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Seismic movies on the XView graphics system

Rick Ottolini[1]

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ABSTRACT

XView is a graphical interaction toolkit derived from the SunView toolkit and running on top of X Windows. It allows portable seismic display software with an easy-to-use control interface.

INTRODUCTION

X Windows is a graphics standard that does low-level graphics and windows. Additional software packages called window managers and command toolkits implement the higher level user interface of menus, buttons, etc. XView is one such toolkit from Sun Microsystems. It improves an earlier toolkit called SunView. XView defines an improved set of command objects and easier-to-program subroutine library (relative to raw X Windows or other toolkits). XView gains through XWindows the advantages of network connectivity and hardware independence. XView is distributed freely with the MIT X Windows source code without the restrictions of its more popular competitor—Motif (TM Open Software Foundation). It works on all our computers.

XView seismic movies is improved over previous versions. One improvement is a sophisticated graphical control panel in addition to the previous keystroke controls. The *same* source code runs on all our computers and workstations. The different parts of the movie program—data management, image transformations, and display—can distributed to computers of different capabilities or to avoid congestion. For example, a Convex→workstation configuration of XView-movie uses the large memory and speed of the Convex along with desktop display.

XVIEW-MOVIE PROGRAM

Layout

The XView-movie layout is one or more control panels and images. The main control panel (Figure 1) controls the image display parameters. Other control panels will

[1]**email:** not available

Figure 1: Display controls of XView-movie. Controls are summarized in Table 1.

handle interactive processing parameters. Multiple images either derive from transformations of same dataset or additional datasets. A set of related images may be "linked" so that altering the geometry of a member changes them all. The currently active control panel and image have highlighted frames.

Table 1: XView-movie controls

SET	COMMANDS
SYSTEM	quit, save pars/data
INFO	data, axes, loop, colors, image, image axes
DATA	load, close
VIEWS	front, side, top, n1, n2, n3, select section, add section
LOOP	forward, reverse, both, stop, step, frame#, speed
ZOOM	out/in 25%, box selection, initial, smooth horz/vert
SIZE	quarter, full horz/vert, equalize, initial, previous
TURN	flip horz/vert, turn left/right, initial
SELECT	point, cross, horz/vert line, any line, box, arc, none
WIGGLE	vert/horz line
PALLET	grey, clip, half, flag, bi, blue, multi, contrast
COLOR	overlay, clip, draw, back

New control functions not in previous versions of seismic movies include:

- Slider control of frame number, speed, and contrast; Fast contrast change is interesting.
- Optional interpolated zoom (for faster computers);
- Stock window sizes and memory of previous size;
- Wiggle line overlays of single lines or regions;
- Generic point/line/region selectors of image portion for further processing.

Figure 2: Sample image from XView-movie. The dark bands are proportional scrollbars (100% here).

Code construction

The C language based object-oriented discipline of Ottolini (1987) was used in the code. This data-centered modularity promotes code reusability. Modules include:

XView-movie objects		
OBJECT	CATEGORY	DESCRIPTION
color	SELF	color names, single screen colors
command	CONTROL	interpret command descriptions
control	CONTROL	control window
data	DATABASE	seplib data
data_axis	DATABASE	seplib data axis
graphics	DRAW	generic graphics device
image	CONTROL	data display
image_axis	SELF	data display axis
info	CONTROL	print information
loop	SELF	animation control
loop_control	COMMAND	loop commands
status	CONTROL	print message
pallet	DRAW	color continuum
raster	DRAW	draw image
save	DATABASE	save files
scroll_control	COMMAND	scroll commands
select_control	COMMAND	data selection commands
size	SELF	image size
turn	SELF	image orientation
view	SELF	multiple images
view_control	COMMAND	multiple image commands
view_list	SELF	multiple image list
wiggle	DRAW	wiggle plots
zoom	SELF	image magnification

OBJECT CATEGORIES:	
COMMAND	mediate XView command object
CONTROL	program flow of control
DATABASE	access external databases
DRAW	graphics
SELF	handle self

Notes

To exploit all the features of XView-movie, the OpenLook window manager must used. These features include four-corner sizing and footer messages. This window manager is distributed as part of the X Windows package.

Animation is tricky in XView. The volume of draw commands can overwhelm incoming interaction requests. The XView toolkit provides an alarm clock to draw repeatedly an image. Programmers should use this in place of a filmloop.

One disappointment in this version of XView is lack of extensibility. I would like to create a custom control object copied and modified from exiting objects, e.g. a two-ended slider, with an XView-like subroutine syntax, but this is not currently possible.

CONCLUSIONS

It is debatable whether to get out of the seismic visualization business as the general science visualization tools from graphics companies and supercomputer centers improve. Some of these tools have creative and powerful characteristics. However, they sometimes lack features tuned for seismic data presentation and are thus less desirable.

REFERENCES

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