WIRELESS & MOBILE NETWORKS

BREAKNECK

EARABLE BASED GESTURE RECOGNITION SYSTEM

PRESENTED BY:

MURTAZA MISTER
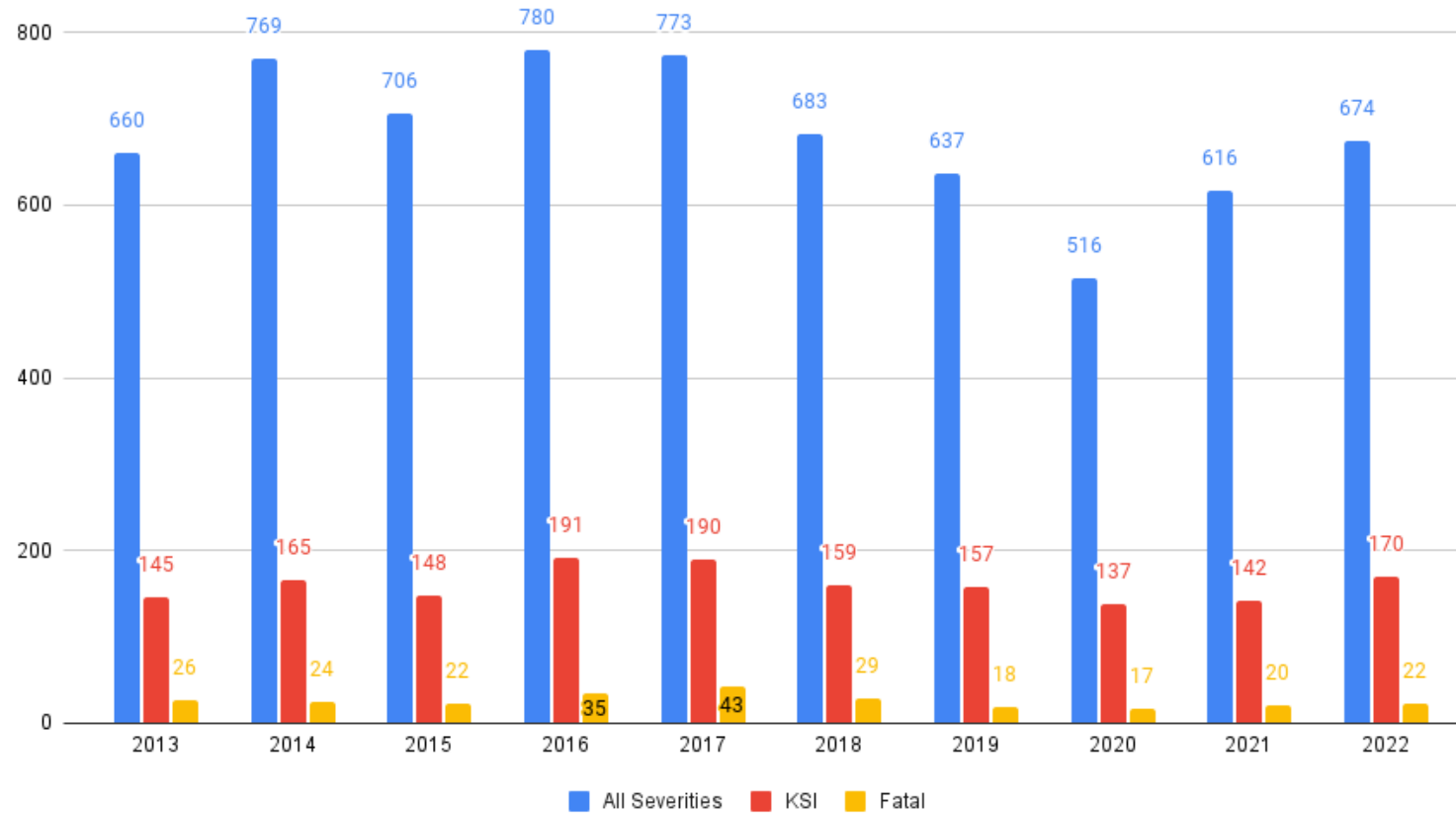
ESHWAR CHAITANYA SARAMPATI

LET'S TALK DATA

LET'S TALK DATA

CRASHES WHERE DRIVERS USING CELL PHONE (2013 - 2022)

Legend: ■ All Severities ■ KSI ■ Fatal

Year	All Severities	KSI	Fatal
2013	660	145	26
2014	769	165	24
2015	706	148	22
2016	780	191	35
2017	773	190	43
2018	683	159	29
2019	637	157	18
2020	516	137	17
2021	616	142	20
2022	674	170	22

LET'S TALK DATA

Consumers admit to these distractions:

