WIRELESS & MOBILE NETWORKS – FINAL PRESENTATION

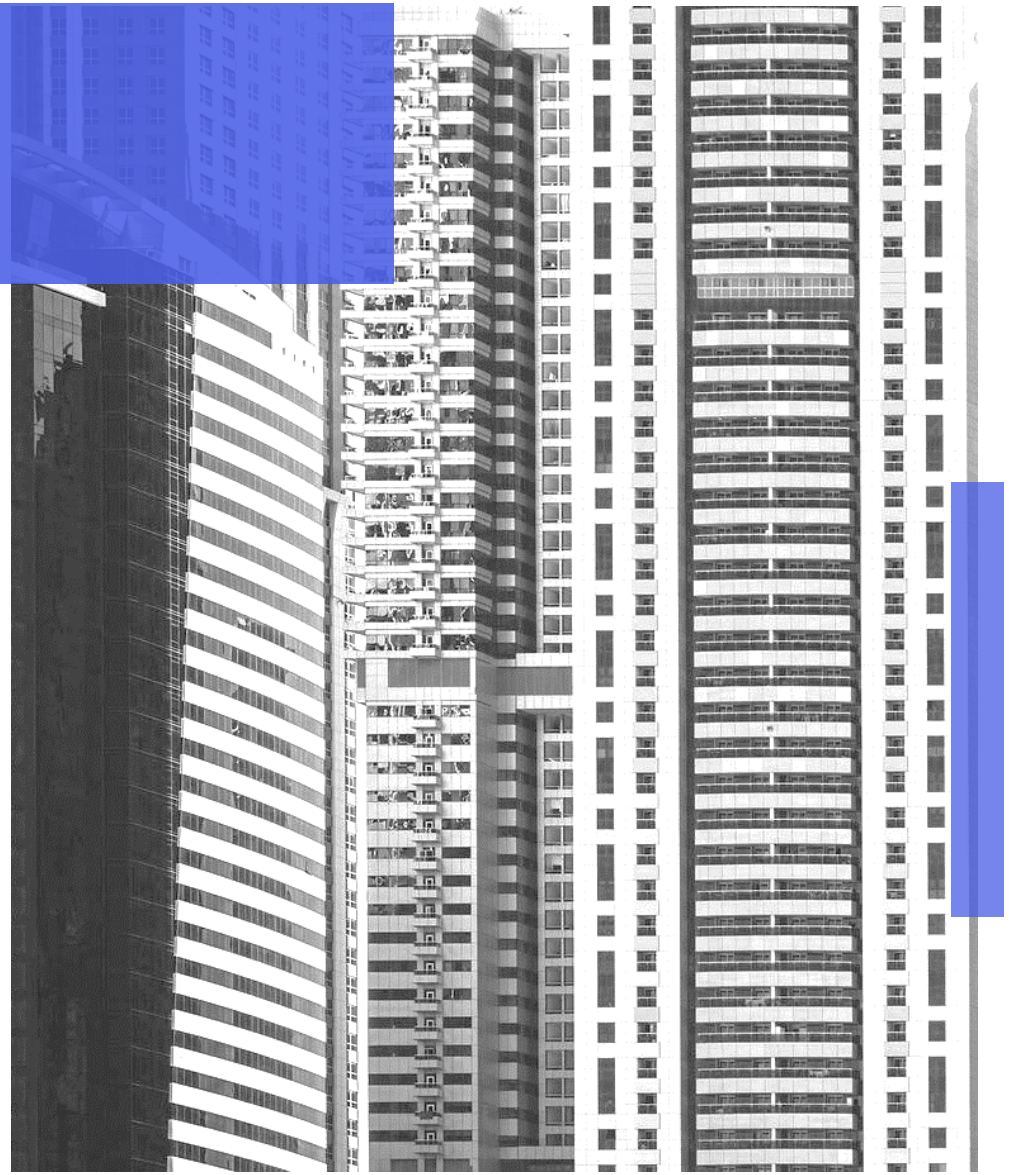
# BREAKNECK

## EARABLE BASED GESTURE RECOGNITION SYSTEM


PRESENTED BY:

MURTAZA MISTER

ESHWAR CHAITANYA SARAMPATI



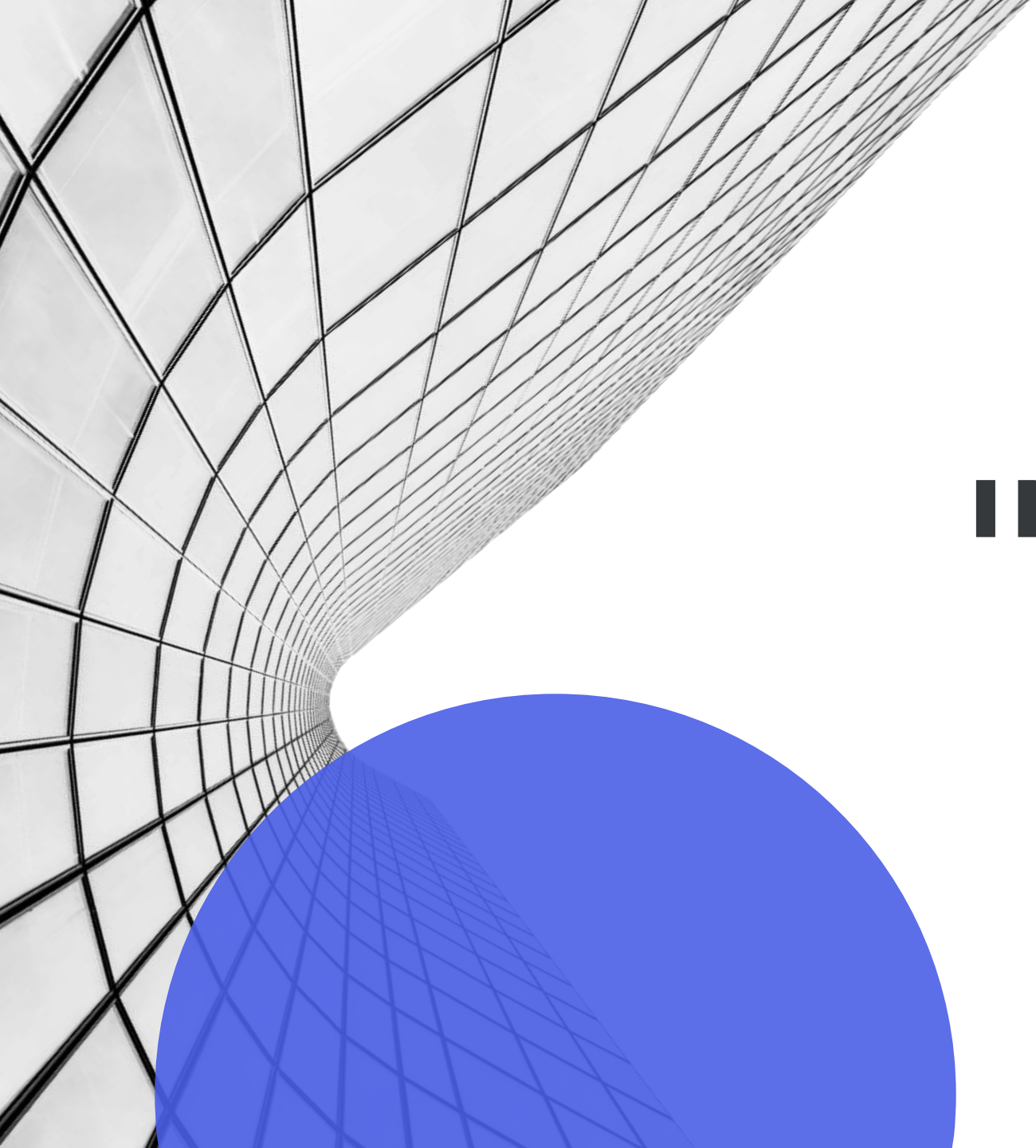
# AGENDA

INTRODUCTION

METHODOLOGY

DATASET & EXPERIMENTS

CONCLUSION



# INTRODUCTION

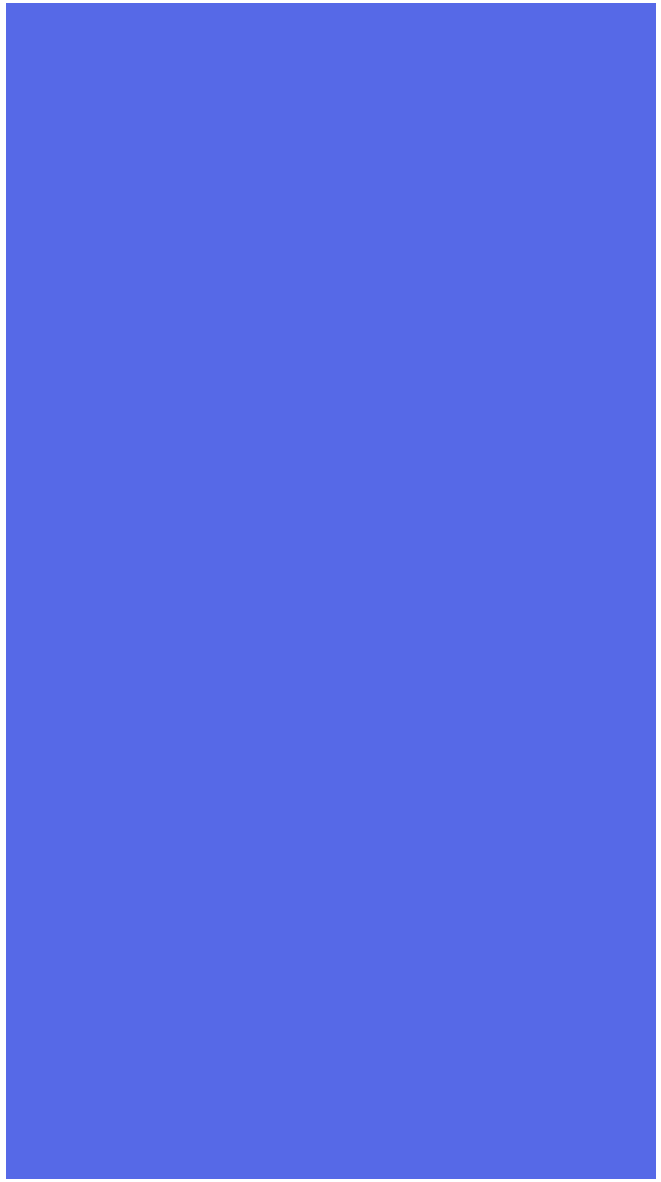
# METHODOLOGY

## DTW

Dynamic time warping, to eliminate the time and speed differences across various individuals

