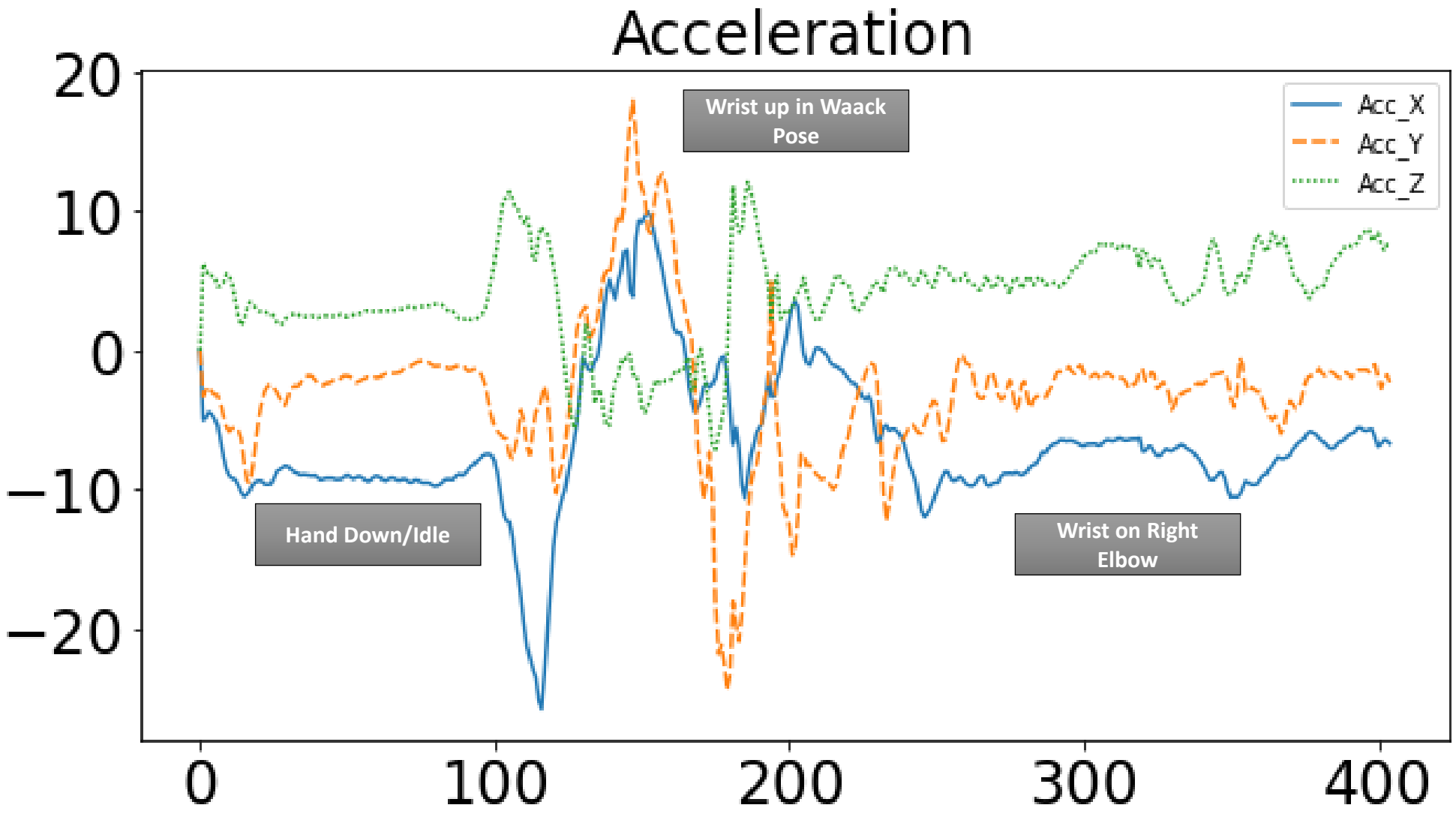
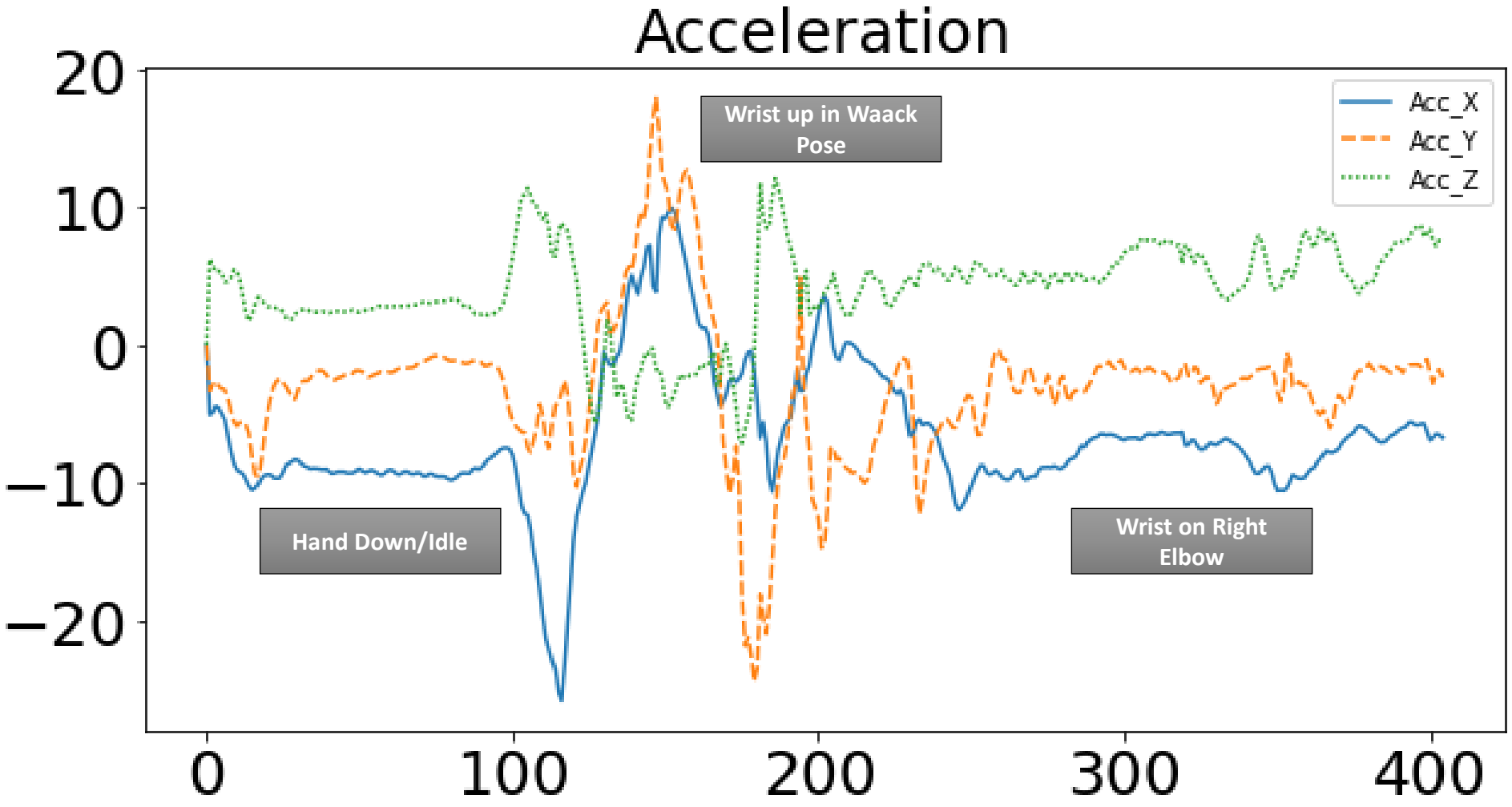
XSens DOT