- **43%** Eating
- **34%** Taking work calls
- **15%** Reading emails
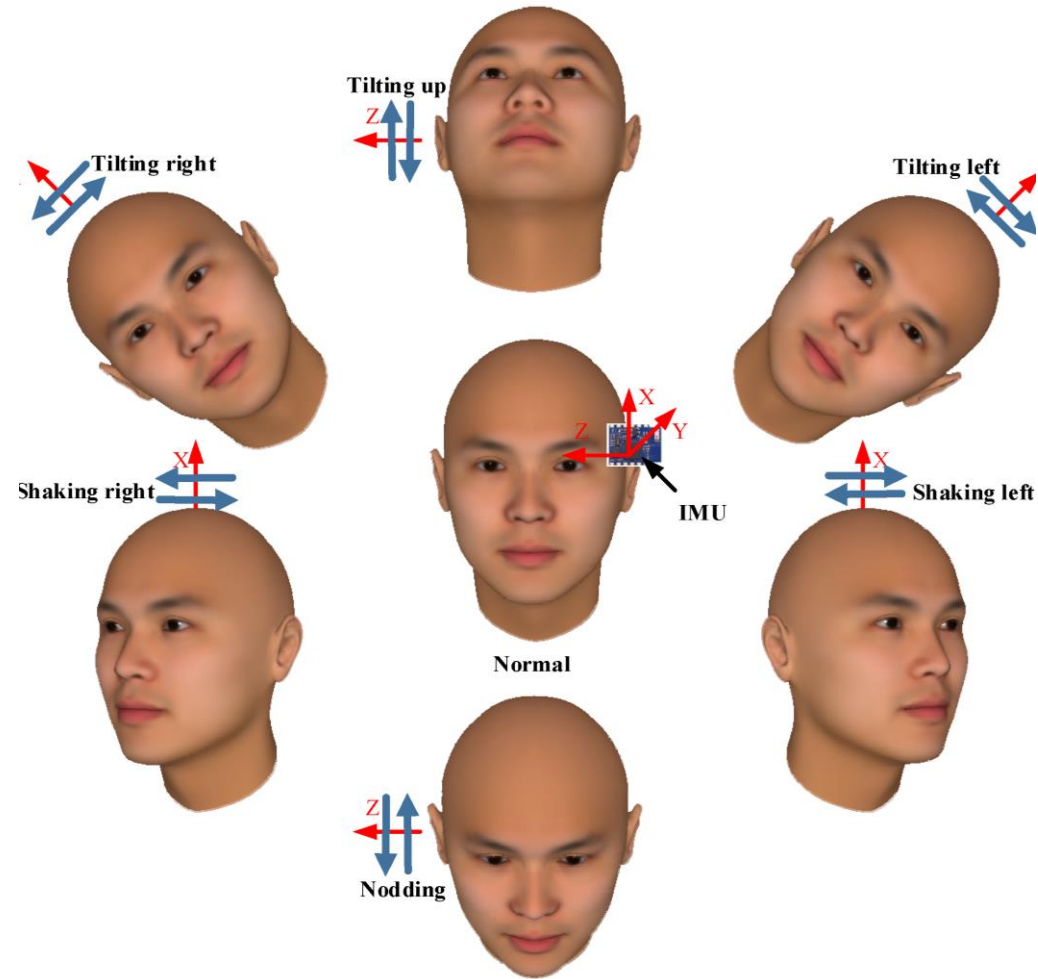- **15%** Doing makeup/hair
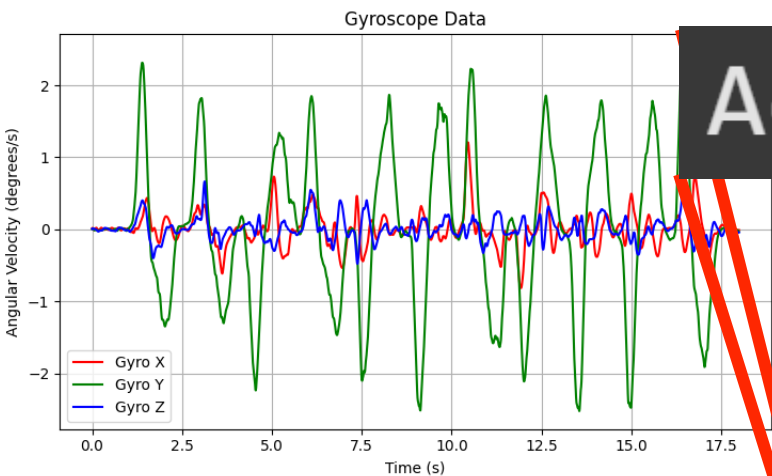
LET'S TALK DATA

PAIN POINT IDENTIFIED

SOLUTION

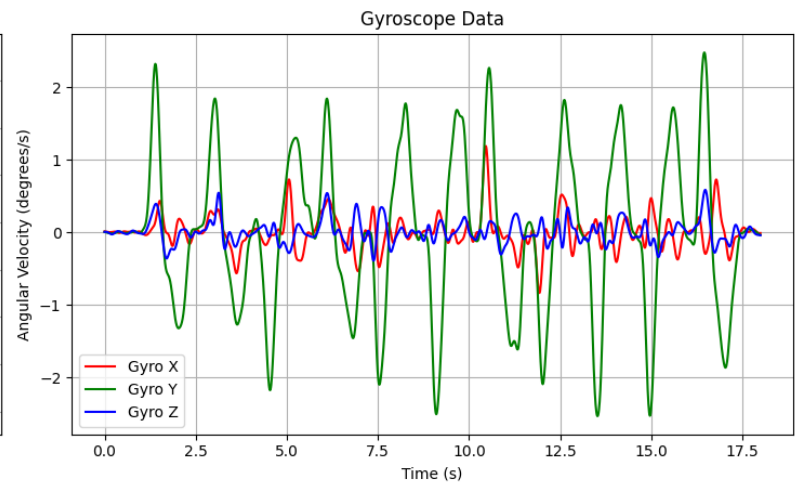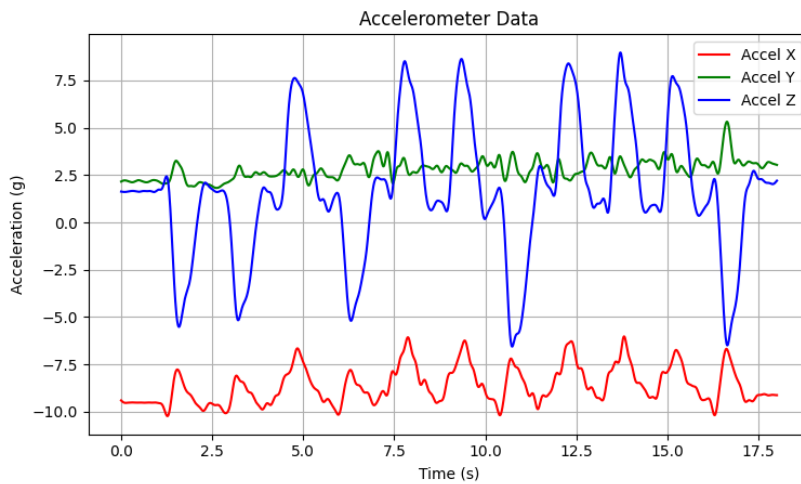# WHY US?