## ISSUES?

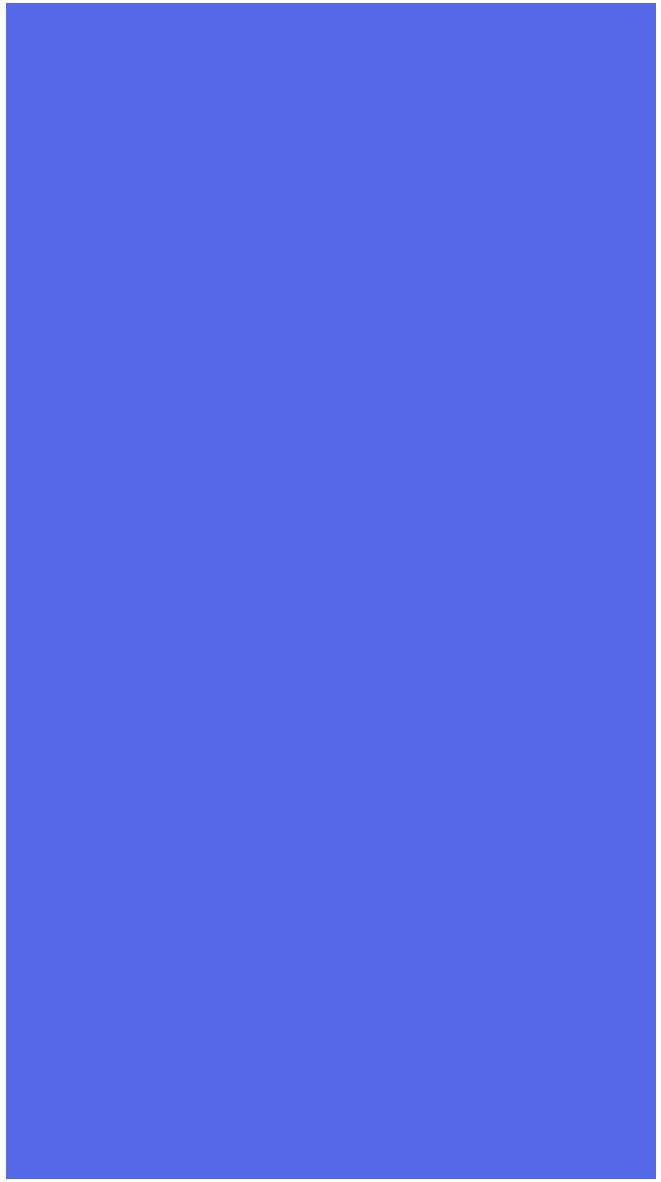
Change of orientation is not an issue.



# SYSTEM PARAMETERS

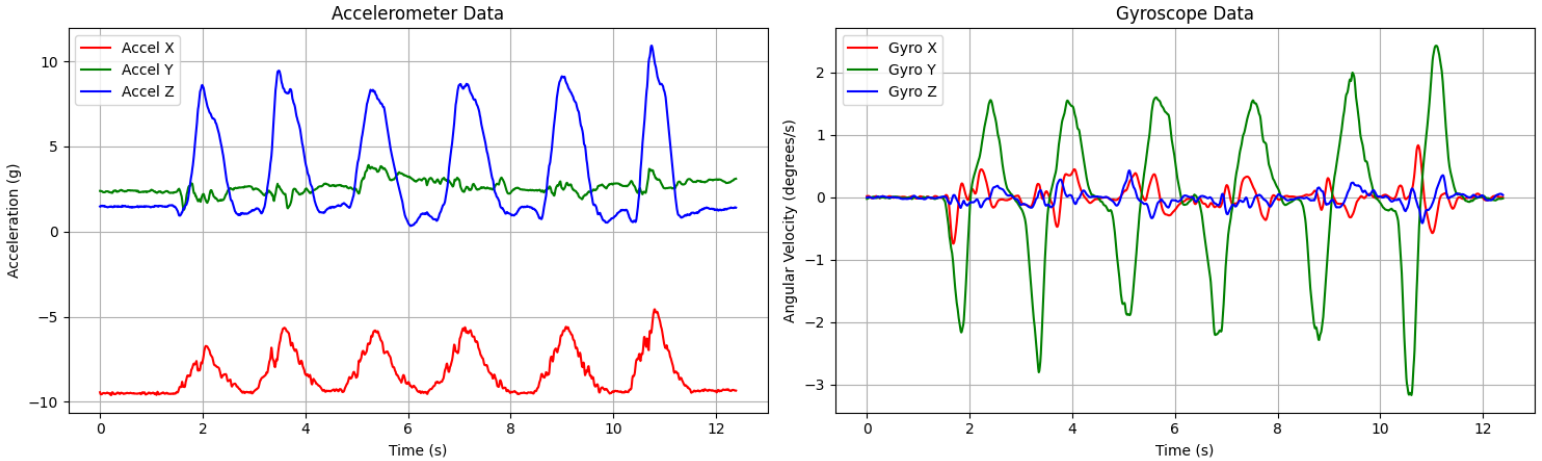
```
window_size = min(len(template_right_tilt['data']), len(template_left_tilt['data']))
step_size = 25
skip_size = window_size // 2
start = 0
threshold = 22.00
ratio_acc_gyro = 2/5
```

