Modeling Robotic Surgery Predictions: Write-Up

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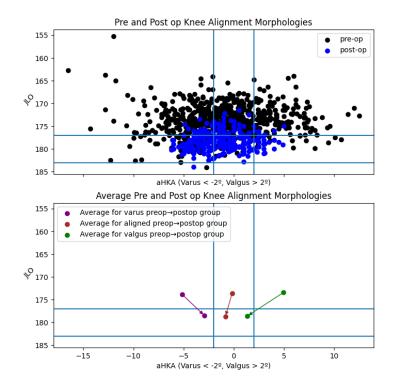


Figure 1: These are the averages of the clusters.

[n_clusters=3] Pre-Op Alignment Post-Op Alignment 155 cluster 0 cluster 0 cluster 1 cluster 1 160 cluster 2 cluster 2 165 **№** 170 ₩0 175 180 185 aHKA (Varus < -2º, Valgus > 2º) aHKA (Varus < -2°, Valgus > 2°) Pre-Op to Post-Op Alignment Average Pre-Op to Post-Op Alignment Average change for cluster 0 Pre-op→Post-op Change for cluster 0 Pre-op→Post-op Change for cluster 1 Average change for cluster 1 Pre-op→Post-op Change for cluster 2 Average change for cluster 2 165 **№** 170 10 175 180 185 -10 -10 aHKA (Varus < -2 $^{\circ}$, Valgus > 2 $^{\circ}$) aHKA (Varus < -2 $^{\circ}$, Valgus > 2 $^{\circ}$)

Clusters of Pre-Op and Post-Op Morphologies with KMeans

Figure 2: These are the clusered data points.

degree 3 polynomial Model Prediction for Planned aHKA from Pre-op aHKA

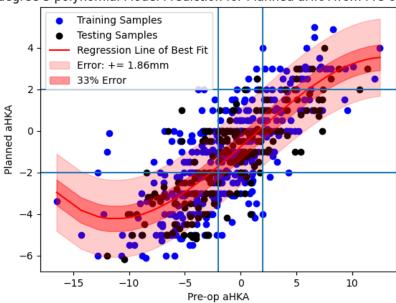


Figure 3: This is a regression trained using a linear regression algorithm. The error is the mean squared distance from the testing set (black). The regression is trained on the training set (blue)

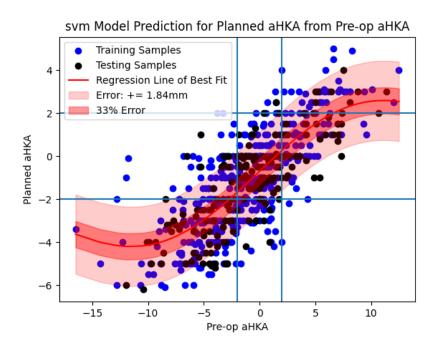


Figure 4: This is a regression trained using a support vector machine algorithm. The error is the mean squared distance from the testing set (black). The regression is trained on the training set (blue)

neural network Model Prediction for Planned aHKA from Pre-op aHKA

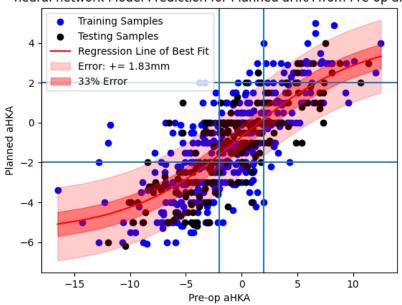


Figure 5: This is a regression trained using a deep learning algorithm on a MLP/neural network model. The error is the mean squared distance from the testing set (black). The regression is trained on the training set (blue)