

# **Fabric Sensing of Intrinsic Hand Muscle Activity**



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Results

## **Sensing Muscle Movements**

### **Hand Gesture Classification**



#### CLASSIFICATION ACCURACY OF FABRIC SENSING SLEEVE AND MYO ARMBAND ACROSS 3 CANDIDATE MODELS

Hx	Fabric Sensor			Myo Armband		
	LDA	RF	MLP	LDA	RF	MLP
H1	70.1%	68.6%	65.1%	84.6%	84.7%	80.4%
H3	84.7%	83.8%	79.4%	84.1%	83.1%	82.1%
H4	84.4%	80.8%	83.0%	86.6%	86.3%	81.5%
H5	81.9%	69.6%	66.7%	78.7%	84.8%	79.0%
H6	13.0%	67.5%	42.0%	77.3%	81.3%	74.6%
H7	70.1%	46.5%	70.6%	88.2%	91.1%	89.9%
H8	92.6%	91.1%	87.7%	89.3%	90.7%	90.0%
H9	77.5%	78.6%	80.3%	86.8%	87.4%	83.3%
Avg	71.8%	73.3%	71.9%	84.4%	86.2%	82.6%
Std	24.9%	13.6%	14.5%	4.3%	3.4%	5.2%

Classification accuracy results of the fabric sensing sleeve compared to the commercial arm band. We trained three machine learning models (LDA, RF, MLP) for the fabric sensor and the Myo armband.

Data (n = 8 total participants, H1, H3, H4 pictured here) from fabric sensing sleeve and in the sensitive sensitive sleeve and in the sensitive sens arm band. Experimental conditions separated by colored bars (grey = isolated, purple = isometric). Each row depicts data from one healthy participant, where the top plot shows fabric sensor activity in µVrms and the top plot depicts corresponding Myo sensor activity in proprietary values (a.u.) with all eight channels plotted in black.

> Fabric sEMG sensors on thenar eminence capture muscle<sup>Myo</sup> activity during thumb movement and isometric contraction. Fabric >Our sensing sleeve can distinguish between thumb muscle activity and finger muscle activity.

- >Our 3-channel sensing array achieves promising classification accuracy of hand open/close intent.
- >For half the participants, the fabric sensing sleeve achieves a maximum classification accuracy within 5% of the Myo armband.
- >In future work, the fabric sensing sleeve could augment a forearm sEMG setup for improved intent inferral.