# DATASET & VERIFICATIONS

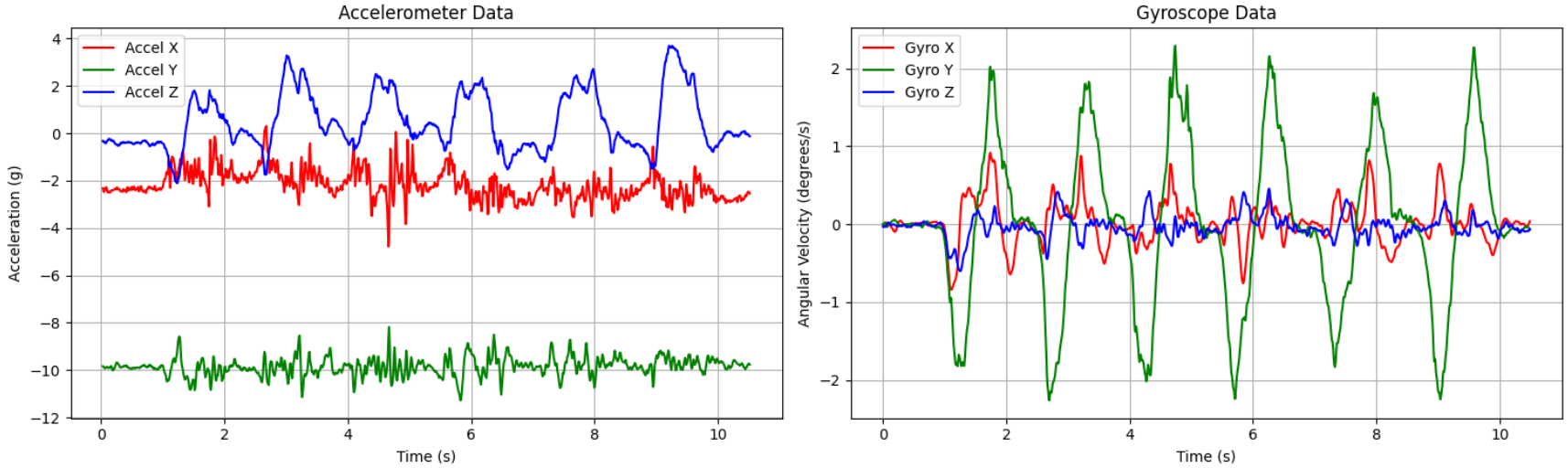


# TYPE OF DATA

**Right Tilt**

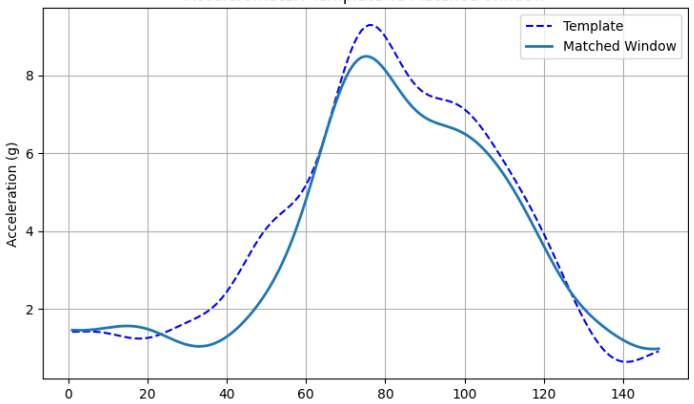


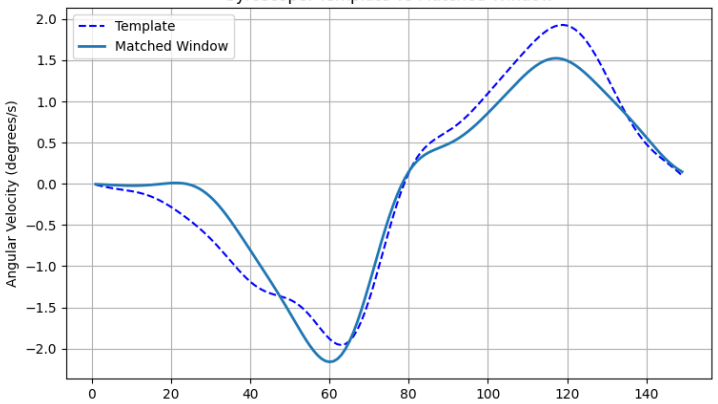

**Sleeping Right Tilt**



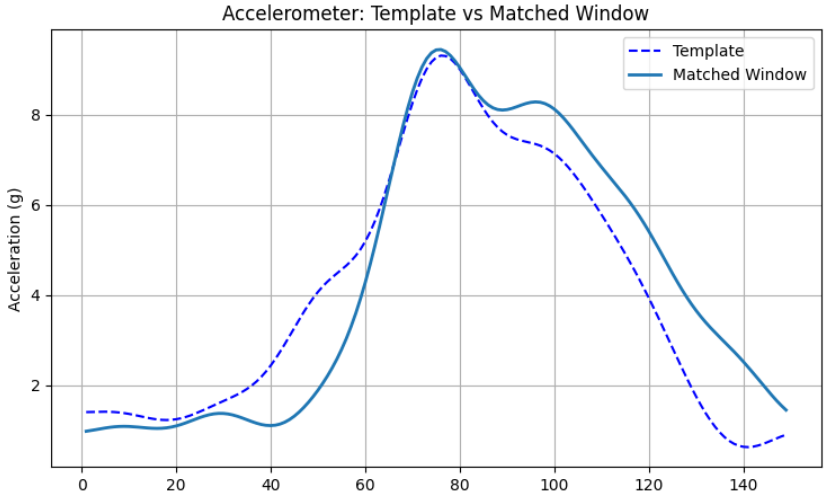
# RIGHT TILTS

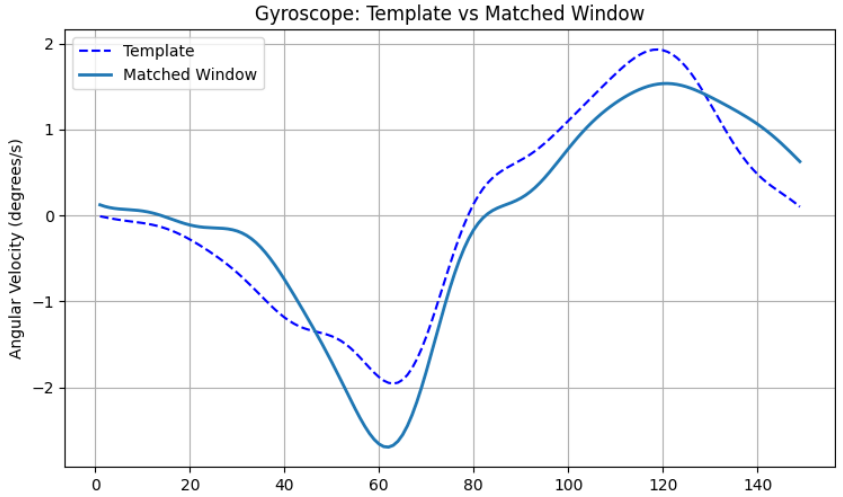
**RIGHT_TILT**



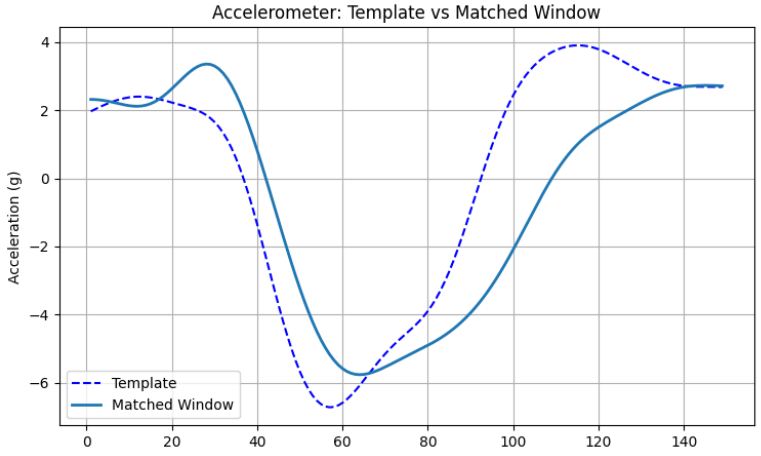

**RIGHT_TILT**

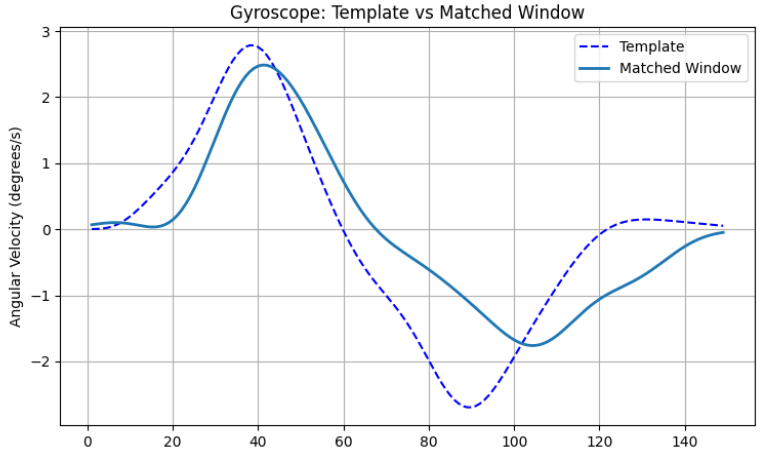


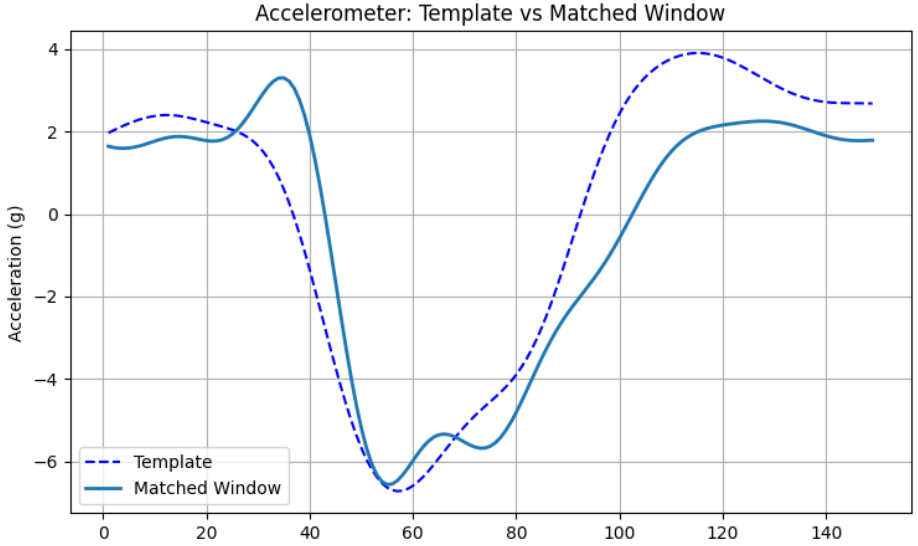
# LEFT TILTS

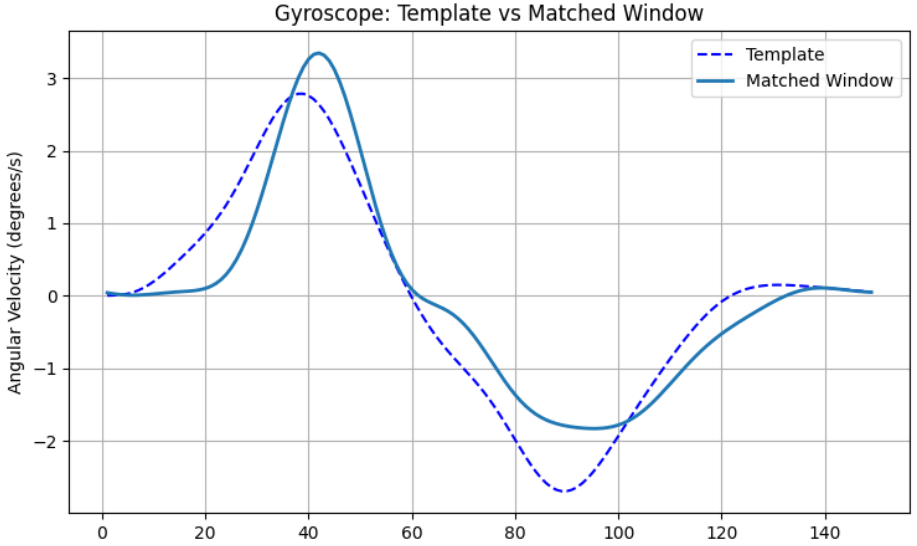
**LEFT_TILT**



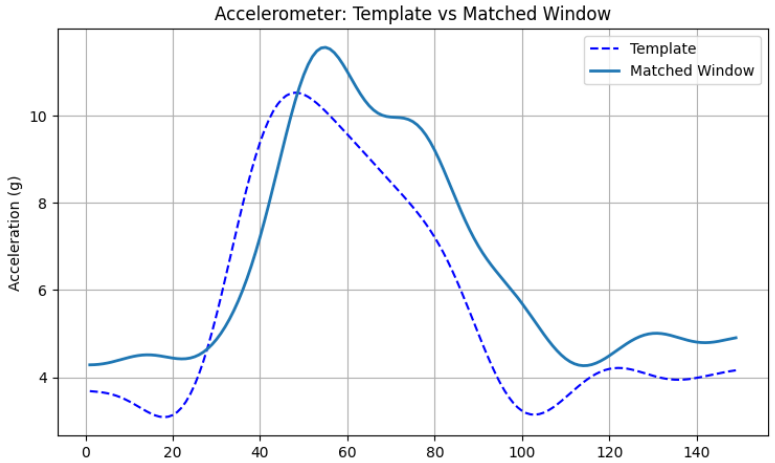

**LEFT_TILT**

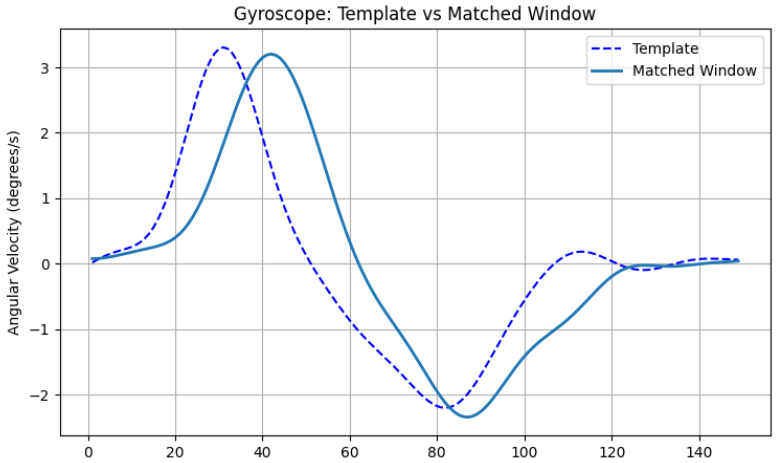


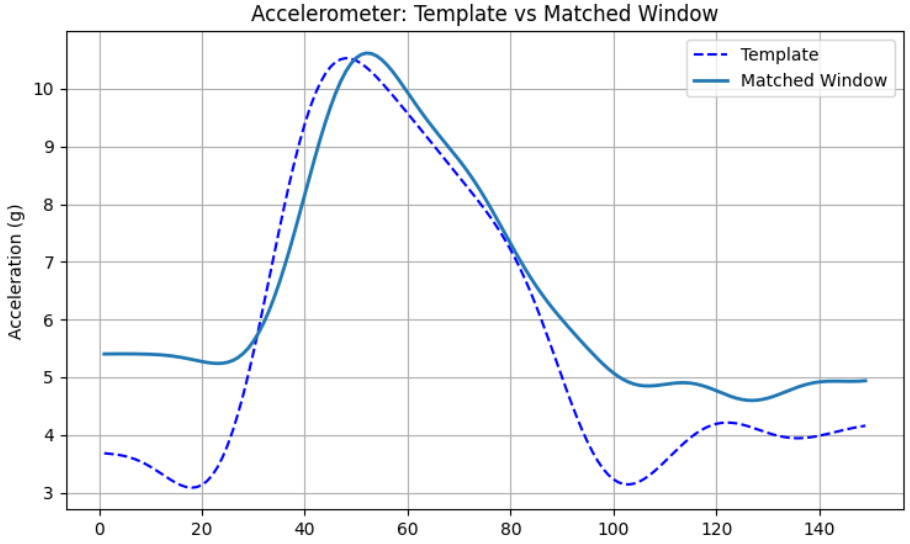
# FRONT NOD

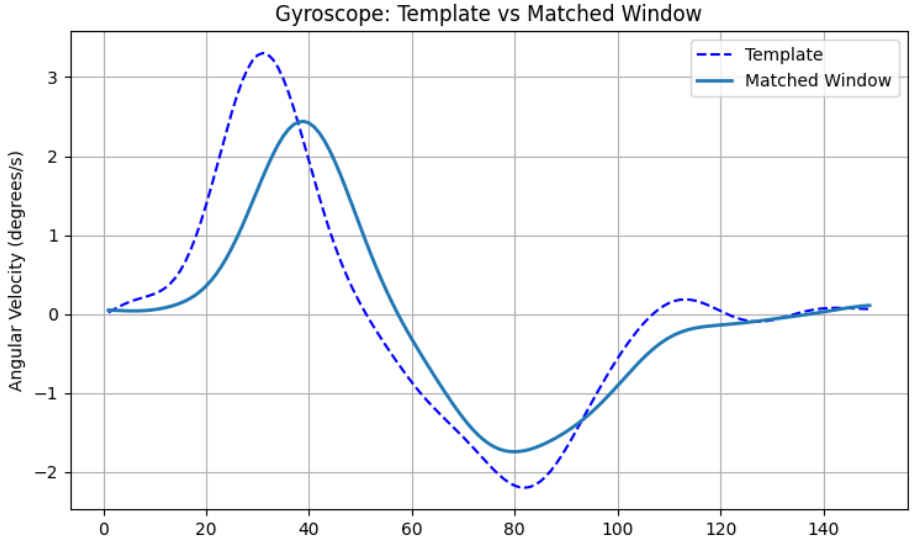