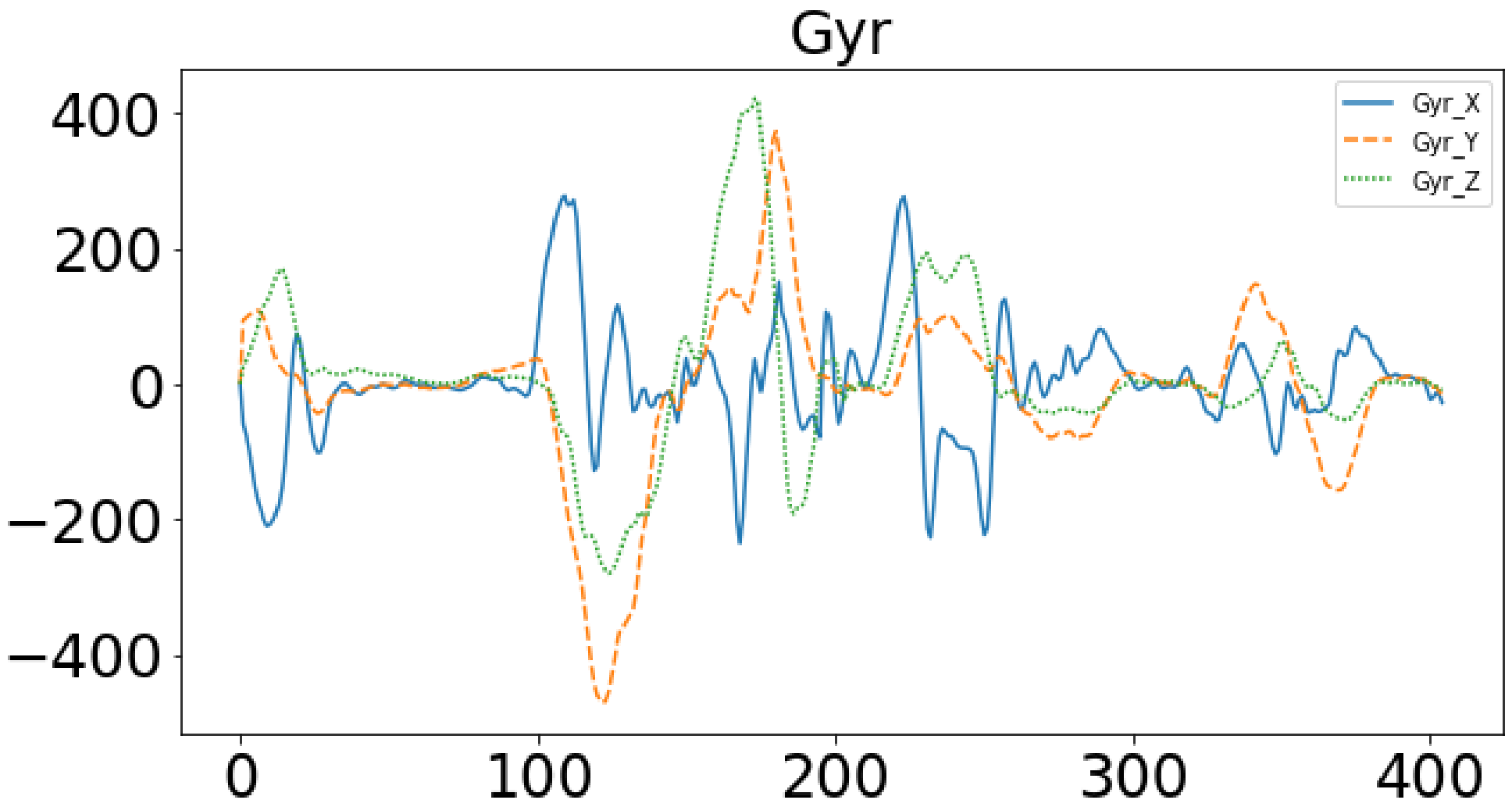
Both Wrists Data

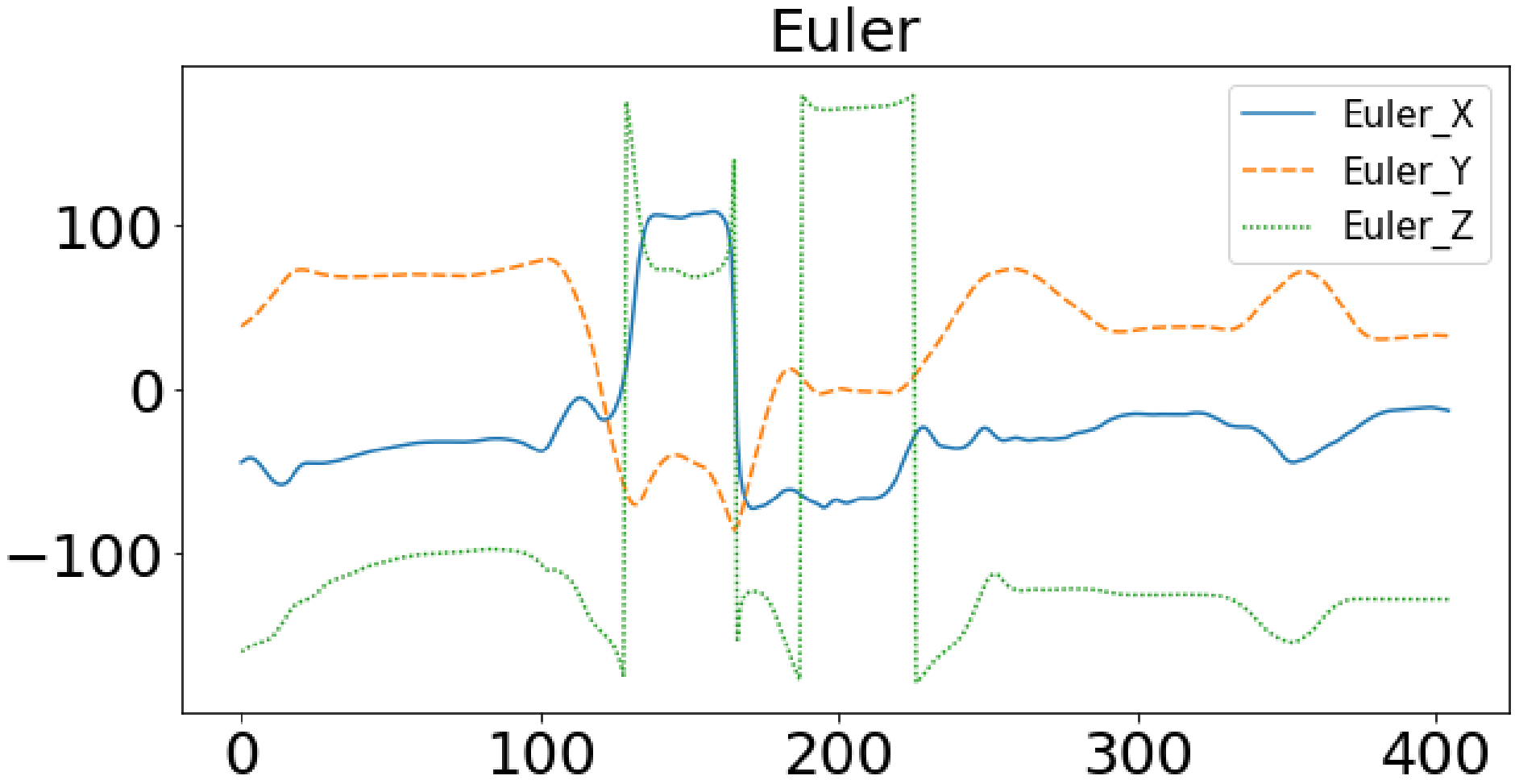
Left Wrist:


Acceleration
20
10
0
−10
−20
0
100
200
300
400
Acc_X
Acc_Y
Acc_Z
Wrist up in Waack Pose
Hand Down/Idle
Wrist on Right Elbow

