

Data & Visualization Weekly Projects Report

2021_03_26

Active Projects

Active Development

- Argonne Gpu Hackathon
 - Got email that due to limited space our team and its proposed project weren't admitted
 - it's ok, I extended a webgpu rust boid simulator example and have it working on exosphere so perhaps I got something similar to the experience of the hackathon from that
 - <https://drive.google.com/file/d/1yzTyizIMLxRXabMTQgk7KzECsVYHrXOf/view?usp=sharing>
- Biosphere 2 Biosystems Visualization Collaboration
- Independent Study Abby Collier
 - Met on friday to discuss final tweaks to the data visualization feature piece
 - Abby built a very nice heatmap displaying squirrel counts from the data set against the hectares they live in within central park
 - Worked on making legend for her graph, and how to add observational notes to the data
 - She will add some prose to outline the process of building the notebook but besides that we have completed our data visualization phase
 - Discussed with her the first resources she should use to get setup and oriented with Touch Designer!
 - From this point on she will be helping me produce material for the astronomy multimedia performance
- Judging The Data Visualization Challenge
 - Planning on approaching a few departments with the offer of a data visualization introductory piece for their grad students
 - Will start with my home department of Neuroscience and perhaps Speech Language and Hearing where I've done quite a bit of work already
- Migrant Forensic Empathy Project: A Digital Borderlands Grant Initiative
 - Recreated scene at larger scale
 - Troubleshooting some of the performance issues that are starting to drop us to 12fps
 - Experimented with raycasting for interaction with certain objects in the scene, performance dropped to 5fps from this
 - Took screenshots to send to Jonathan with an update
- Oyster Vibrio Literature Review
 - Sent email to check on status of this as its been 6 months since their last update
 - Setup meeting this friday to discuss her needs and advise about data visualization techniques

- Remote Visualization Infrastructure Development
 - Big breakthrough learning more webgpu with the Rust systems programming language
 - Now understand enough to create some of the simple visualizations I've produced in Touch Designer
 - This means a significant improvement in performance because its written almost from scratch in gpu modern (vulkan not opengl) graphics code
 - Ran demonstration on 3 different machines of particle system where the mouse was an attractor
 - On new desktop was able to run 15 million particles close to 60 fps <https://drive.google.com/file/d/1yyVqGcrgrW1rjqE8DPML8LDsJVetj1h1/view?usp=sharing>
 - Using laptop as nomachine display for exosphere cloud instance with 1/4 of V100 was able to run 1.5million particles in realtime
 - Performance dropped on exosphere using 15 million particles
 - Video links [https://drive.google.com/file/d/1JbMX0GnxqVZgED8vcfoNEKGmEeYaCPld/view?usp=](https://drive.google.com/file/d/1JbMX0GnxqVZgED8vcfoNEKGmEeYaCPld/view?usp=sharing) (1.5 million), <https://drive.google.com/file/d/1zg-fUDU4cYLmW-bksi3GBwplzqWnTBj7/view?usp=sharing> (15 million)
- Resbaz Organizer And Workshop Provider
 - Met with Alex and planned our workshop
 - Will send outline to Ian Johnson who works at Observable and see what he thinks
 - Meeting with other Zoom and Youtube Coordinator Chinmay at somepoint to practice zoom and youtube upload
- Stellerscape Astronomy Multimedia Dance Performance
 - Fixed Gasoline errors
 - Ran AGORA Disc example which is Isolated Milky-Way Like Disk Galaxy using pthread over 10 cores (took 2 days to complete)
 - Created 2 visualization workflows for this within Touch Designer, Volumetric renderer, Instanced particle system
 - The volumetric renderer was a useful technique to brush up on but suffered from 3D texture size limitations in touch designer
 - The instanced particle system will be a much better approach requiring less pre-processing (no 3D texture to create, just parsing a binary snapshot from gasoline) and doesn't have visual artifacts produced at certain angles
 - visual results [https://drive.google.com/file/d/1KFpEVgSEkSh4ZxSClgoLPJEL_Cp3m9ik/view?usp=](https://drive.google.com/file/d/1KFpEVgSEkSh4ZxSClgoLPJEL_Cp3m9ik/view?usp=sharing) (instanced particle system) , <https://drive.google.com/file/d/1DkSOdYlJpbWoZqremOAbLzGY9XB7/view?usp=sharing> (volumetric renderer)

Consultations

Upcoming

- Bryan Carter Photogrammetry
- Has Faculty Collaborations With Holodeck

- Jason Hortin Holographic Dance Graduate Project
- Observablehq Portfolio Of Data Visualization
- Ray Tracing On The Hpc

Completed For Fiscal Year

Workshops/Trainings

- Mt. Lemmon In Your Pocket-Creating A Virtual Reality Tour
 - https://rtdatavis.github.io/#GIS_week2020
- Presentation For Civil Engineering Department
 - <https://docs.google.com/presentation/d/15Z9zcxU4vIIgFPnKEcaGv9GH7JtjNdx4Xpnjec0EzEc/edit>
- Tech Core Level Up Presentation Monday, Sept 28 2020
 - <https://rtdatavis.github.io/#techcoresept28>
- Tech Core Level Up Presentation Tuesday, Mar 17 2020
 - <https://rtdatavis.github.io/#techcoremar20>
- Womens Hackathon: Visualization On The Web Workshop
 - <https://womenshackathon.arizona.edu/>
 - <https://www.youtube.com/channel/UCe1YiJ53o3qcayVs4cipeXA/videos>
 - <https://www.youtube.com/watch?v=VLwPOtqW8oM>

Completed Projects/Collaborations

- 3D & Vr Retrofit Azlive
 - <https://rtdatavis.github.io/#retrofitAZLIVE>
- Bio5 Virtual Reality Tour
 - <https://rtdatavis.github.io/#bio5-vr-tour>
- Covid Retail Mitigation Web Scraping
 - <https://rtdatavis.github.io/#retailscraping>
- Force Directed Biochem Networks
 - <https://rtdatavis.github.io/#biochem-networks>
- Neuro Choropleth
 - <https://rtdatavis.github.io/#neuro-choro>
- Spring Break Covid Photo Maps
 - <https://rtdatavis.github.io/#spring-break-covid>

Infrastructure Developed

- Autamus Web Interface
 - https://rtdatavis.github.io/#autamus_interface
- Virtualgl For Nvidia Accelerated Remote Hpc Visualizations
 - <https://rtdatavis.github.io/#virtualgl>
- Xpra And Singularity For Comprehensive Graphical Application Support On Hpc
 - <https://rtdatavis.github.io/#xprasingularity>

Protocols and Analysis Developed