**FRONT_NOD**



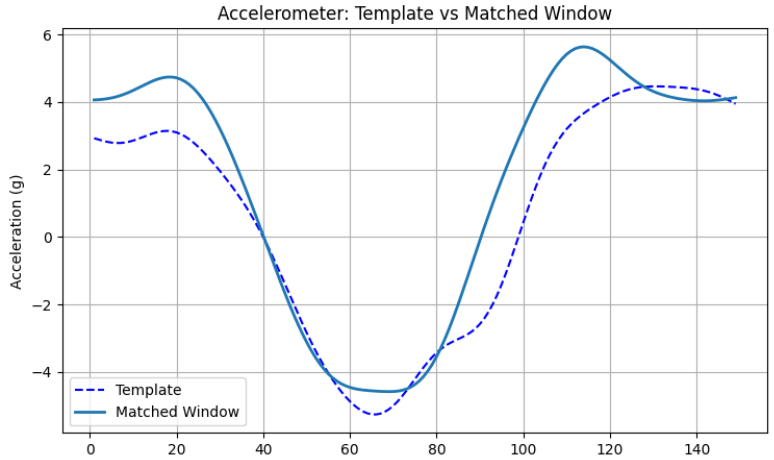

**FRONT_NOD**

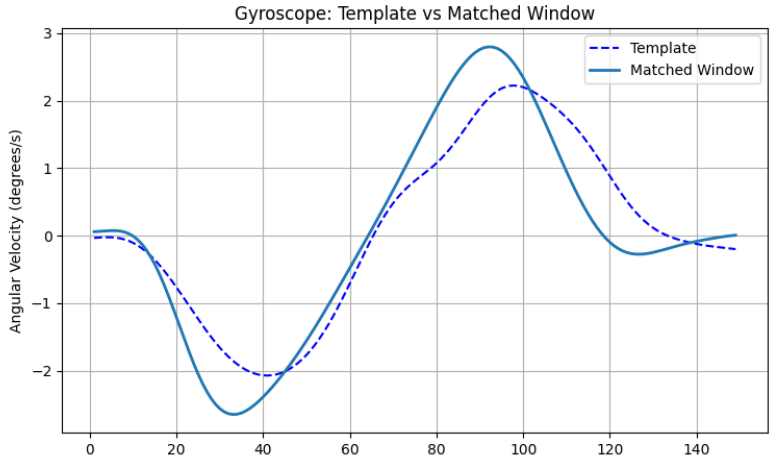


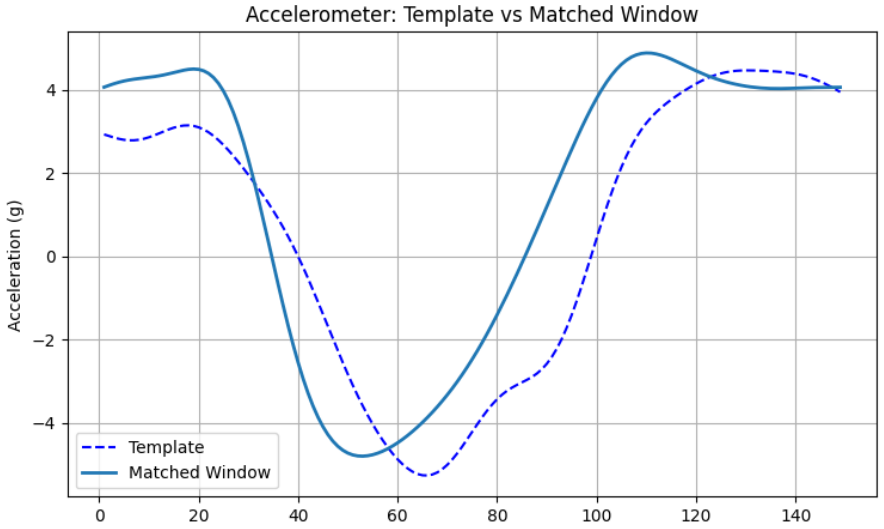
# BACK NOD

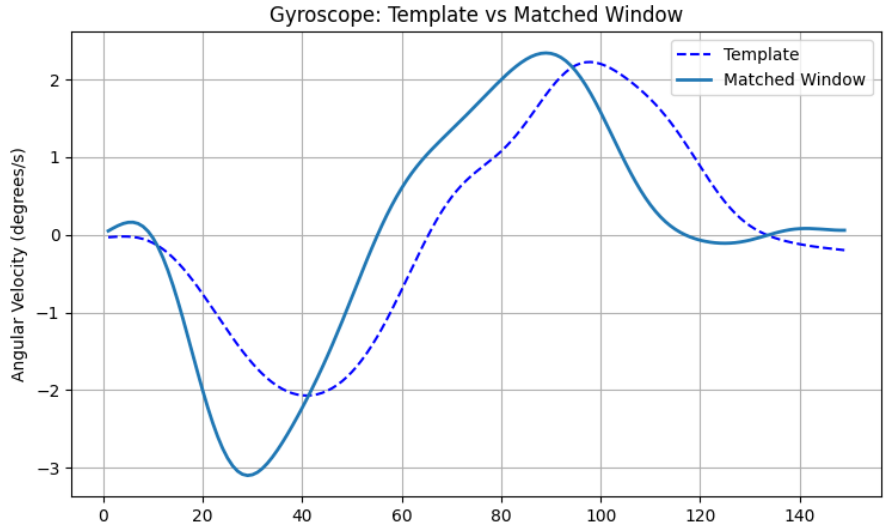
**BACK_NOD**



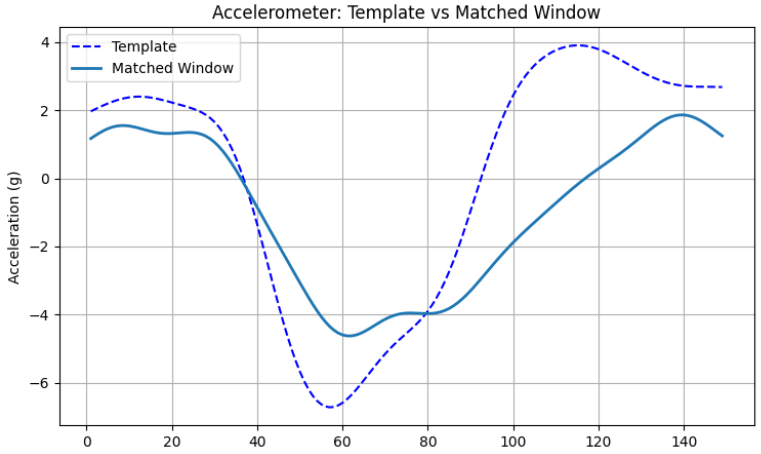

**BACK_NOD**

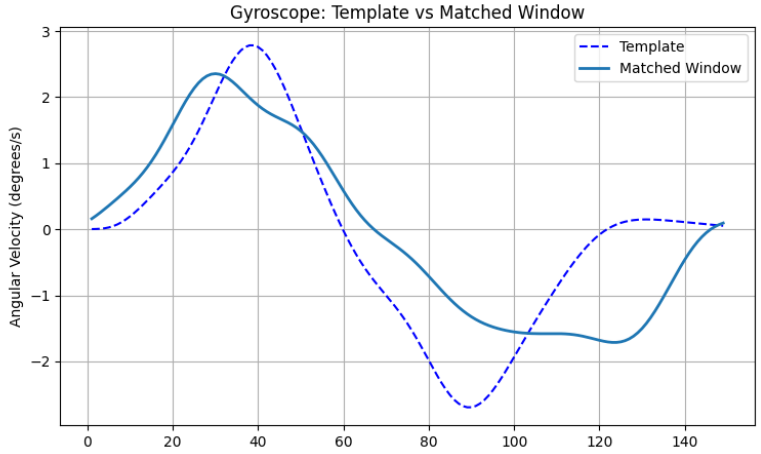


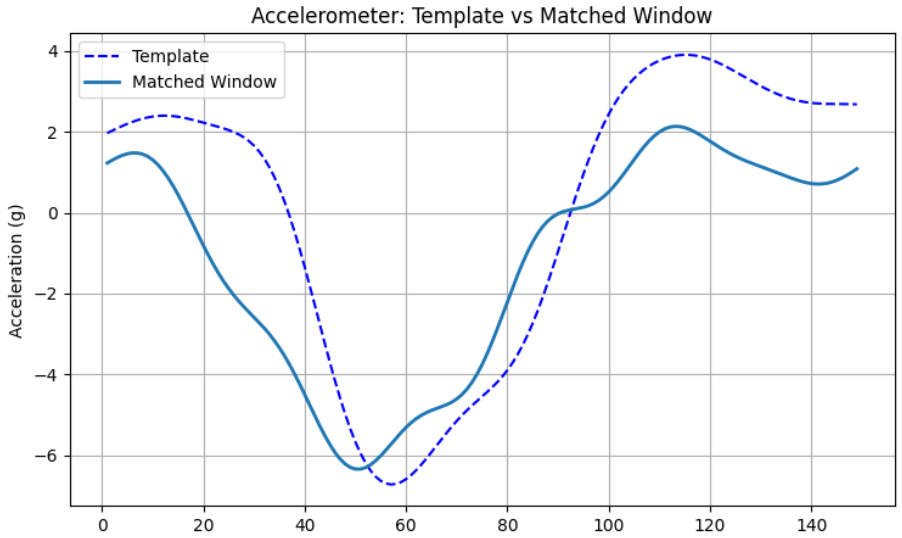
# SLEEPING LEFT TILT

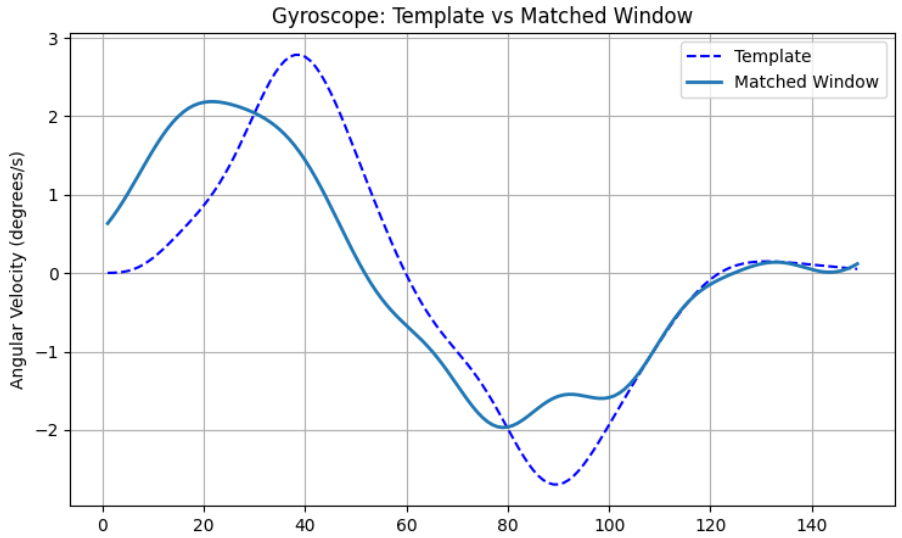
**LEFT_TILT**



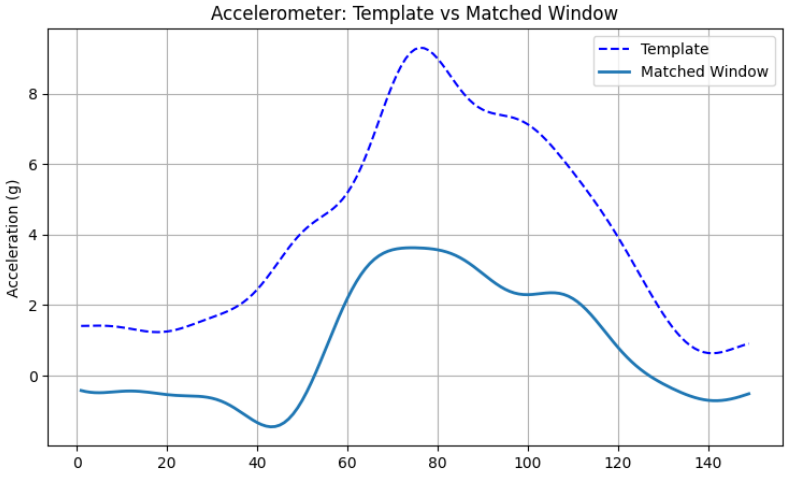

**LEFT_TILT**

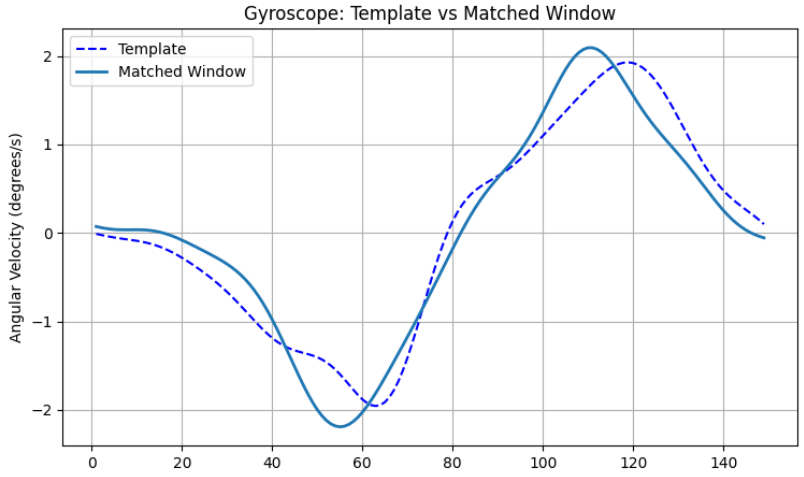


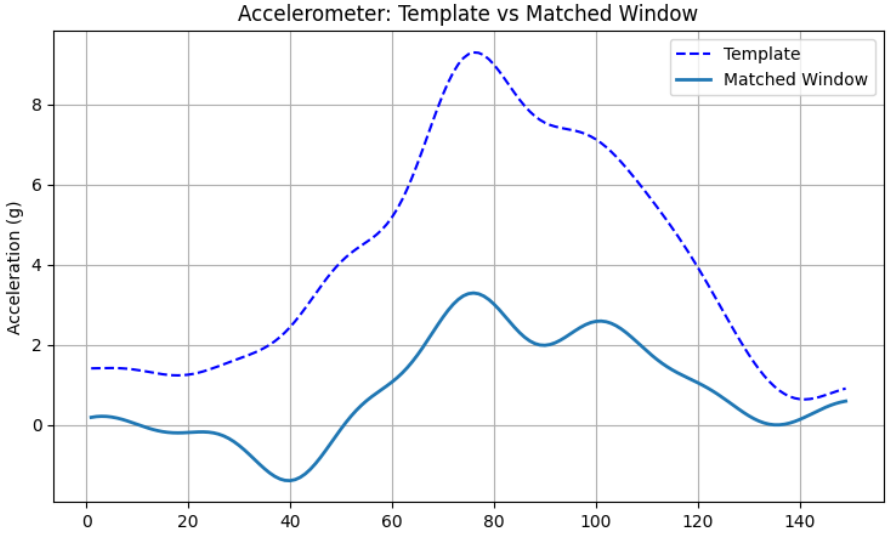
# SLEEPING RIGHT TILT

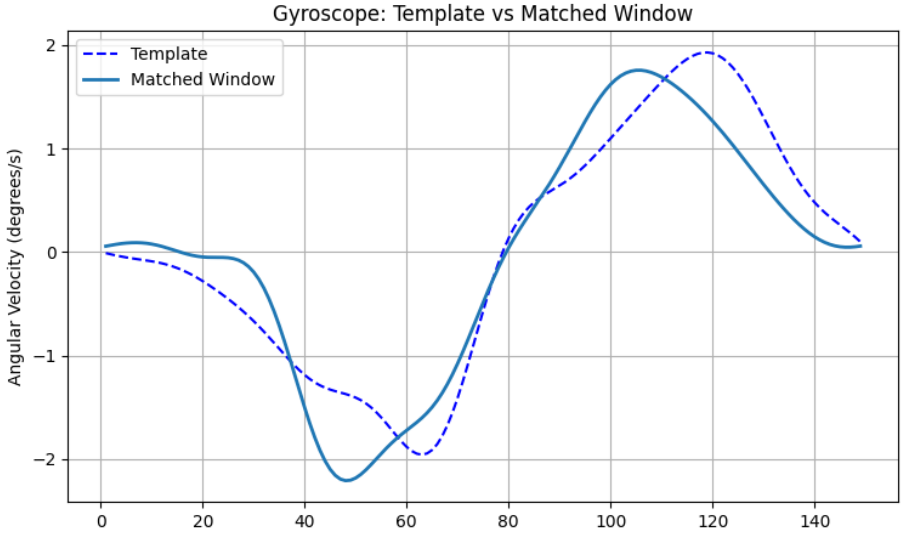
**RIGHT_TILT**



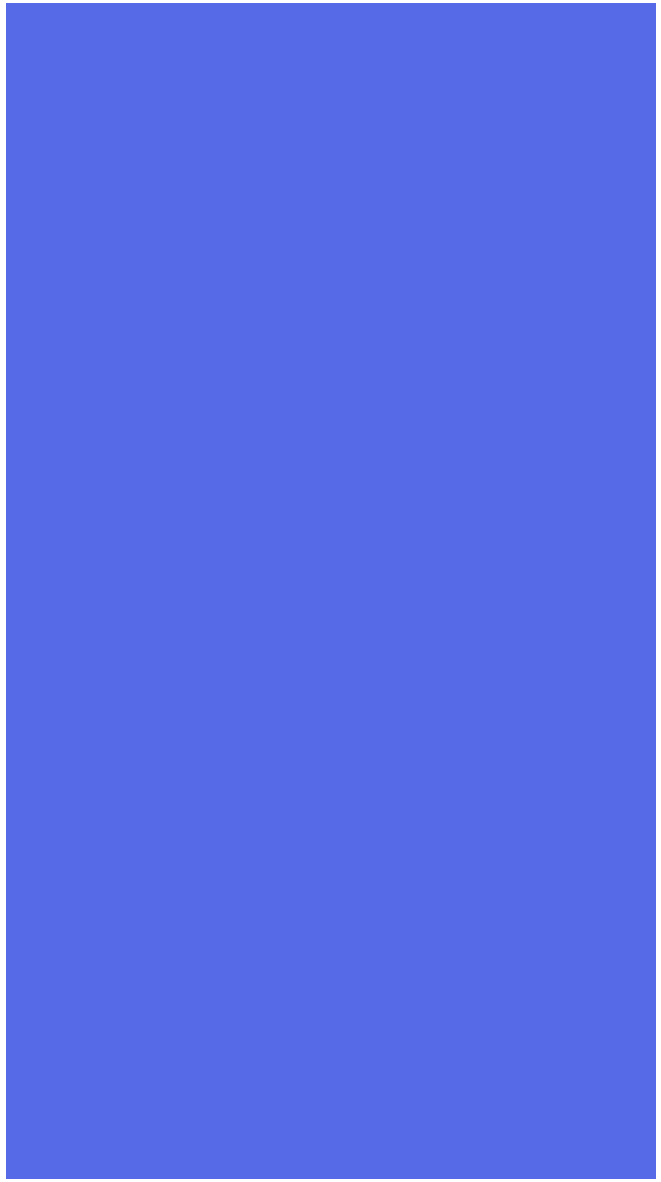