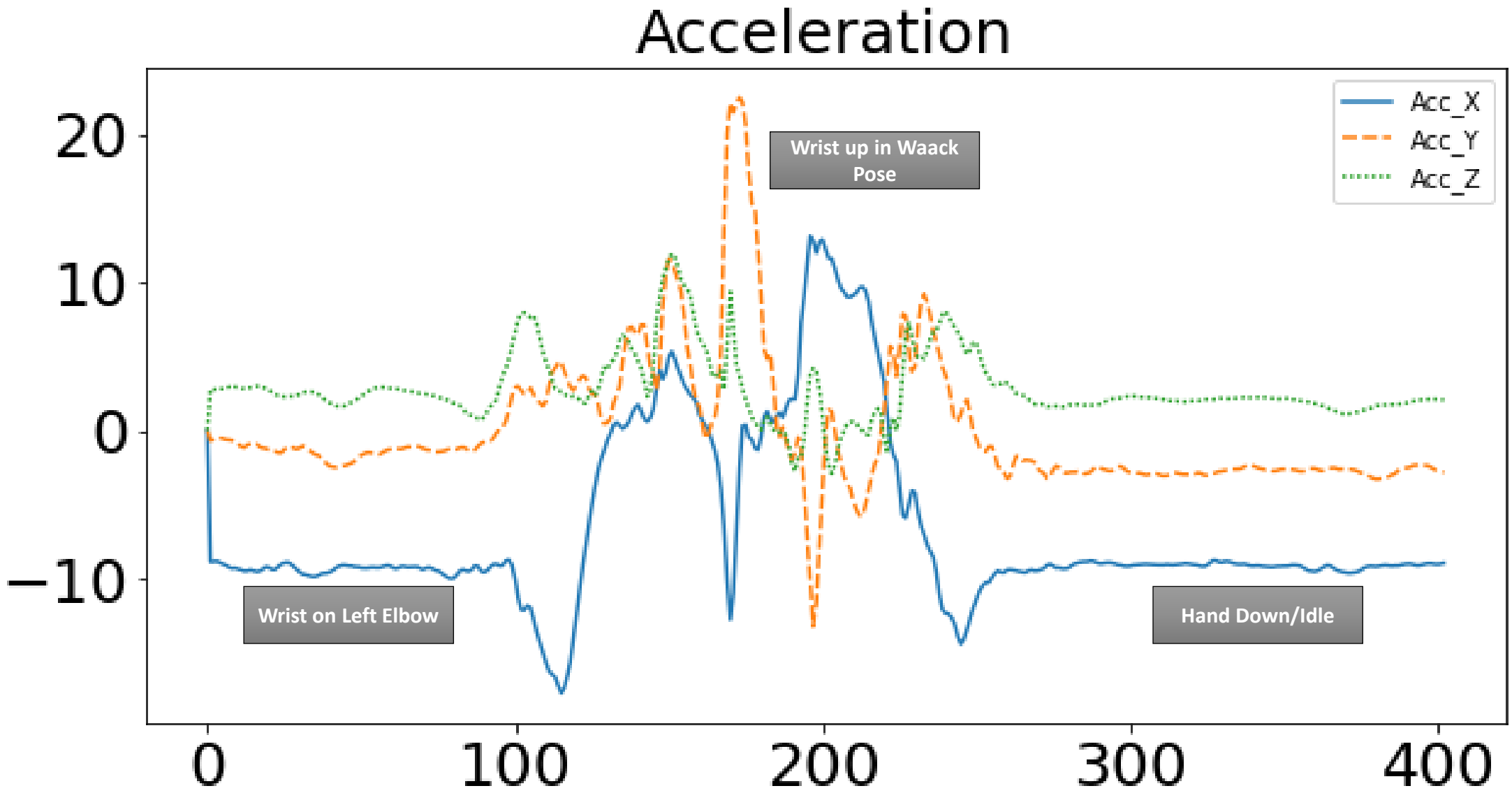

Acceleration
20
10
0
−10
−20
0
100
200
300
400
Acc_X
Acc_Y
Acc_Z
Wrist up in Waack Pose
Hand Down/Idle
Wrist on Right Elbow

