EXPERIENCES IN HIGHER EDUCATION WITH SOS

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Indiana University
OVERVIEW

1. About us
2. How we use SOS
3. Challenges with using SOS
4. Overview of SOS projects
5. Highlights of specific SOS projects
IU ADVANCED VISUALIZATION LAB

"promote the innovative application of visual technologies to advance Indiana University’s missions in research, education, creative activity, and community outreach."
WHY SOS AT IU?

- Put state university in global context
- Students from 49 states and 165 foreign nations enrolled in 2014
- 70+ foreign languages
- International networks: ACE, TransPAC, etc
- School of Global and International Studies
SOS IN THE CIB
SOS IN THE CIB

- Suspended from ceiling in large, open lobby
- Staff on hand experienced with unique displays
- Runs passively throughout the day, but can be reserved for events
HOW IS THE SOS USED AT IU?

- Building tours
- Class support: School of Fine Arts, Science Olympiad
- Special events: SOS Week, SOS After Dark
- Signage during non-SOS events
SOS Week with Ingo Günther

Figure 1. Visitors gather at the “SOS After Dark” outreach event. The event started at 8:30pm which offered prime viewing of the projected Sphere with no incoming sunlight and featured a variety of visualizations on the Science on a Sphere display, the IQ-Wall, and Günther’s WgiProcessor exhibit.
CHALLENGES WITH SOS AT IU
CHALLENGE
Physical location: lobby with glass walls, lots of light

RESPONSE
• Keep lobby lighting low
• Draw shades on sunny days
• Schedule SOS-centric events after sunset
CHALLENGE

Many researchers don't have global data

- US only ~2% of Earth
- Indiana only ~1% of US

RESPONSE

- Embrace it!
- Repeat relevant sections
  - See Vincent Keller's talk on the SOS Splitter tool
  - Thursday 2pm Theater Lobby
CHALLENGE
Most interest comes from outside the scientific disciplines

RESPONSE
• Embrace it!
• Develop new techniques
• Create our own datasets
OVERVIEW OF SOS PROJECTS

- Non-Dataset, SOS related Projects
- Datasets
X3D Emulator
X3D Virtual Reality Emulator
Single User Kiosk
Winter Olympics & World Cup
Local & IU Data
Digital Signage
PowerPoint & 360 Panoramas
3D environment render & Artist exhibits
GOOGLE ANALYTICS

Daily Google analytics session & location data
Individual Latitude and Longitude data
IUware - Student Accessed Site
Mixing Device Types

Desktop vs. Tablet use - IU Knowledge Base
GOOGLE ANALYTICS

• Requirements
  1. Access to data
  2. Clean Data - API
  3. Visualization - Processing
GOOGLE ANALYTICS

- Modular Workflow

1. Daily scheduled shell script runs
2. Calls google API script and retrieves data - examples available through google
3. Data saved into .CSV File
4. Processing Script takes data and generates Visualization
5. Shell script manages labeling images correctly and transferring to SOS
EMOTABLE SPHERE

SOS Version of Margaret Dolinsky's art project Emotable Portraits
EMOTABLE SPHERE

- MaxMSP used to create and modify real time webcam video and export as image sequence
- Image Sequence transferred to SOS(FTP/SSH)
- Modified music visualization script created by Scott Muller that loads images onto SOS
- Did not account for distortion
GOOGLE STREET VIEW

STREET VIEW PANORAMAS FOR SOS
STREET VIEW WORKFLOW

1. User navigates to site, enters address
2. Site fetches panorama from Google Maps API
3. Site sends image data to server on SOS host
4. Server saves panorama in SOS format, updates playlist
Google Street Viewer | @thespite

A google street panorama viewer with WebGL using GSVPano.js and three.js. Uses Geolocation API, Fullscreen API and Pointer Lock API if available.

You'll need Chromé, Firefox 8+, or another browser that supports CORS WebGL textures.

Check out the Floating Shiny Knot!

Find me on google+ | Follow me on twitter

How to use

Click and drag the panorama viewer. Mouse wheel to zoom in and out. Use the controls on the right to look for addresses and change image quality.

Google Street Viewer

https://www.clicktorelease.com/code/street/
Client

```javascript
var canvas = mesh.material.uniforms.map.value.image;
var data = canvas.toDataURL();
...
myhttp.send(data);
```

Server

```javascript
var data = address.replace(/\^undefineddata:image\\w+;base64/, "");
var buf = new Buffer(data, 'base64');
fs.writeFile('/home/sos/image1.png', buf);
```
D3 ON A SPHERE

A WORKFLOW FOR USING D3.JS WITH SOS

1. Use D3 to generate SVG in the browser
2. Use SVG Crowbar to save SVG to a file
3. Use graphics editor to clean up, add annotations, etc
4. Create playlist on SOS
STREAMGRAPH FOR TIME SERIES

• Stacked bar chart wrapped around the equator
• Categories appear as colored streams
• Popularized by Last.FM listening histories
Streamgraph Chart

D3 streamgraph example

http://bl.ocks.org/lgrammel/1935509
SVG Crowbar

A Chrome-specific bookmarklet that extracts SVG nodes and accompanying styles from an HTML document and downloads them as an SVG file—A file which you could open and edit in Adobe Illustrator, for instance. Because SVGs are resolution independent, it’s great for when you want to use web technologies to create documents that are meant to be printed (like, maybe on newsprint). It was created with d3.js in mind, but it should work fine no matter how you choose to generate your SVG.

The Bookmarklet

SVG Crowbar ← Drag this to your bookmarks bar.

After you’ve installed the bookmarklet, you can execute it on any page. Go ahead and try it out on this crazy map.

(You can click on the link instead to test it on this page immediately.)

Update

Some users reported that styles were not stored with the SVG files, so we added a new version that should work everywhere. The new method is slower, so loading can take a while on pages with many SVG elements. Still in beta.
VORONOI DIAGRAM

1. Specify set of points
2. Calculate regions which are closest to each point
Spherical Voronoi Diagram

Jason Davies' Spherical Voronoi

https://www.jasondavies.com/maps/voronoi/
Download KML from SOS Locations

https://www.google.com/maps/d/embed?mid=zWIHp2z9bzho.kHZ71NU6mNt8
Convert to CSV using geojson.io

[Link: http://geojson.io/]

```json
{
"type": "FeatureCollection",
"features": []
}
```
1. Change spherical voronoi code to use equirectangular projection
2. Grab SVG with SVG Crowbar
3. Edit SVG with graphics editor
QUESTIONS?

FOR MORE INFO

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