LEFT-RIGHT WHILE SITTING

Original Test left right tilt

Accelerometer Data

Gyroscope Data
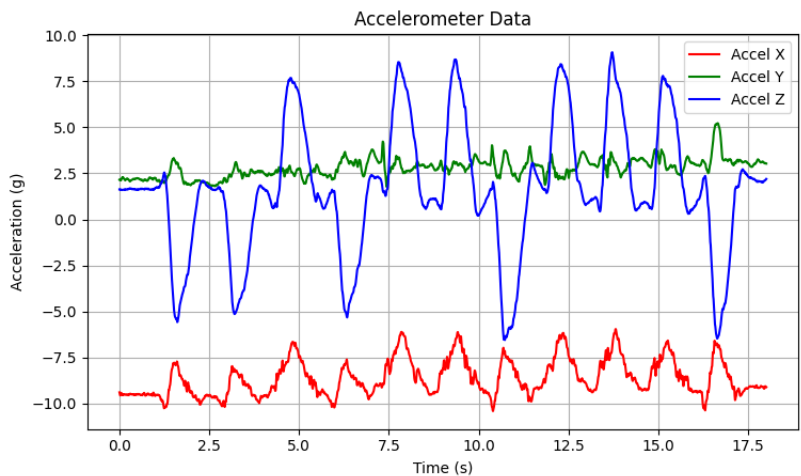
Accuracy: 100.0%
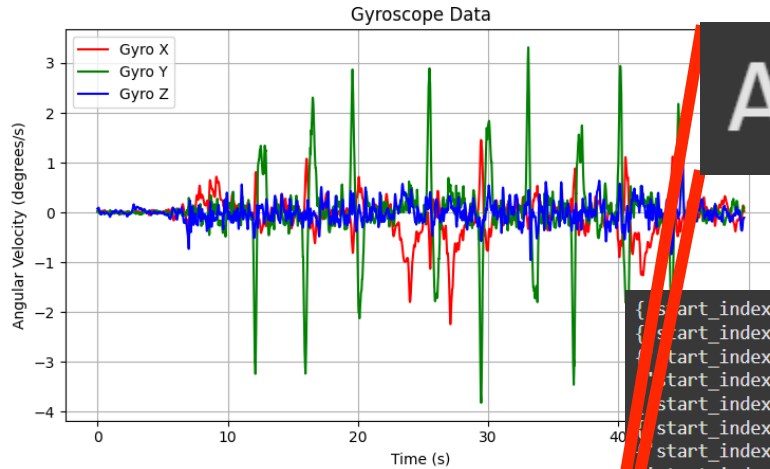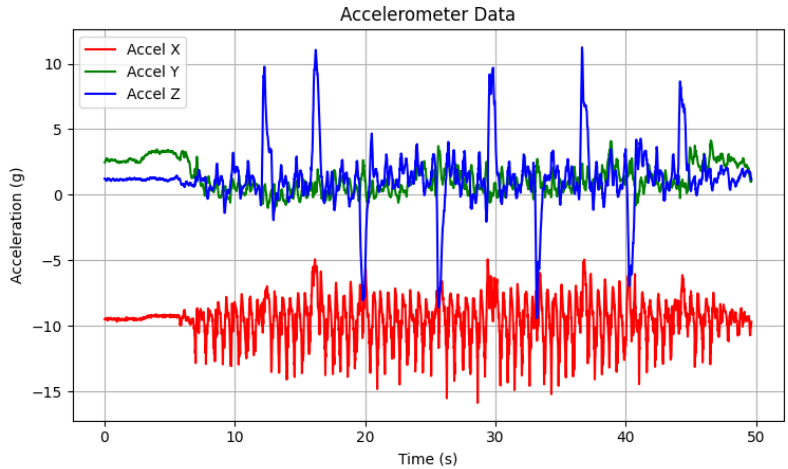
{'start_index': 100, 'end_index': 249, 'dtw_distance': 10.840561340507513, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 274, 'end_index': 423, 'dtw_distance': 14.026787245583858, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 398, 'end_index': 547, 'dtw_distance': 7.9233521066989__, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 572, 'end_index': 721, 'dtw_distance': 14.913573__05927, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 696, 'end_index': 845, 'dtw_distance': 9.66437163598863, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 845, 'end_index': 994, 'dtw_distance': __240792246840122, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 1019, 'end_index': __168, 'dtw_distance': 14.46647411846463, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 1143, 'end_index': 1292, 'dtw_distance': 9.284105539305543, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 1292, 'end_index': 1441, 'dtw_distance': 8.406836436316716, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 1441, 'end_index': __, 'dtw_distance': 7.030046139917572, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': __, 'end_index': 1764, 'dtw_distance': 10.302987855372468, 'type': <Match.LEFT_TILT: 2>}
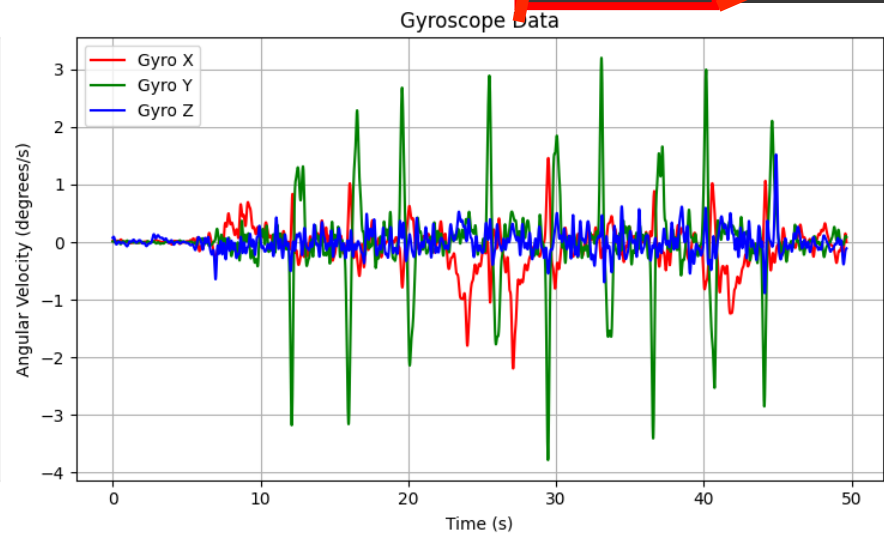Accuracy: 100.0%