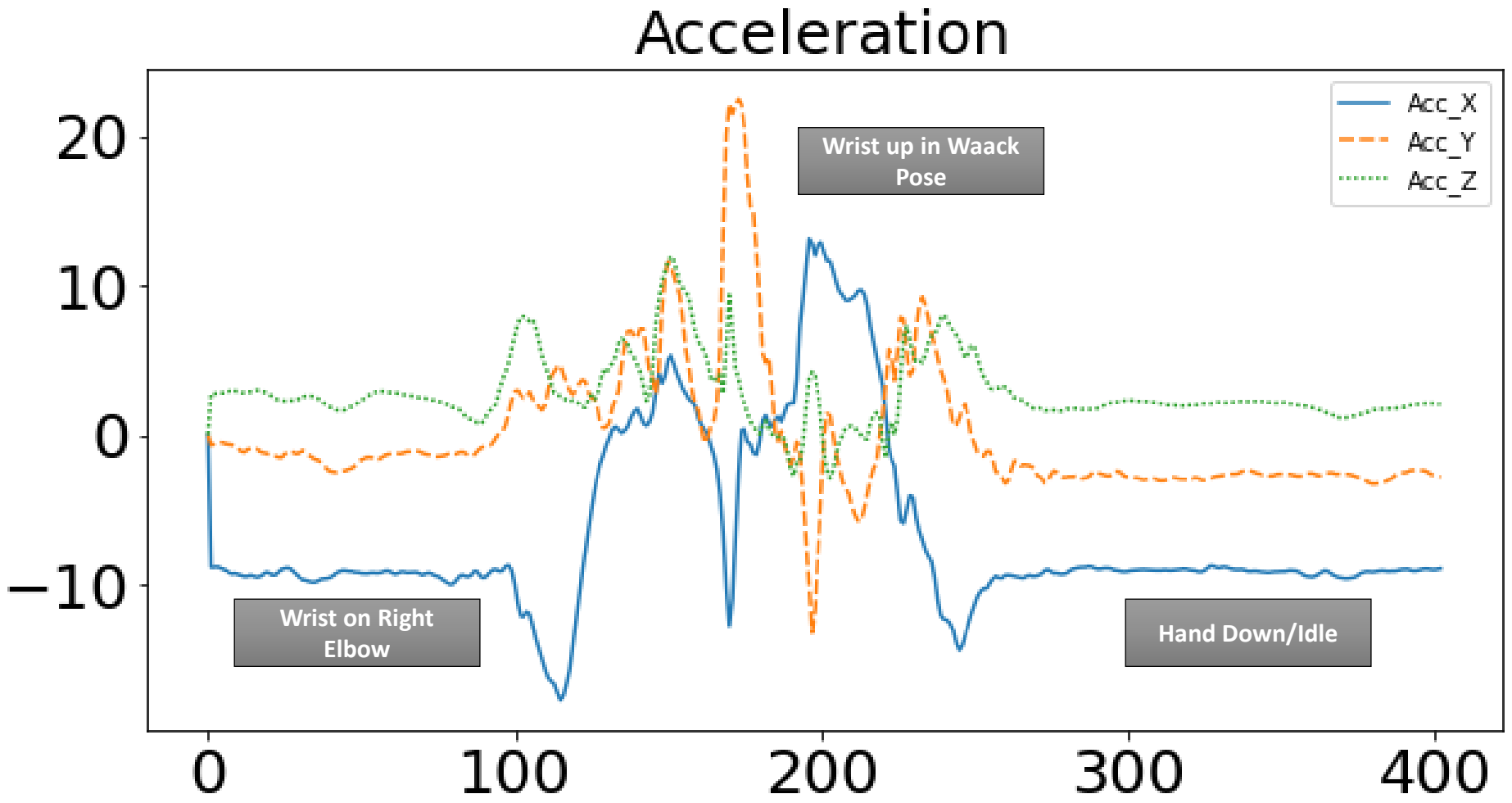
Acc: X-Axis
10
0
−10
−20
−30
Hand Down/Idle
Wrist up in Waack Pose
Wrist on Right Elbow
Acc: Y-Axis
20
0
−20
Hand Down/Idle
Wrist up in Waack Pose
Wrist on Right Elbow
Acc: Z-Axis
10
0
−10
Wrist up in Waack Pose
Hand Down/Idle
Wrist on Right Elbow