**RIGHT_TILT**



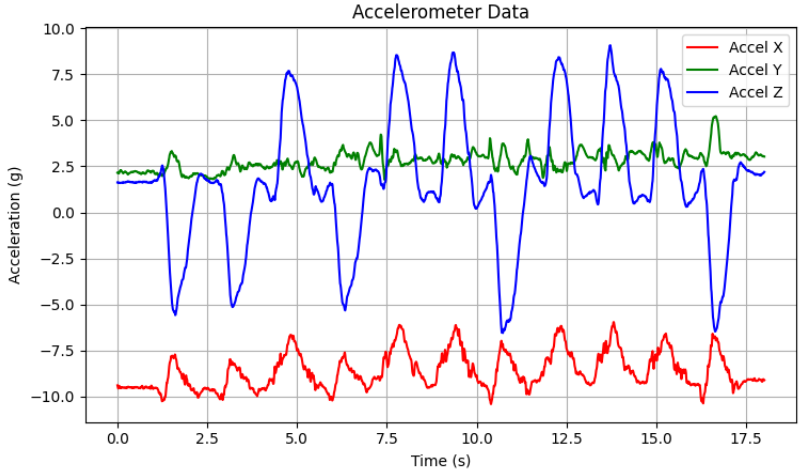



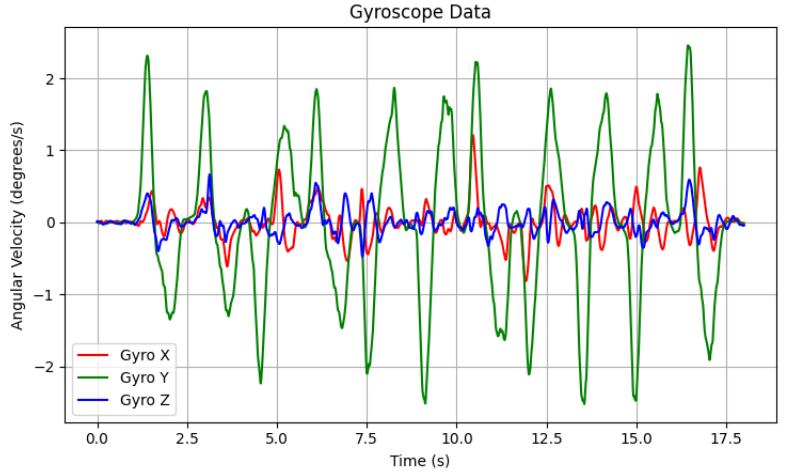
# EXPERIMENTS



# LEFT-RIGHT WHILE SITTING

**Original Test left right tilt**




```
{'start_index': 100, 'end_index': 249, 'dtw_distance': 13.840561340507513, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 274, 'end_index': 423, 'dtw_distance': 14.026787245583858, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 398, 'end_index': 547, 'dtw_distance': 7.923352110669804, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 572, 'end_index': 721, 'dtw_distance': 14.913573338505927, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 696, 'end_index': 845, 'dtw_distance': 9.664284163598863, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 