Filtered test left right tilt

Accelerometer Data

Gyroscope Data

BREAKNECK

LEFT-RIGHT WHILE WALKING

Original walk test

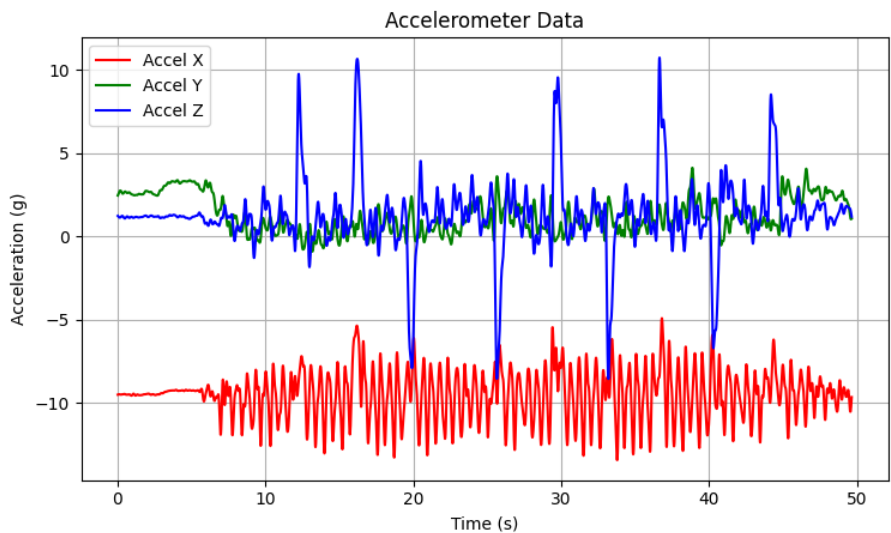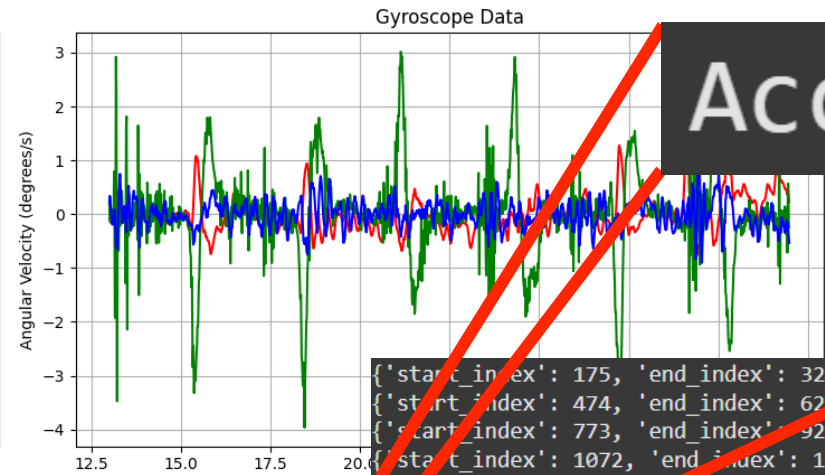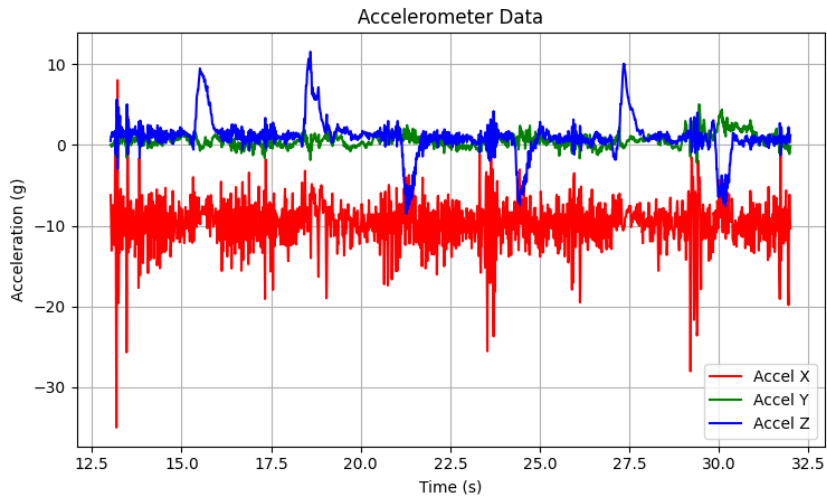**Filtered walk test**