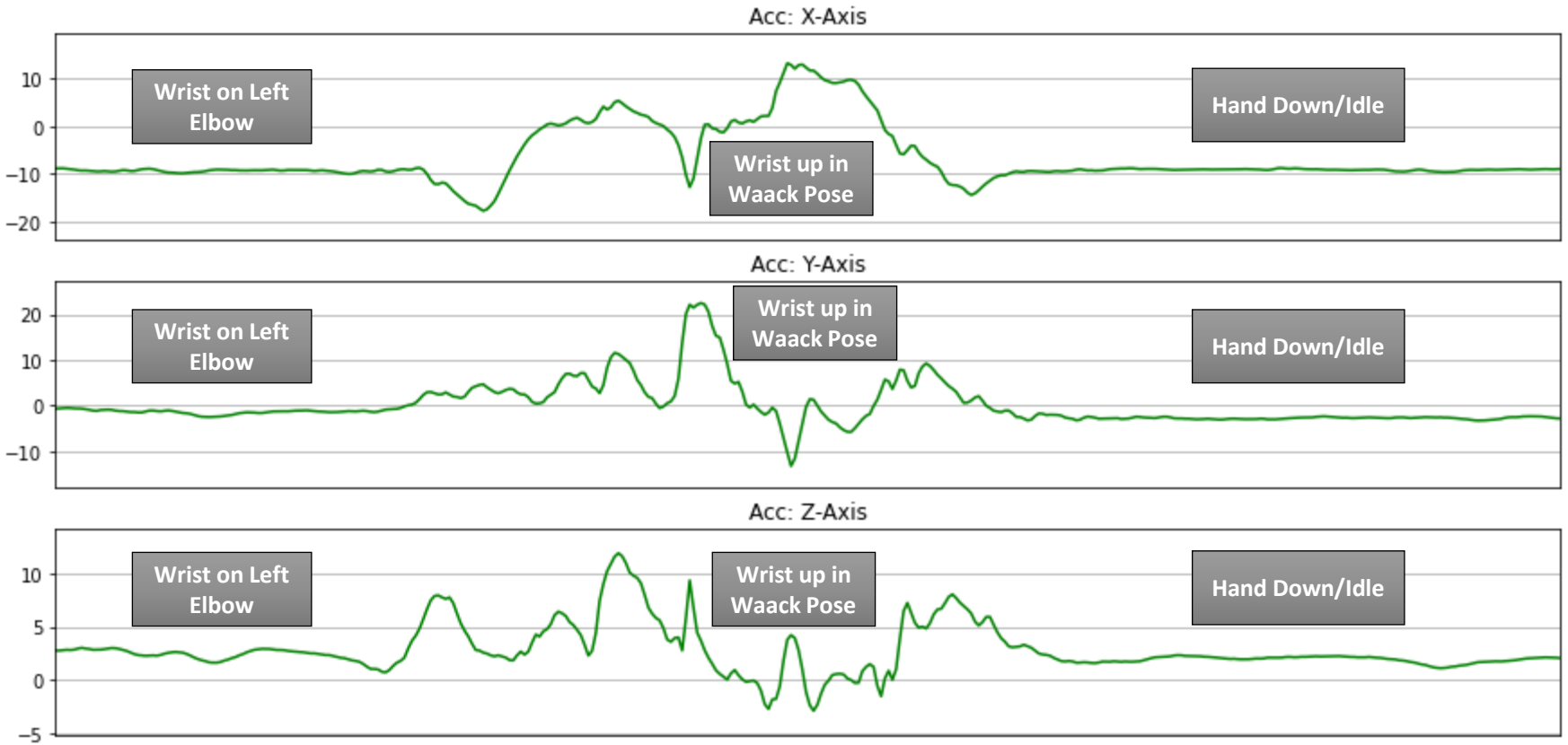

Gyr
400
200
0
−200
−400
0
100
200
300
400
Gyr_X
Gyr_Y
Gyr_Z

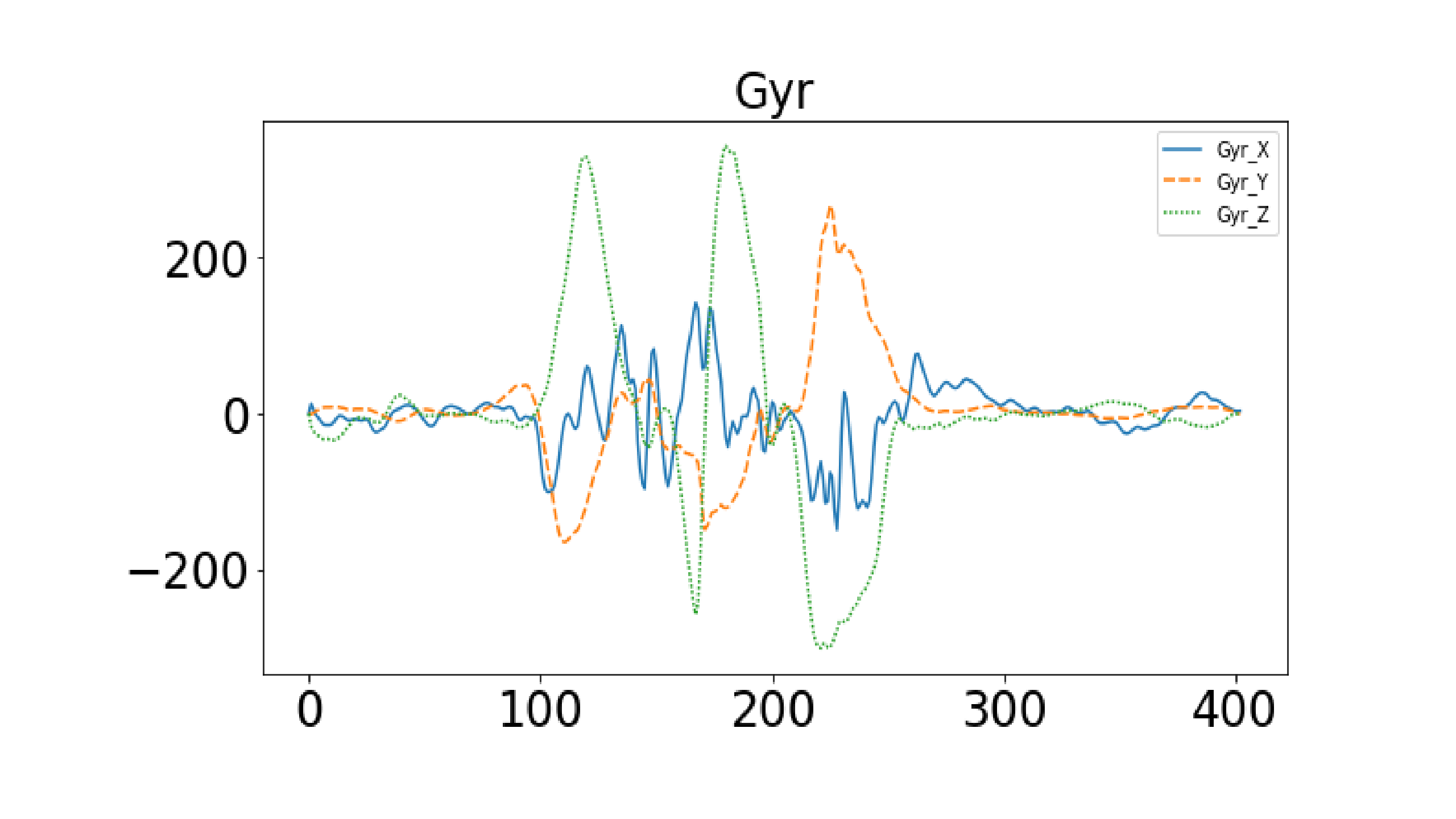

Euler
Euler_X
Euler_Y
Euler_Z
100
0
−100
0
100
