Before you begin using NCSA Collage, you may need to format your data into one of the supported file types. The recommended file type is HDF. HDF is a file format developed at NCSA to provide for the storage of all types of information that a scientist might need. This includes floating-point datasets of any dimension, raster images, color tables, polygonal data, irregularly meshed and curvilinear data, and text annotations describing images and datasets. NCSA provides several documents describing HDF and software utilities for converting data into HDF files. Refer to the documents listed in Appendix E, "References," for more information.

Data can only be saved to HDF files. Future versions of NCSA Collage will provide capabilities to save data to other file formats.

Data Import Support

If you are using an application that does not save information into a usable data file format for NCSA Collage, there is a tool used to import data into NCSA Collage. The Screen Capture tool allows users to capture any screen image, even from other applications, and treat it as a raster image within NCSA Collage. Once captured, all raster image operations are available for that image.

Collaboration Support

NCSA Collage allows multiple users located at different sites to share information in a *collaboration* session. Collaboration is like an on-line brainstorming meeting where all users see and manipulate the same data. To have a collaboration session, you must have two or more users where each user runs NCSA Collage on their own computer and each computer is connected to a network. In the collaboration session, each user is given the same view of the data and all users may manipulate the data using the tools in NCSA Collage. As the data is manipulated, each user's display is updated to show the changes. By allowing all users to share this common view of data, each user can participate in the analysis discussion.

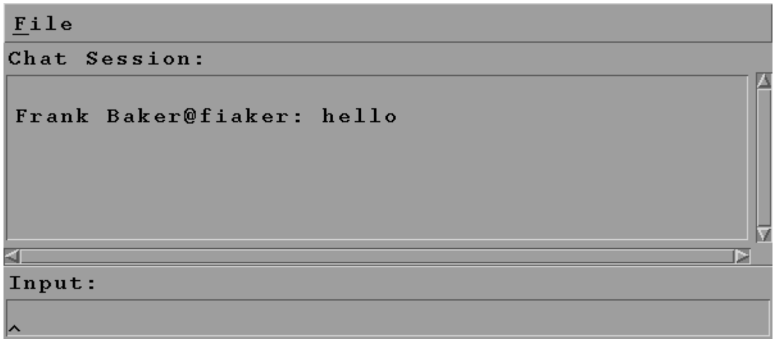
On UNIX systems, the collaborative session is supported by a separate application called the NCSA Collage Server. The server sends and receives information to all participants to maintain a common view of the data on each user's machine.

Collaboration is best utilized when all users can discuss ideas over the telephone while operating NCSA Collage on their computers. While using the telephone is convenient, it is not required for a collaboration session. Other tools described below provide communication abilities.

Chat Box Window

When telephone communication is not available, collaborative users may communicate during the session using the Chat Box by typing text messages. Messages are sent to all users in the session with the name of the user preceding the text.

Figure 1.9 Chat Box Window

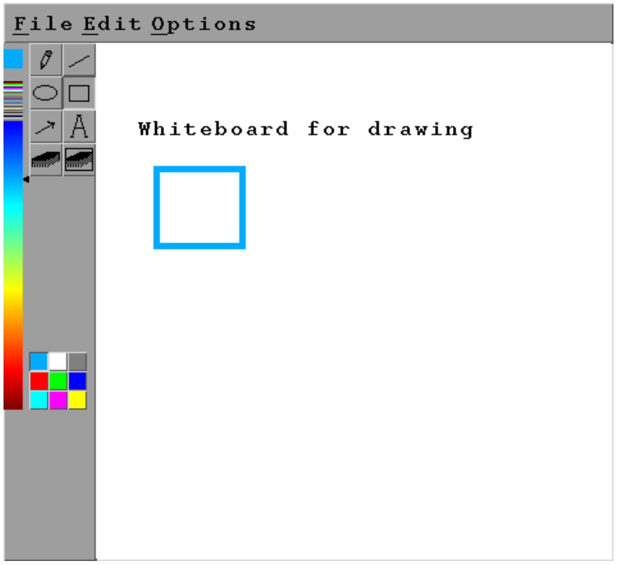


Frank Baker@fiaker: hello

Whiteboard Window

The Whiteboard window is synonymous with a physical whiteboard. Multiple participants may draw on the Whiteboard at the same time with different colored markers using the overlay drawing tools that were previously described in this chapter. Essentially, the whiteboard is an overlay layer that does not have a data layer.

Figure 1.10 Whiteboard Window

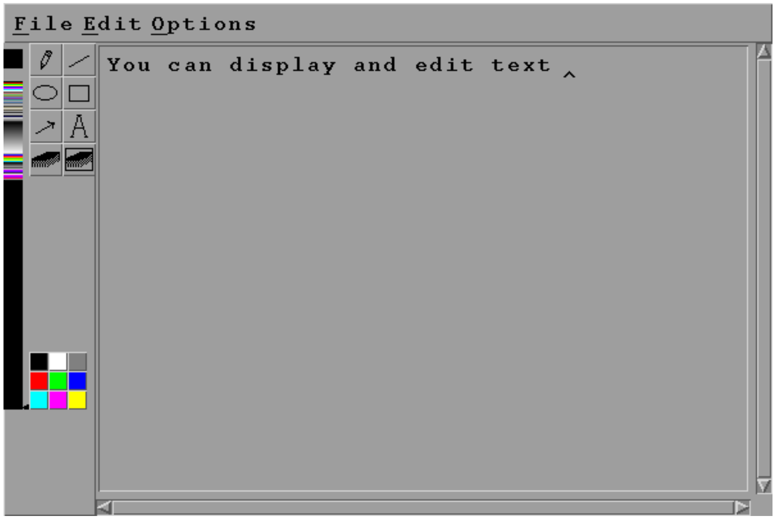


Whiteboard for drawing

Text Edit Window

Multiple participants may edit a text file in a collaborative session. Basic text editing features are provided along with an overlay layer for annotations. Overlay drawings do not affect the contents of the text file.

Figure 1.11 Text Edit Window



You can display and edit text

Preferences

Several X resources may be set in your local X environment. X resources are described in Appendix C, "X Resources Used by NCSA Collage."