{'start_index': 1125, 'end_index': 1274, 'dtw_distance': 18.08482824740133, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 1524, 'end_index': 1673, 'dtw_distance': 13.37469337490245, 'type': <Match.RIGHT_TILT: 1>}
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{'start_index': 2472, 'end_index': 2621, 'dtw_distance': 10.5617010662309, 'type': <Match.LEFT_TILT: 2>}
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{'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%

Accuracy: 100.0%

LEFT-RIGHT WHILE CYCLING

Original cycle test

Accelerometer Data

Gyroscope Data
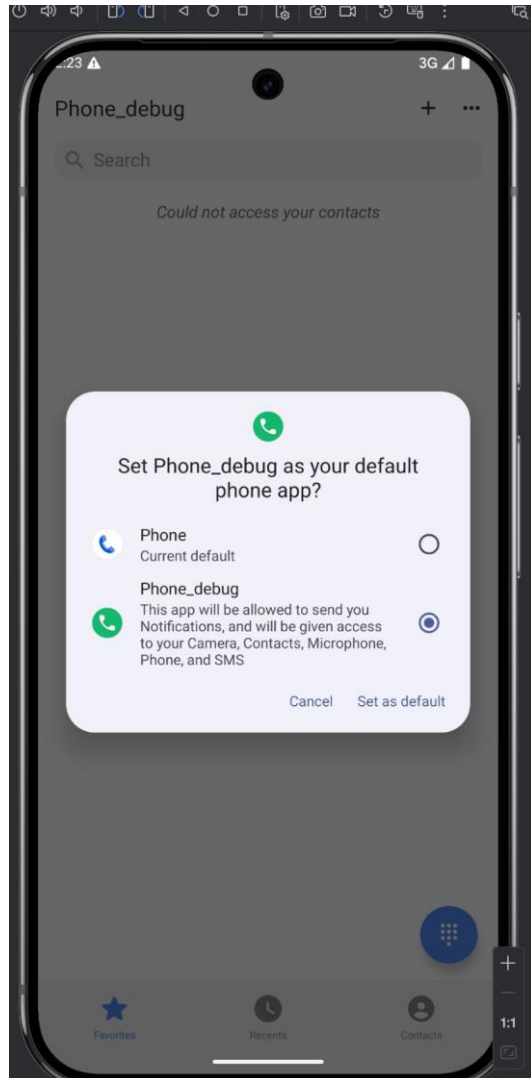
{'start_index': 175, 'end_index': 324, 'dtw_distance': 13.77878674181515, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 474, 'end_index': 623, 'dtw_distance': 13.139838609312974, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 773, 'end_index': 922, 'dtw_distance': 19.174164728279944, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 1072, 'end_index': 1221, 'dtw_distance': 11.755872317794182, 'type': <Match.LEFT_TILT: 2>}
{'start_index': 1346, 'end_index': 1455, 'dtw_distance': 18.864984092876455, 'type': <Match.RIGHT_TILT: 1>}
{'start_index': 1650, 'end_index': 1769, 'dtw_distance': 16.528958372160595, 'type': <Match.LEFT_TILT: 2>}

