AUTOMATIC CUSTOMIZATION OF PARAMETERIZED 3D MODELS

Seth Coleman, Zachery Bingaman
Moravian University
colemans@moravian.edu, bingamanz@moravian.edu

Faculty Advisor: Jeffrey Bush, Moravian University, bushj@moravian.edu

ABSTRACT

We present the 3D model customization system of 3DAdapt, an app for discovering printable 3D models tuned for occupational therapy. The customization system allows users to enter custom dimensions into the app's model viewer and see the adjustments in real-time. The two 3D modeling programs supported for customizable models are OpenSCAD and Onshape. They both implement parameterized models, that is the models are computed based on variables. However, they have incredibly different formats. We took these formats and created an internal, universal, JSON representation for all 3D models in our system, including these changeable variables, to be used throughout our platform. OpenSCAD was converted through a process involving the OpenSCAD CLI, using Python to parse the text output to create the internal representation. The web-based system of Onshape required a much different process accessing the Onshape web API. This code generates a version of the model modified by user-specified variables and converts it to the internal representation for 3DAdapt's backend. The variable customization system within 3DAdapt exemplifies the importance of flexible data formats and the importance of planning the communication between server and client in a large, interconnected system.