Data & Visualization Weekly Projects Report 2021_04_16

Active Projects

Active Development

- Advice For Thesis Defense Visualizations, Sabrina Nardin
  - Met with Sabrina to discuss her dissertation defense's visualizations
  - Her data is visualizing 8 different violent events from Italy's history in the last 50 years covered by 3 different newspapers
  - Most of her questions were about how to improve her existing approaches so I laid out the foundation of "task abstraction" taught to me by Joshua Levine using Tamara Munzner's design theory for visualization
  - Shared resources with Sabrina and recommended a few changes, but overall tried to equip her with the ability to critique her own work
  - Mentioned other best practices such as sharing her visualizations with as many other people that are like her target audience as early as possible
- Biosphere 2 Biosystems Visualization Collaboration
  - Fixed issues with converting vtu to obj!
  - Apparently issues stemmed from using 0 based counting in the obj face indices
  - Gave Omani full folder of simulation results to work with
  - Started email chain with Developers at Open Root Sim about how to change the simulation parameters to create different plant root systems
  - I believe we won't get very far with this because they only focus on a few model plants and nothing bigger than a corn plant
  - Looked into L systems for generating artificial root structures, but it would be great to get scans of some much bigger plants
  - Omani started working on the VFX of animating particles traveling along the outsides of the mesh, but I think that's going to take time
- Data Visualization Roadshow With Jeff Oliver
- Independent Study Abby Collier
  - Met up and started working on custom materials
  - Had long discussion in the meeting cementing the mental model of how the shaders are using different color channels to move particles
  - Also started working on how to use other texture inputs to help with particle spreading patterns
  - Had to rush into using uniform sampler2D types
  - As a result I made a short video recording explaining how to do modular arithmetic to calculate texture sample coordinates from instance id's for each of our particles
- Judging The Data Visualization Challenge

  - Started reviewing the entries, on track to finish this before the 28th
- Migrant Forensic Empathy Project: A Digital Borderlands Grant Initiative
  - Created realistic scaling version, but found that there's visual artifacts on the faces far from the camera, created SO issue for this but I imagine I will just have to downsize the mesh and alter other aspects to make the landscape scale feel appropriate
  - Spent a while re-writing the cross placement Rust code, so that the quad tree regions feature overlap
  - This ultimately makes the program less performant but the results are much more accurate
  - Performance benchmarking by isolating each individual entry of the scene and checking the fps
  - Learned that there doesn't seem to be any one piece causing performance issues which is comforting
  - Reached approximately the halfway point of allotted time for this project and there's still some big aspects I still have to implement
- Oyster Vibrio Literature Review
- Remote Visualization Infrastructure Development
  - Met Peter Messmer of Nvidia's HPC remote visualization division at Nvidia GTC
  - Discussed several projects that I want to leverage their tool Omniverse for
  - Got positive feedback that streaming results to displays like CATalyst's big display walls or even Biosphere2 should be included in their Omniverse Beta release that's out now
  - Met quite a few other individuals who will probably be able to assist with this going forward
  - Will be testing using Exosphere and my own local machines before looking into HPC -> Catalyst
- Resbaz Organizer And Workshop Provider
  - Built workshop Observable notebook
  - Created observable notebook conversion of Kate Isaac's Vega-lite data visualization workshop
  - Discussed with Blake what the process would be for adding videos to the resbaz youtube channel, it sounds like he'll take that on just because it sounds like access is a tricky subject
  - Setup next meeting with Chinmay for following wednesday
- Stellarscape Astronomy Multimedia Dance Performance
  - Switched gears in development for this project to curves instead of particle systems
  - Reviewed videos that Kay sent to me for inspiration
  - Spent time reading Fundamentals of Computer Graphics chapters on splines, Hermite cubics, and Bezier curves
  - Made a proof of concept GPU compute touch designer example of 100^2 lines interpolated to a level of detail around 1000 segments per line

  - Somehow this still ran at 60fps? Not going to argue with the results.
  - Setup meeting with Gustavo the director of the new Sensor Lab to discuss the sensor options we will have access to for the show
  - Researched and implemented a system for switching between running Visualizations within Touch Designer so that we can script the whole performance from beginning to end without being hands on
  - This will be ultimately better because its still pretty likely that we would press the wrong thing at the wrong time and create a technical difficulty

Consultations

- Advice For Thesis Defense Visualizations, Sabrina Nardin

Upcoming

- Bryan Carter Photogrammetry
- Collaboration With Techcore'S Summer Internship
- 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