Accuracy: 100.0%

Original cycle test
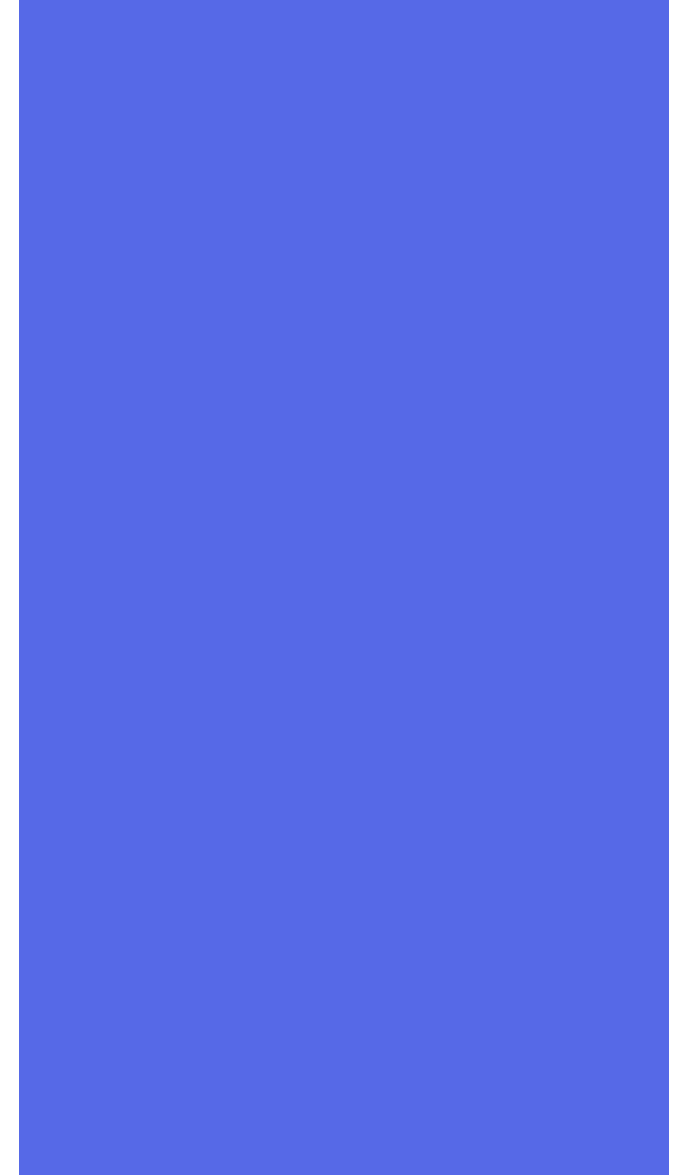
Accelerometer Data

Gyroscope Data

SETUP

SETUP

SETUP

USAGE

USAGE

result is {'start_index': 0, 'end_index': 149, 'dtw_distance': 0.0, 'type': <Match.RIGHT_TILT: 1>}

this will accept the call

USAGE

USAGE

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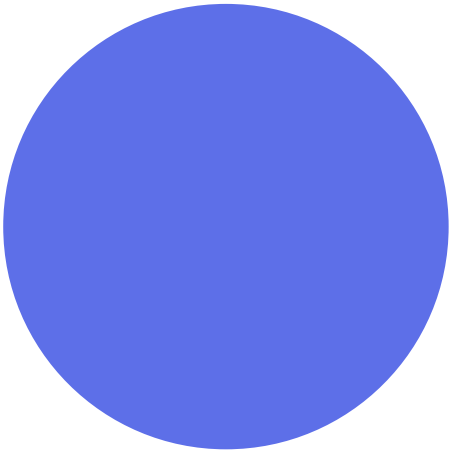this will accept the call

USAGE

USAGE

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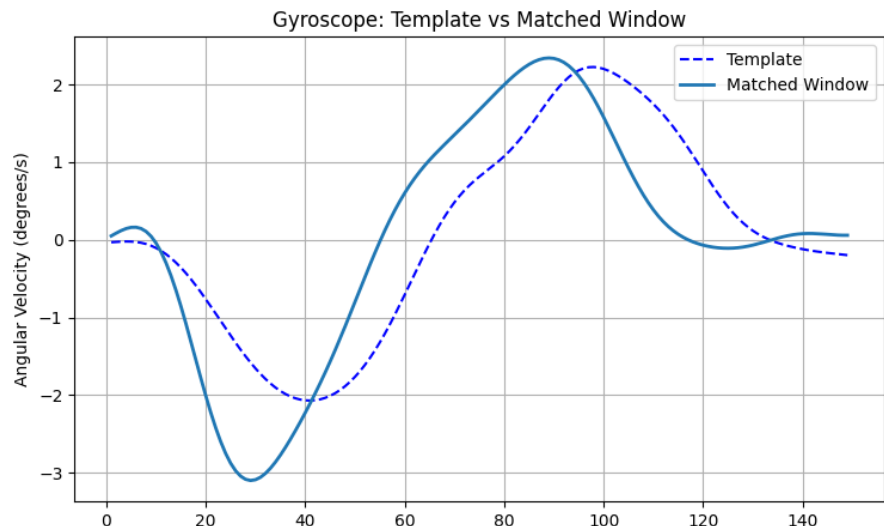chay: this will reject the call

USAGE

USAGE

ITS THAT SIMPLE!

ADDITIONALLY!