845, 'end_index': 994, 'dtw_distance': 14.240792246840122, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 1019, 'end_index': 1168, 'dtw_distance': 14.466474114846463, 'type': <Match.LEFT_TILT: 2>}
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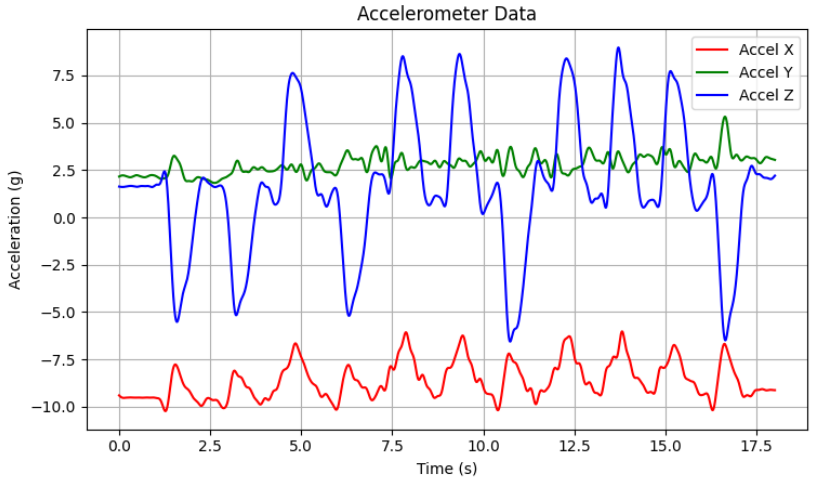
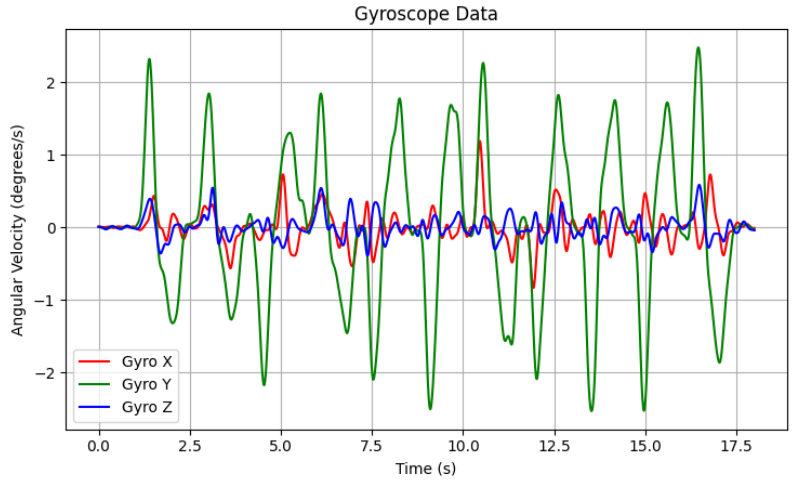
{'start_index': 1292, 'end_index': 1441, 'dtw_distance': 8.406836436316716, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 1441, 'end_index': 1590, 'dtw_distance': 7.030046139917572, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 1615, 'end_index': 1764, 'dtw_distance': 10.302987855372468, 'type': <Match.LEFT_TILT: 2>}
Accuracy: 100.0%
```

