Workshop on Single Particle Reconstructions And Visualization

Scientific Animation

Tutorial

Matthew Dougherty
National Center for Macromolecular Imaging
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matthewd@bcm.tmc.edu
Scientific Animation

- Preliminary
- Iris Explorer basics
- SAIL basics
Preliminary Survey

1. How many are familiar with LINUX?
2. How many are familiar with Iris Explorer?
3. How many are using other viz packages?
4. How many program in C, C++, or Fortran?
5. How many have datasets for Sunday?
Preliminary Disclaimer

- Developed for SGI
- Lab is running with Linux Red Hat 8.0
- Iris Explorer 5.0 tested against 6.1 => 7.3
- Alpha version of explorer on RH 8
- Alpha version of SAIL on Linux
- MPEG compression does not work under Linux

For our lawyers, who have microscopes:
Preliminary
Getting started

1. Login
   • Account = baylor
   • Password = jkl06$

2. Type the following:

   tcsh
   mount /data
   ls –l /data/viz/update
   source /data/viz/update
   cp /data/viz/programs/* /usr/explorer/SAIL/templates/programs
   ls –l /usr/explorer/SAIL/templates/programs
Iris Explorer Basics

- Spectrum of use
- Critical files and directories
- Documentation
- Data structures
- Shared memory & parallel processing
- Running “explorer”
- Running “mbuilder”
- Installation issues
Spectrum of use

1. MDW, new code written with IRIS Explorer in mind
   - MDW, no use of cx

2. MDW, plus cx API routines
   - MDW, plus cx data types

3. no MDW
   - power modules (explicit reference counting control)

low power | high power
Critical files & directories

EXPLORERHOME
• /usr/explorer
• /usr/explorer/Explorer.config
• /usr/explorer/sample.cshrc

EXPLORERUSERHOME
• ~/.explorerrc
• ~/explorer
• ~/.cshrc
Data structures

- Parameter (text, integer, float)
- Lattice (n-dimensional, coordinates)
- Geometry (openInventor, openGL)
- Pick (interactive, point, normals, camera)
Shared memory & parallel processing

- 32 bit addressing
- Shared memory max=512MB
- Each module has access to it
- Each module is an independent process
- Max number of modules is 64
- Each process has a 2GB memory space
- Potential memory is over 60 GB
Iris Explorer Basics

Running “explorer”

- Map editor
- Librarian
- NAG provided modules
- Modules (input/output, control, widgets)
- Map examples
Iris Explorer Basics

Running “mbuilder”

- Go to the directory with the source code
- Start mbuilder
- Define inputs/outputs
- Create source code hooks
- Create widgets
- Build & install
SAIL Basics

- Files and directories
- Installation procedures
- SAIL manager
- Projects/templates/modules managers
- Example: LDL
- Animation suite
SAIL Basics
files & directories

- /usr/explorer/SAIL
- /usr/explorer/SAIL/src
- /usr/explorer/SAIL/modules*
- ~/sail
- ~/sail/projects
- ~/sail/projects/0000/config
- ~/sail/projects/0000/frames
- ~/sail/mpeg
SAIL Basics
Installation procedures

- Gunzip/untar file
- Start explorer
- Start SAIL_INSTALL
- In the SAIL source tree=> build mode
- Out of the SAIL source tree=> install mode
you need write access to /usr/explorer
SAIL Basics

managers

- SAIL launches other modules
- Accesses explorer documentation
- Projects
- Templates
- Modules, for display management
SAIL Basics

Example: LDL

• Isosurface
• StereolImages
• BoxCrop
• LatCoord/ColorSurface
• LatCoord/LatCut
SAIL Basics

Example: HSV_vp5

- Pdb atoms
- Pdb backbone
- Pdb filter
- Pdb residue
- Pdb EDM
- SoTransform
- GeoBuilder
SAIL Basics

Animation

• Scripting
• Examples
• Problems/future
SAIL Basics

scripts

- Initial conditions
- Camera control
- Event control
- Geometry control

- Spreadsheet layout
- First two columns => time
  absolute + frame/fps
SAIL Basics

scripts/initial conditions

- #SAIL_SCRIPT version=1
- #
- IC.startTime
- IC.stopTime
SAIL Basics
scripts/camera control

- `t f SoCamera->readFile KEYFRAME=1`
- `t f SoCamera.orientation.ROLL 0`
- `t f SoCamera.orientation.PITCH 0`
- `t f SoCamera.orientation.YAW 0`
- `10 0 SoCamera.orientation.ROLL 0`
- `20 0 SoCamera.orientation.ROLL 90`
## SAIL Basics

### scripts/event control

- t f Event.char.ID 0 some text string
- t f Event.int.ID 0 1776
- t f Event.float.ID 0 3.1415

- 0 0 Event.char.ID 0 the rain in Spain
- 2 0 Event.char.ID 0 falls gently on

- 0 0 Event.int.ID 1 0
- 5 0 Event.int.ID 1 5
- 5 1 Event.int.ID 1 0

- 0 0 Event.float.ID 0 0
- 10 -1 Event.float.ID 0 3.1415
## SAIL Basics

### scripts/geometry control

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<th>f</th>
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<td>NULL</td>
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<td>f</td>
<td>SoTransform.rot.ROLL</td>
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<td>t</td>
<td>f</td>
<td>SoTransform.rot.PITCH</td>
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<tr>
<td>11</td>
<td>t</td>
<td>f</td>
<td>SoTransform.rot.YAW</td>
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</tbody>
</table>
SAIL Basics

Example: animations

- LDL
- HSV PDB & EM
- RDV
SAIL Basics

Review of SAIL modules

- Data readers
- Render
- Isosurface
- BoxCrop
- SoMaterial
- Colorsurface
- SoTransform
- LatCoord
- GenerateColormap

- ReadCLUT
- SAIL
- SAIL_INSTALL
- Projects
- Templates
- Modules
- PDB suite
- Inventor suite
- Animation suite
Known problems & future solutions

- Shared memory garbage collection
- Open Inventor transcribe
- Stereo graphics
- Polygons & transparencies
- Proprietary data files
- Shutdown cleanup

- HDF for data management
- Spaceball manager for better interface
- Integration with python
TO GET A COPY

• IRIS explorer  www.nag.com
  » Available on Linux & SGI
  » Cost $750-$1000

• SAIL  matthewd@bcm.tmc.edu
  » Available on SGI
  » Soon to available on Linux
  » free