FRONT NOD
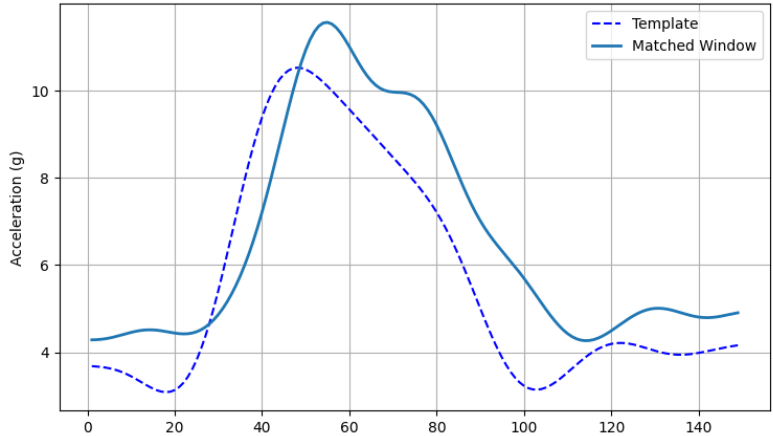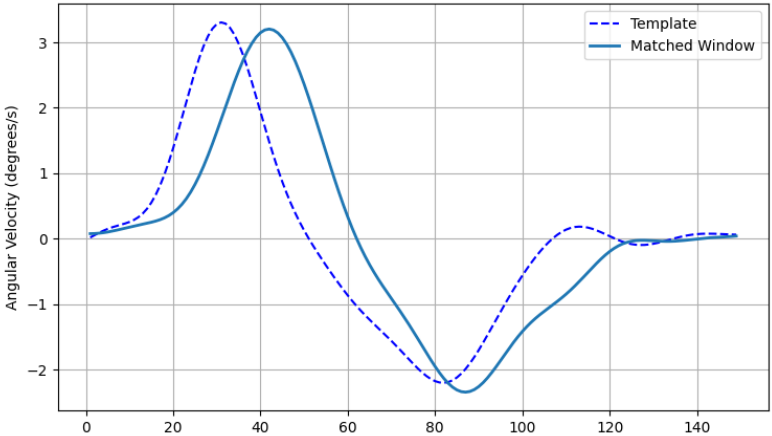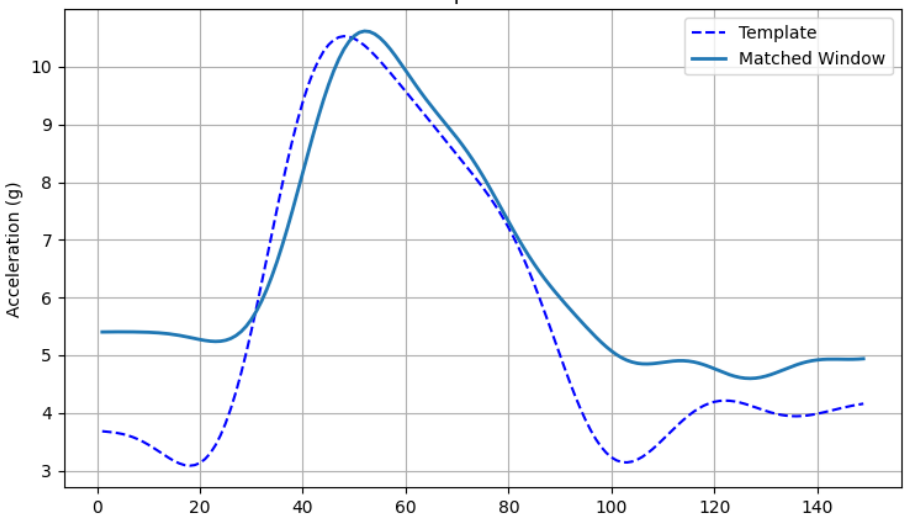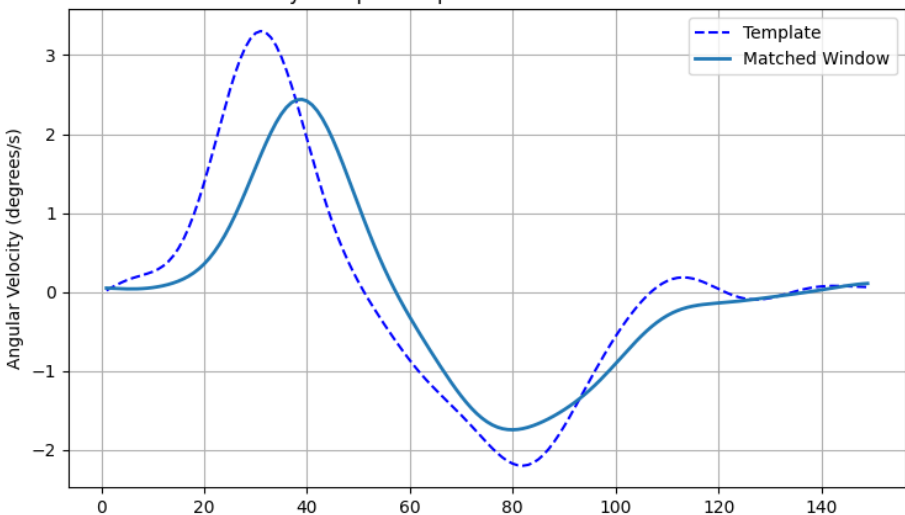
FRONT_NOD