200
300
400

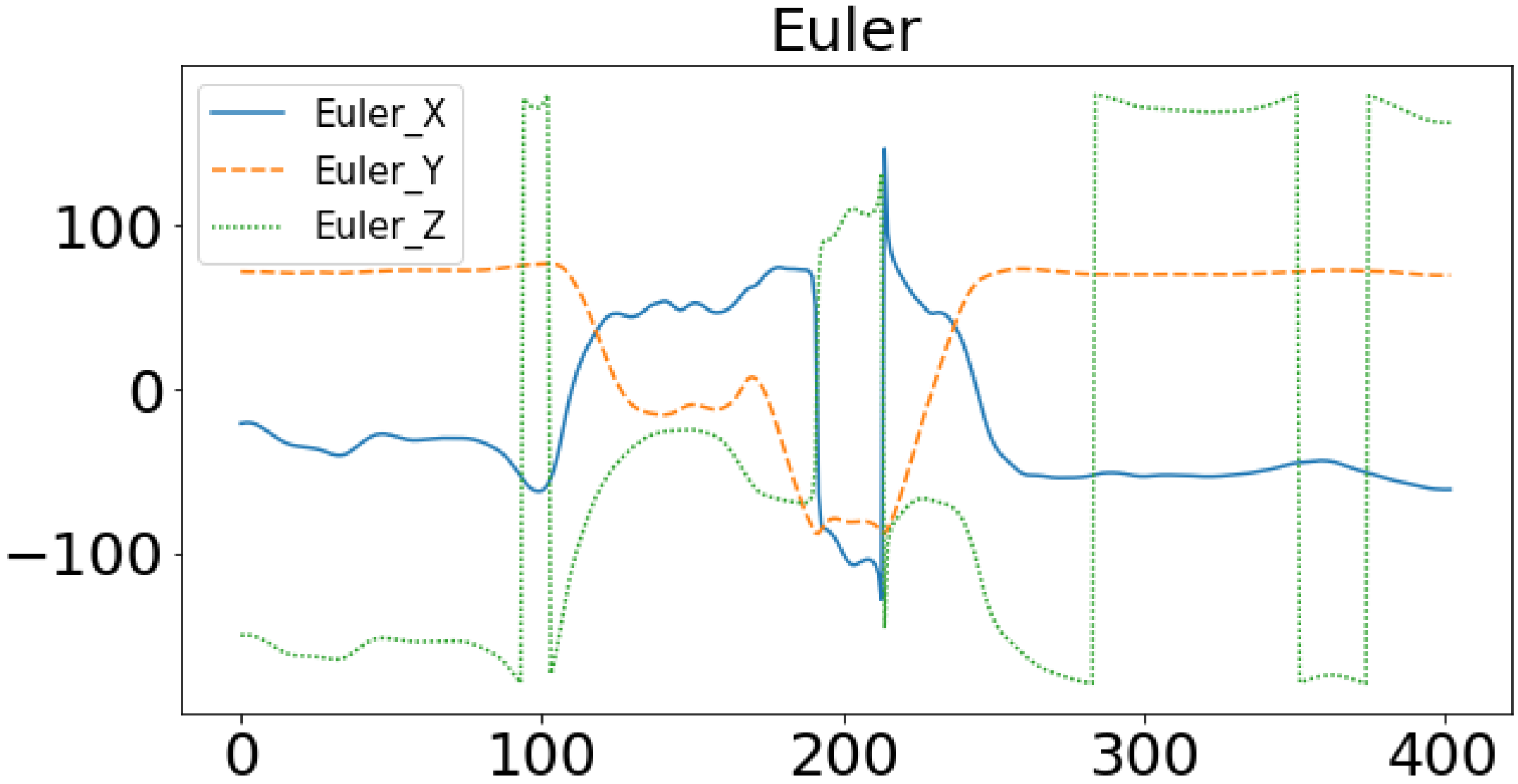
Right Wrist:


Acceleration
Acc_X
Acc_Y
Acc_Z
Wrist up in Waack Pose
Wrist on Left Elbow
Hand Down/Idle
20
10
0
−10
0
100
200
300
400

