Visualization of Medical Data in Web Virtual Reality: Tractograms in VTK.js

Federico Rafael García García

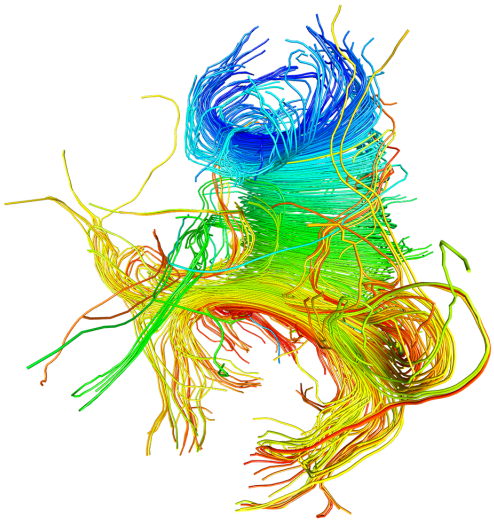

Figure 1: Rendering of the corpus callosum, consisting of 554,060 vertices and 753 polylines.

Keywords: tractograms, VTK, VTK.js, medical data, MRI, DWI, magnetic resonance, virtual reality, polyline

Abstract

The objective of this work is to develop a web application for viewing medical data immersively, allowing the user to interact with said data in a 3D virtual reality environment. The visualization of this type of data presents a series of challenges given the enormous volume of information which they represent. This work has focused on a specific type of data: brain nerve tracts, which are represented as polylines. The growing interest in virutal reality and the use of web applications has led to the creation of this project, where preprocessing and tube generation techniques are applied to a given a polyline set in order to improve visualization and performance in a virtual reality enviornment, all runnable from a compatible web browser. A web application has global reach and works on multiple devices, and saves the user the need to install specific modules or programs for its use. The VTK graphics library, in its web version, VTK.js, has been used for this project, along with HTML and JavaScript to create an interface and executable environment in a web browser.