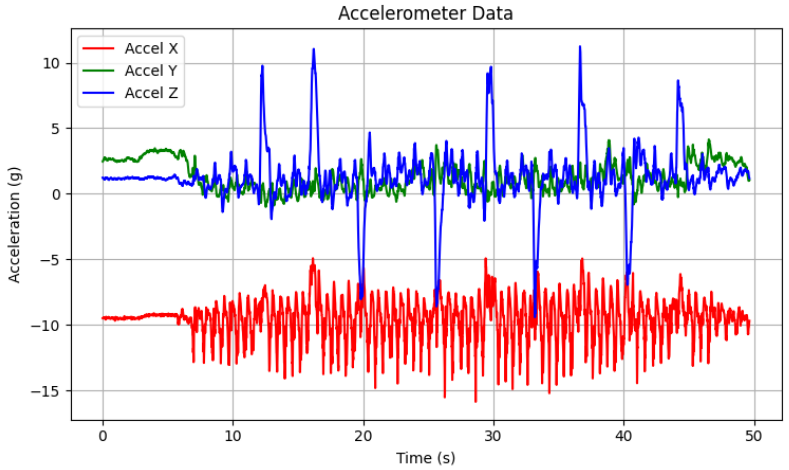
**Filtered test left right tilt**

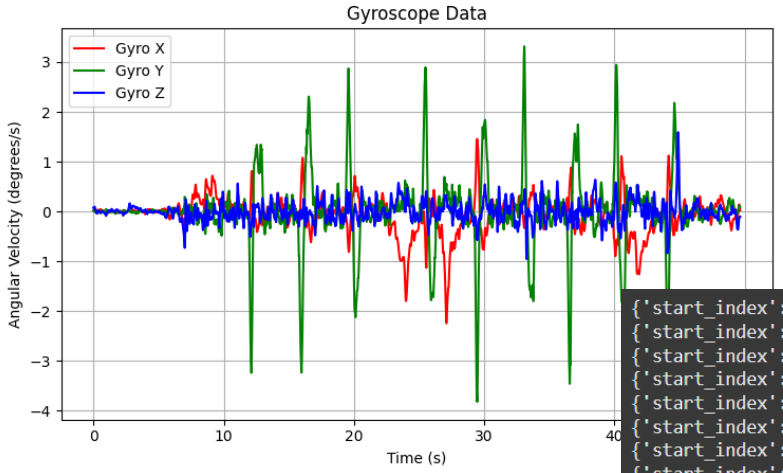


# LEFT-RIGHT WHILE WALKING

**Original walk test**




```
{'start_index': 1125, 'end_index': 1274, 'dtw_distance': 18.084828247463133, 'type': <Match.RIGHT_TILT: 1>}
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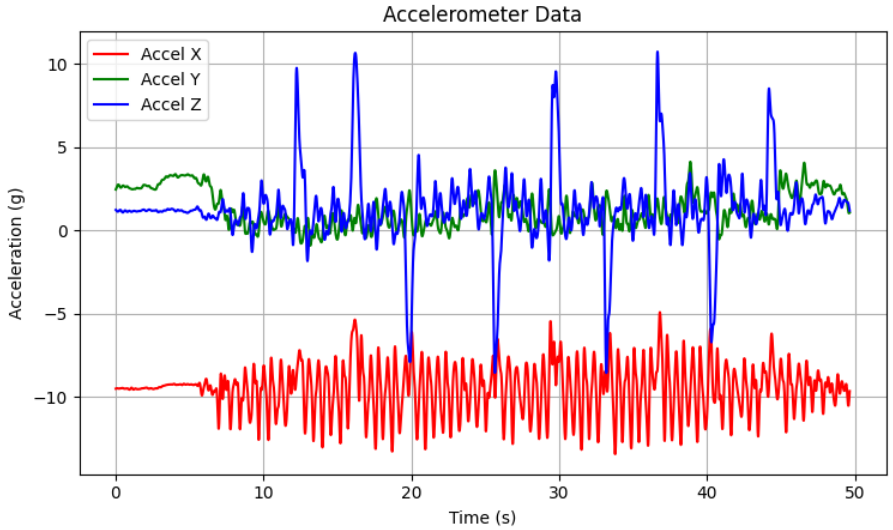
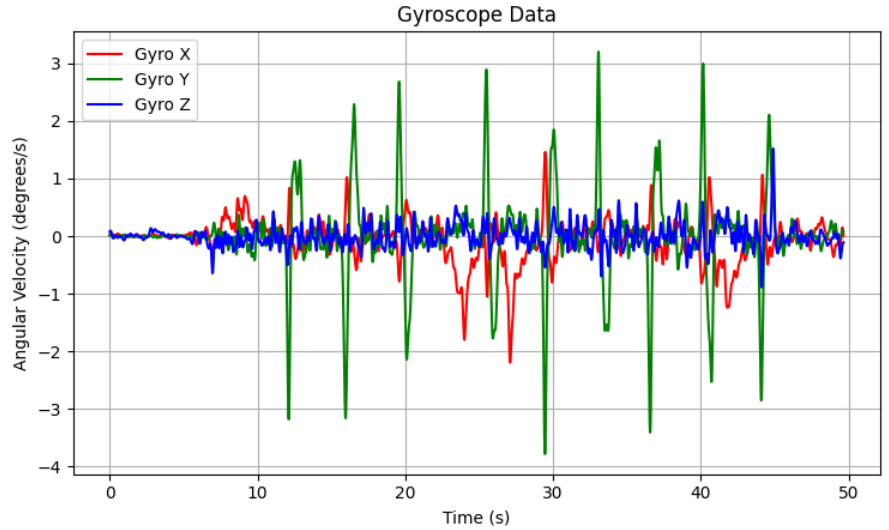
{'start_index': 1898, 'end_index': 2047, 'dtw_distance': 9.860762671519085, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 2472, 'end_index': 2621, 'dtw_distance': 10.5617010662309, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 2846, 'end_index': 2995, 'dtw_distance': 13.538133245609028, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 3220, 'end_index': 3369, 'dtw_distance': 11.201916996504938, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 3544, 'end_index': 3693, 'dtw_distance': 11.667791226115678, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 3918, 'end_index': 4067, 'dtw_distance': 6.688959477429849, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 4292, 'end_index': 4441, 'dtw_distance': 10.833904673434672, 'type': <Match.RIGHT_TILT: 1>}
Accuracy: 100.0%
```

