

Assignment 1: Visualization Construction

WebGL Review

WebGL is a JavaScript extension to the 3D rendering library, OpenGL. In other words, WebGL can be used to render 3D graphics in browser environments. With WebGL, users have full control over the graphics pipeline, so just about anything can be rendered. In terms of data types, WebGL is a JavaScript API, so all data types supported by JavaScript would likely be supported by WebGL.

That said, WebGL is likely impractical for data visualization as it's extremely low level. In order to render a bar chart, a user would need to write their own vertex and fragment shaders, transform their own vertices, and manipulate their own data. In other words, the data visualization batteries are not included. As a result, WebGL would be an unlikely candidate for typical data visualization projects.

VTK Review

VTK, also known as the Visualization Toolkit, is an abstraction on OpenGL to allow for easier visualization. According to the website, VTK can model just about any problem from physical science. However, there's a bias toward medical imaging and engineering. From a practical standpoint, VTK integrates well with popular programming languages like Python, and its strong parallelism allows for highly scalable rendering.

In terms of use, VTK is an excellent tool for 3D visualization as the library has support for a variety of data types including CompositePoly, MultiBlock, and OverlappingAMR. In addition, VTK has support for meshes and a variety of 3D structured data. As mentioned previously, VTK also has native support for medical data like skin and bone surfaces. Of course, since VTK is built on top of OpenGL, there are plenty of opportunities for 3D modeling. Regardless, VTK appears to be a powerful visualization tool.