SIA LAB

Upper Arm Length Prediction

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Abstract

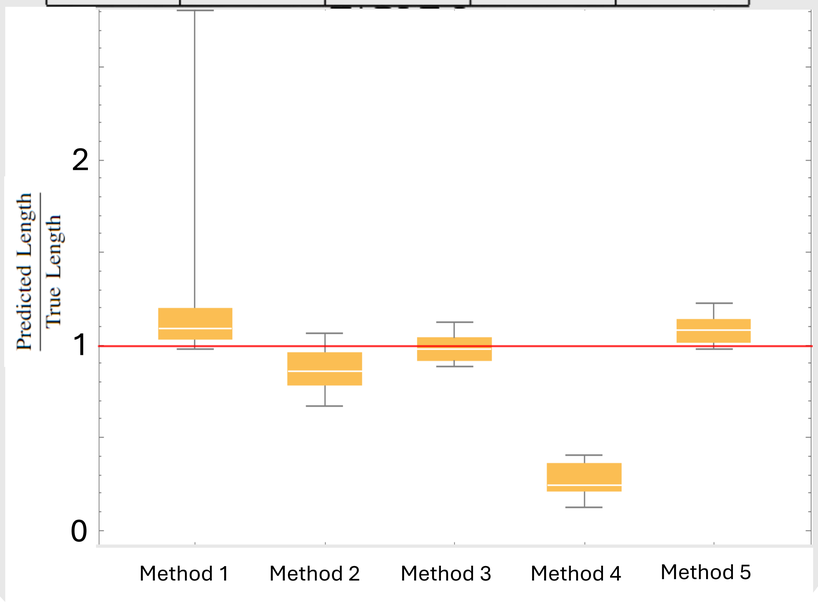
Knowledge of biomedical sensor placement is often important for wearable medical devices

This study aims to develop a method for estimating upper arm length using motion data, acquired through a motion-tracking device worn on an individual's upper arm.

Accurate estimation of upper arm length helps to account for variations in biomedical data acquisition for wearable devices positioned on the upper arm.

Results

Z_1	Z_2	Z_3	Z_4	Z_5
1.330	-1.325	-0.164	-7.508	1.379

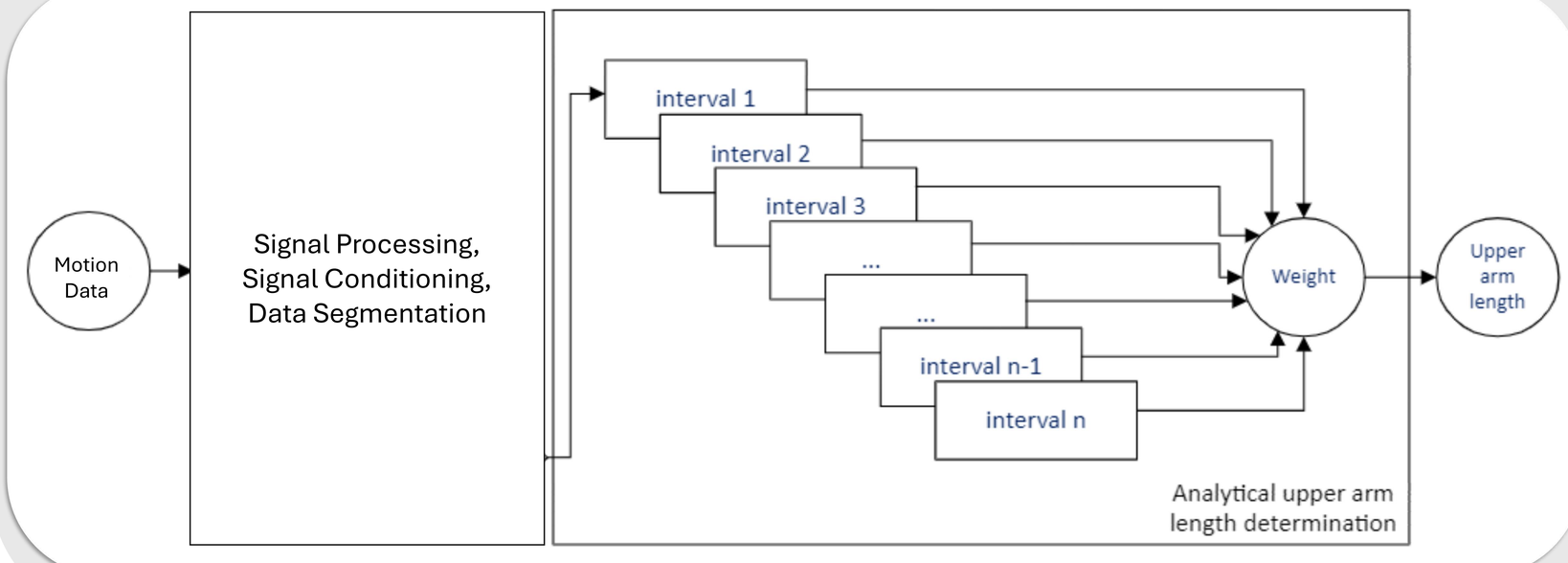


Discussion

The table indicates the z-score of the error for various approaches using different analytical length determination methods. Using a z-score statistic gives a sense of how large the error is. A z-score closer to 0 is better. Method 3 has the best performance.

The plot shows the ratio of upper arm length predicted normalized against the true upper arm length. A ratio closer to 1 is better. Method 3 again has the best performance.

Method



Conclusion

The host of algorithms evaluated here each show a relatively accurate approach for estimating upper arm length. Across these various methods, method 3 ultimately performs best in predicting upper arm length relative to true arm length.

Future Work

Future work will focus on reducing constraints so that length calibration can happen automatically. Machine learning methods will also be explored as alternatives to this analytical method.

Acknowledgement

I would like to thank Columbia Amazon SURE for sponsoring my research this summer.