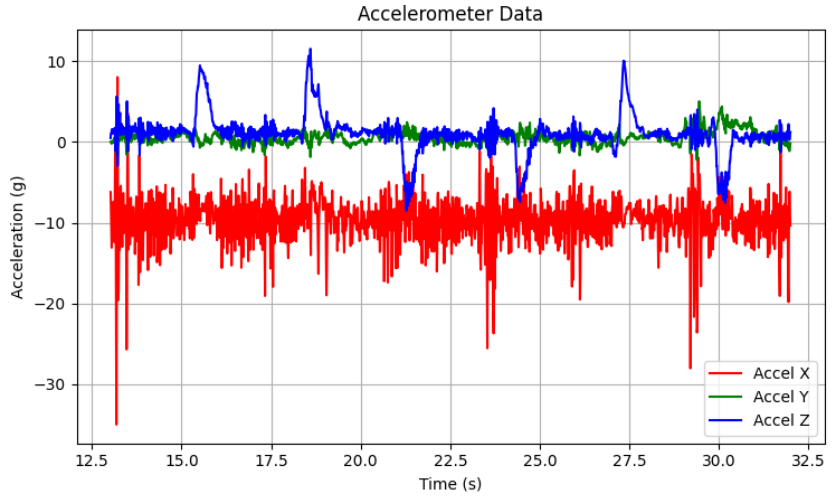
**Filtered walk test**

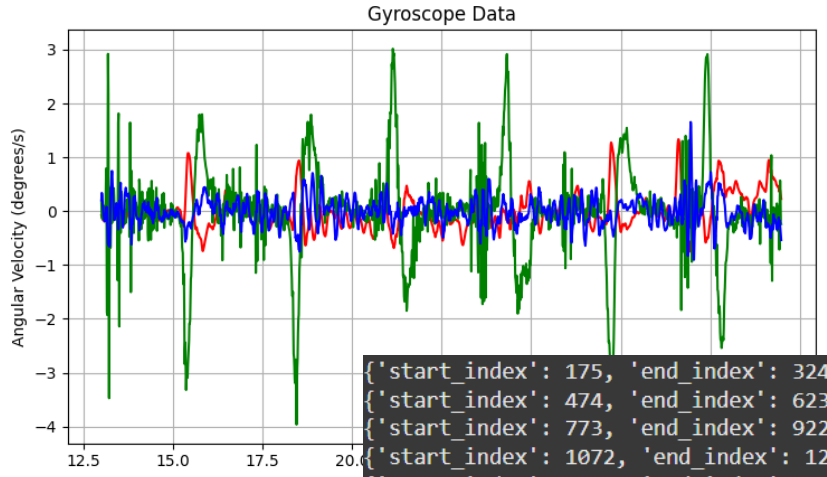


# LEFT-RIGHT WHILE CYCLING

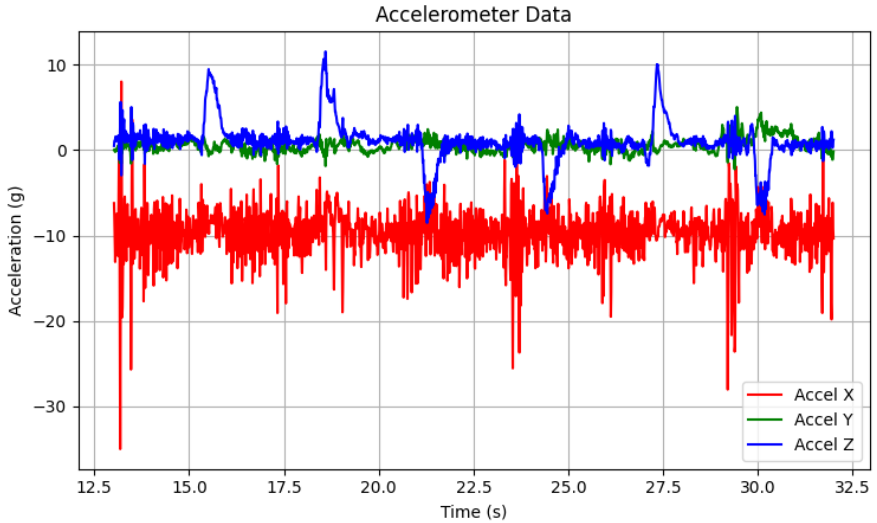
**Original cycle test**

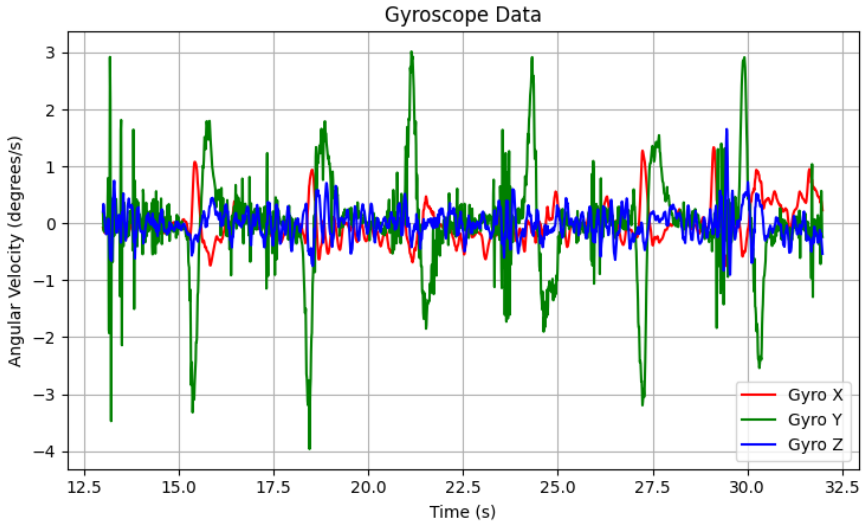


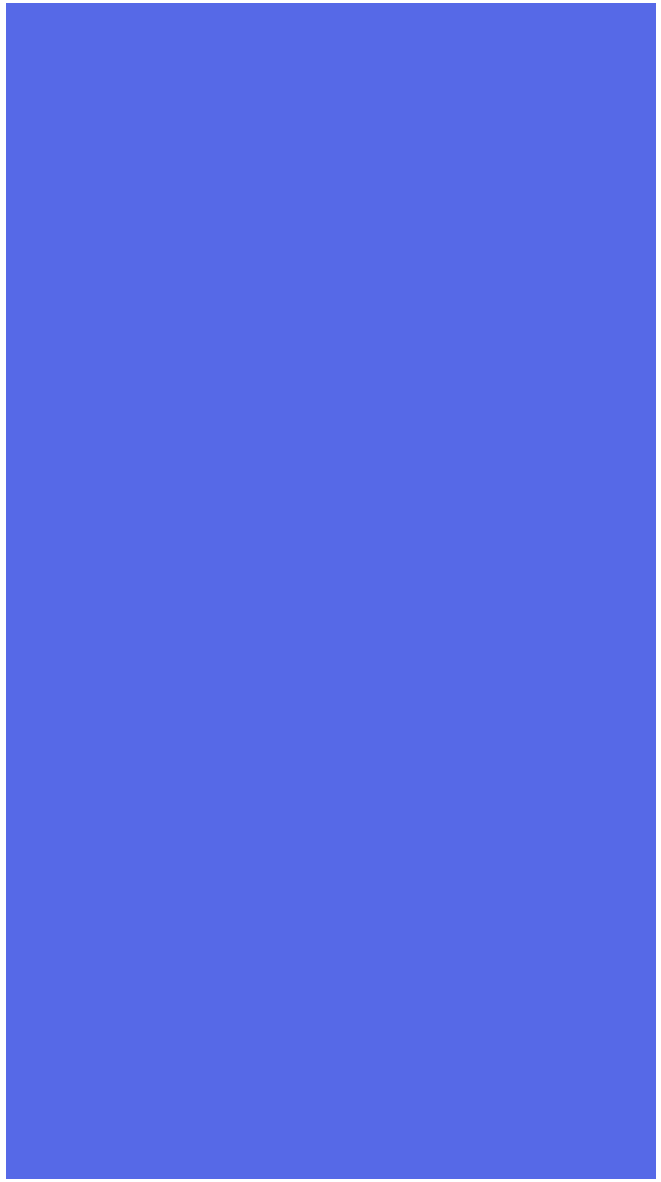

```
{'start_index': 175, 'end_index': 324, 'dtw_distance': 13.771878674181515, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 474, 'end_index': 623, 'dtw_distance': 13.139838609312974, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 773, 'end_index': 922, 'dtw_distance': 19.174164728279944, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 1072, 'end_index': 1221, 'dtw_distance': 11.755872317794182, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 1346, 'end_index': 1495, 'dtw_distance': 18.864984092876455, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 1620, 'end_index': 1769, 'dtw_distance': 16.528958372160595, 'type': <Match.LEFT_TILT: 2>}
Accuracy: 100.0%
```

**Original cycle test**

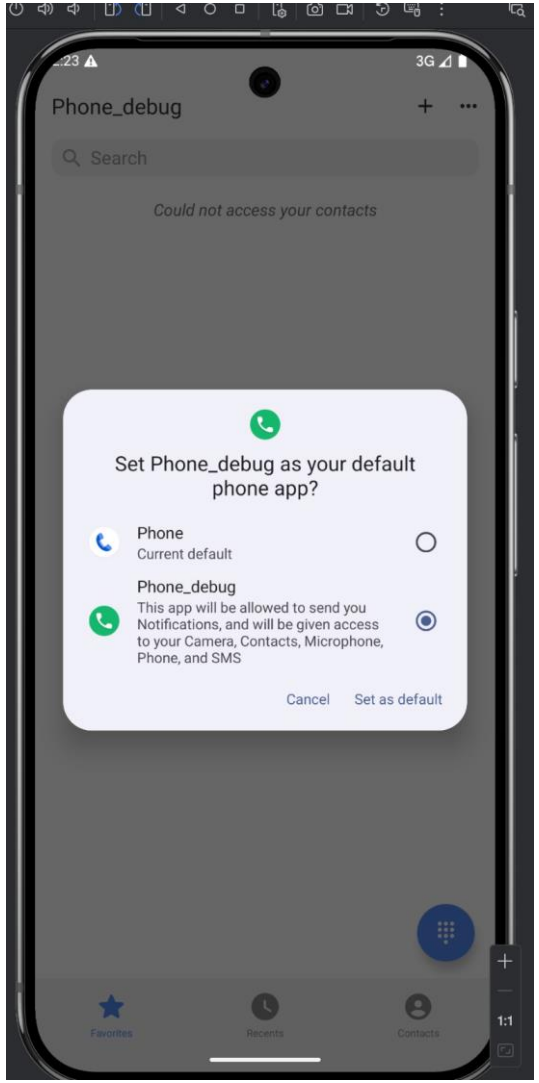


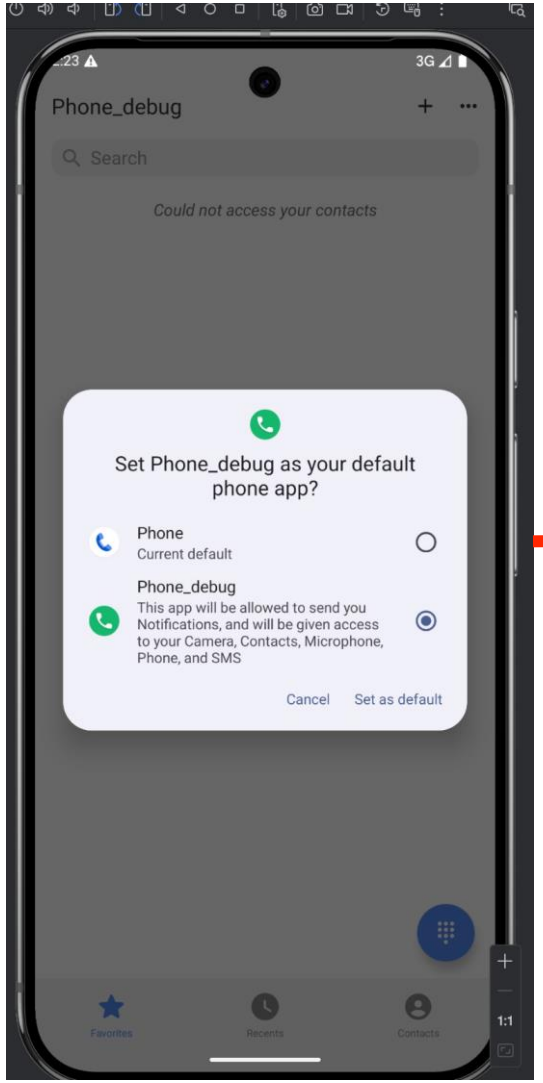
# SETUP



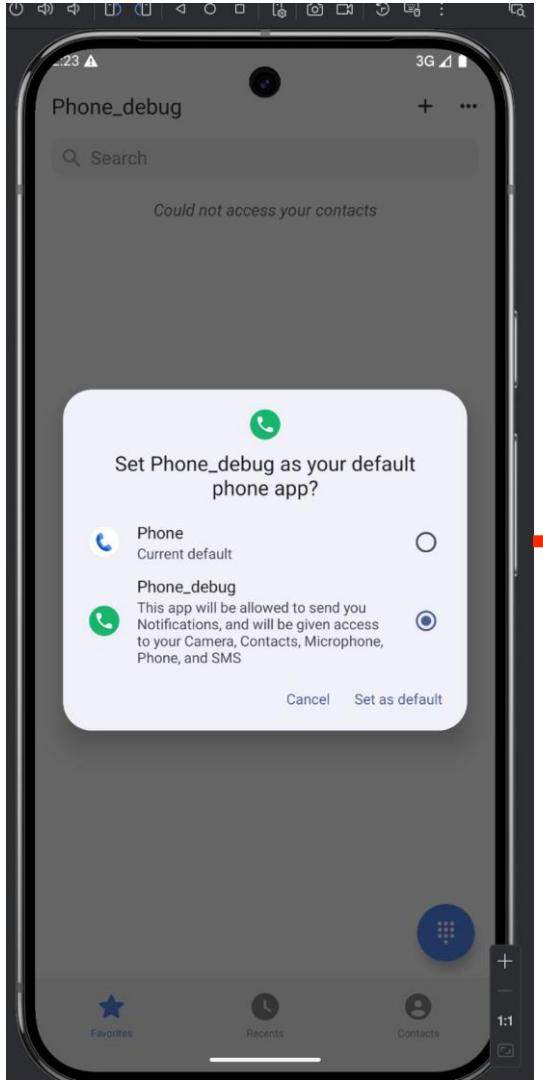
# SETUP


Phone_debug
Search
Could not access your contacts
Set Phone_debug as your default phone app?
Phone
Current default
Phone_debug
This app will be allowed to send you Notifications, and will be given access to your Camera, Contacts, Microphone, Phone, and SMS
Cancel
Set as default
Favorites
Recents
Contacts
1:1

# SETUP


Phone_debug
Search
Could not access your contacts
Set Phone_debug as your default phone app?
Phone
Current default
Phone_debug
This app will be allowed to send you Notifications, and will be given access to your Camera, Contacts, Microphone, Phone, and SMS
Cancel
Set as default
Favorites
Recents
Contacts
1:1

# SETUP


Phone_debug
Search
Could not access your contacts
Set Phone_debug as your default phone app?
Phone
Current default
Phone_debug
This app will be allowed to send you Notifications, and will be given access to your Camera, Contacts, Microphone, Phone, and SMS
Cancel
Set as default
Favorites
Recents
Contacts


Phone_debug
Search
No contacts found
Allow Phone_debug to find, connect to, and determine the relative position of nearby devices?
Allow
Don't allow
Favorites
Recents
Contacts

# USAGE

# USAGE

```
result is {'start_index': 0, 'end_index': 149, 'dtw_distance': 0.0, 'type': <Match.RIGHT_TILT: 1>}
this will accept the call
```

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this will accept the call
```

# USAGE

# USAGE

```
chay: result is {'start_index': 0, 'end_index': 149, 'dtw_distance': 0.0, 'type': <Match.LEFT_TILT: 2>}
chay: this will reject the call
```

# USAGE

```
chay: result is {'start_index': 0, 'end_index': 149, 'dtw_distance': 0.0, 'type': <Match.LEFT_TILT: 2>}
chay: this will reject the call
```

# USAGE

```
chay: result is {'start_index': 0, 'end_index': 149, 'dtw_distance': 0.0, 'type': <Match.LEFT_TILT: 2>}
chay: this will reject the call
```

# ITS THAT SIMPLE!

# THANK YOU

Murtaza Mister

Eshwar Chaitanya Sarampati