Exploring Dynamic Changes in Foot Morphology Across the Adult Population

Introduction:

* Applications: diabetes, AFOs
* Static foot shape dependent on foot length, sex, height, weight, bmi, etc
* Dynamic foot shape not well understood nor captured

Methods:

* General subject recruitment/processes for data collection

Figure 1: Flowchart of data capture

* Cite JOSS paper for capture tools

Figure 2: Example flowchart of raw pointcloud to morphed template

* Isolation of right foot using plane detection, clustering algorithm, color value of right foot over left foot
* Registration of template foot using static template deformation with radial basis field applied to whole set of points (gias library, non-rigid deformation)
* Dynamic registration using iterative templates generated from previous frame
* TBD: sectioning of the foot to account for change in joint angles, we don’t want this to influence our significance tests
* Statistical analysis -> multiple regression generation of the data using PCA

Results:

Figure 3: Volumetric overlay of the changes in local morphology with different parts of gait cycle (maybe with 3 different sex/height combinations)

* Significance testing of linear regression
* Post-hoc power analysis of linear regression (tell us if we need more subjects)

Figure 4: Changes in foot measures during gait cycle (can we get this from the template)