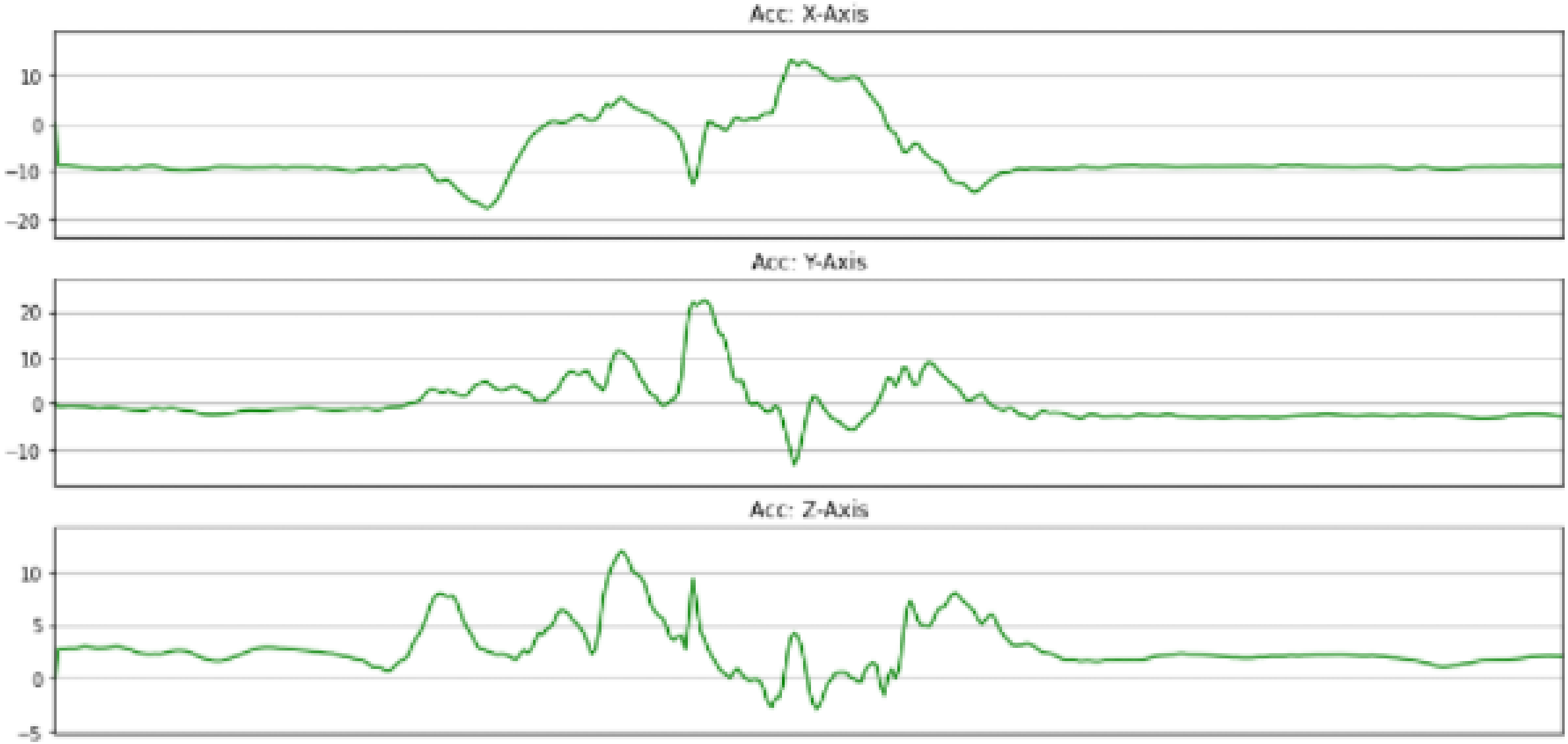

Acceleration
Acc_X
Acc_Y
Acc_Z
Wrist up in Waack Pose
Wrist on Right Elbow
Hand Down/Idle
20
10
0
−10
0
100
200
300
400


Acc: X-Axis
10
0
−10
−20
Wrist on Left Elbow
Wrist up in Waack Pose
Hand Down/Idle
Acc: Y-Axis
20
10
0
−10
Wrist on Left Elbow
Wrist up in Waack Pose
Hand Down/Idle
Acc: Z-Axis
10
5
0
−5
Wrist on Left Elbow
Wrist up in Waack Pose
Hand Down/Idle


Gyr
Gyr_X
Gyr_Y
Gyr_Z
200
0
−200
0
100
200
300
400


Euler
Euler_X
Euler_Y
Euler_Z
100
0
−100
0
100
200
300
400

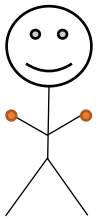
CNN: Right Wrist



Approach

XSens DOT

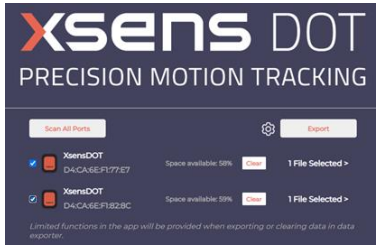
Apply to both wrists



Connect sensors

XSens DOT Phone App

Capture dance motion



XSens DOT Data Exporter

Send accelerometer data

Jupyter/Python

Approach

XSens DOT

Apply to both wrists

Connect sensors

XSens DOT Phone App

Capture dance motion

Dance Demonstration

Export data from Xsens App

XSens DOT Data Exporter

Send accelerometer data

Jupyter/Python

Accuracy	
Sukor et al.	
Bayat et al.	
da Silva et al.	90%
Drumond et al.	96%
Gomes et al.	
Pavai	

- Using wearable inertial sensors to track everyday human motion has been a popular subject in previous papers in classifying and recognising human activities.
- Plenty of projects involving human activity recognition have already been explored and published.
- However, identifying dance motions from wearable inertial sensors to determine the accuracy of a dance choreography has not been well inspected.

Author	**Data**	**Approach**	**Accuracy**
Bayat et al.	Accelerometer	*Combination of Classifiers:* Multilayer Perceptron, LogitBoost and SVM	91.15%
Gomes et al.	Accelerometer	KNN *Combination of Classifiers*: Random Forest & KNN	79% 78%
Sukor et al.	Accelerometer	Multilayer Perceptron Neural Network	96.11%
da Silva et al.	Motion Capture	LSTM	95%
Drumond et al.	Accelerometer	LSTM	96%
Pavai	Accelerometer	Bidirectional LSTM	90+%
Our Approach	Accelerometer	Bidirectional LSTM	60+%