BACK NOD

BACK_NOD

BREAKNECK
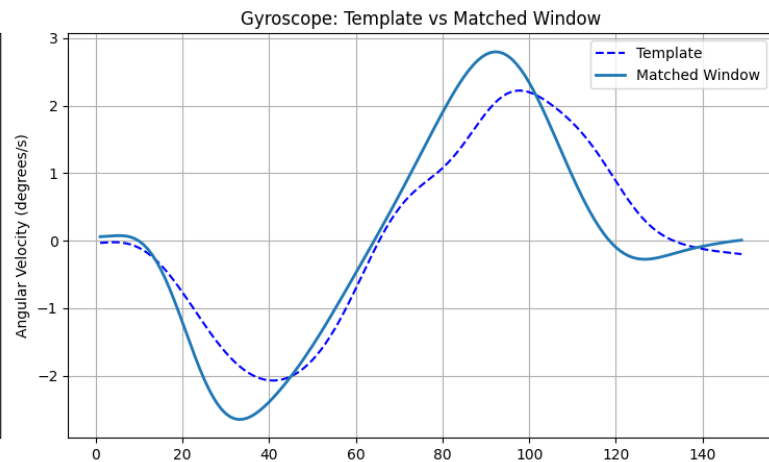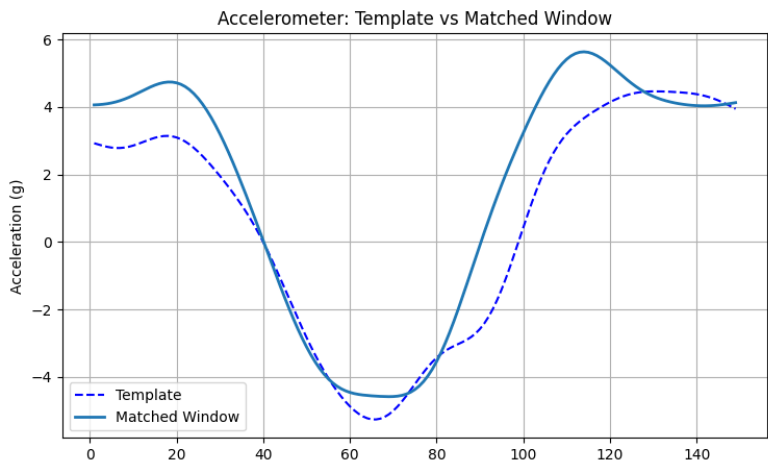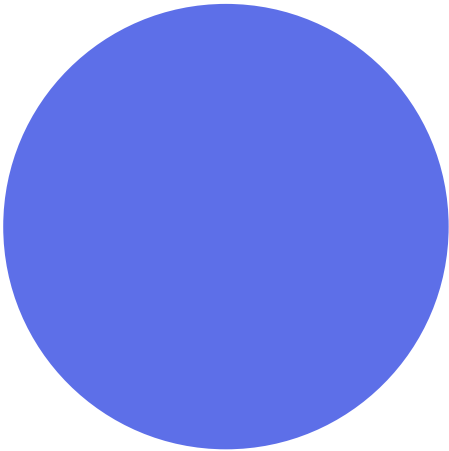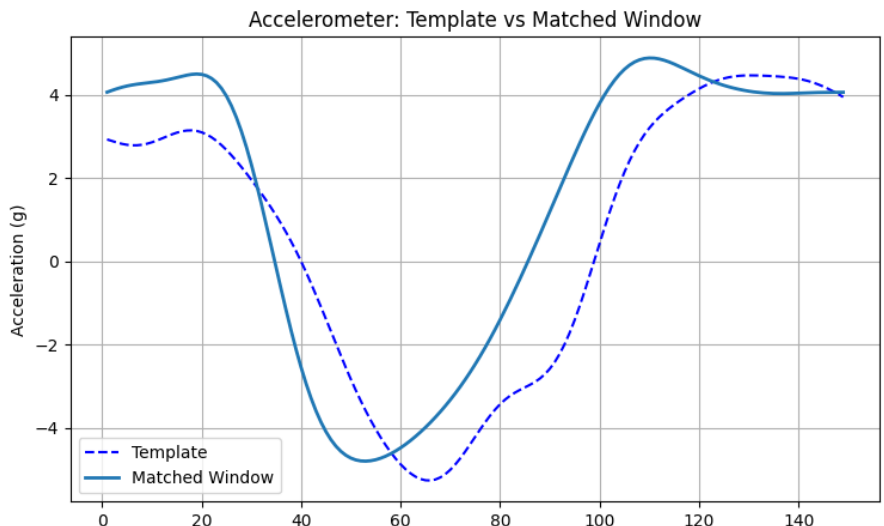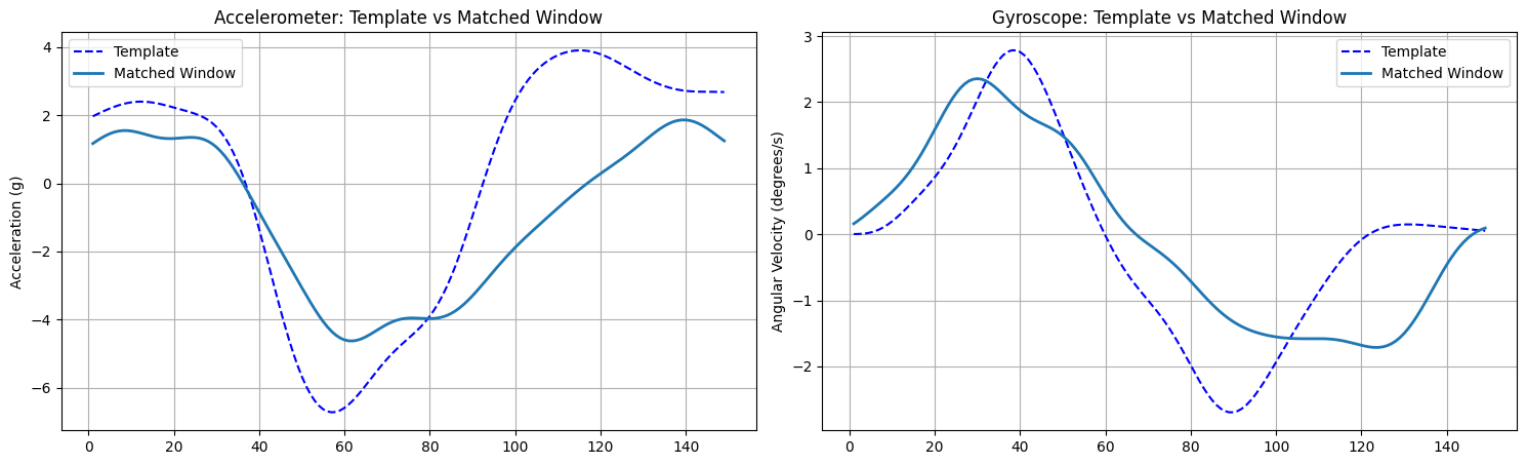
SLEEPING LEFT TILT
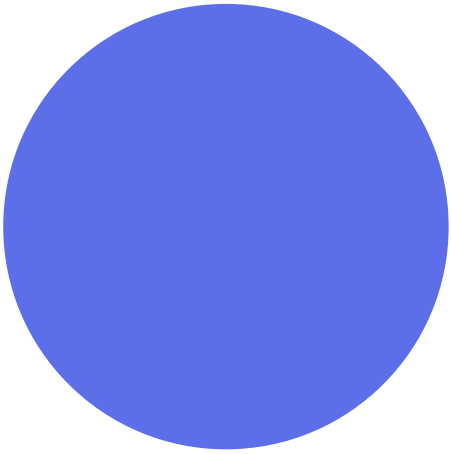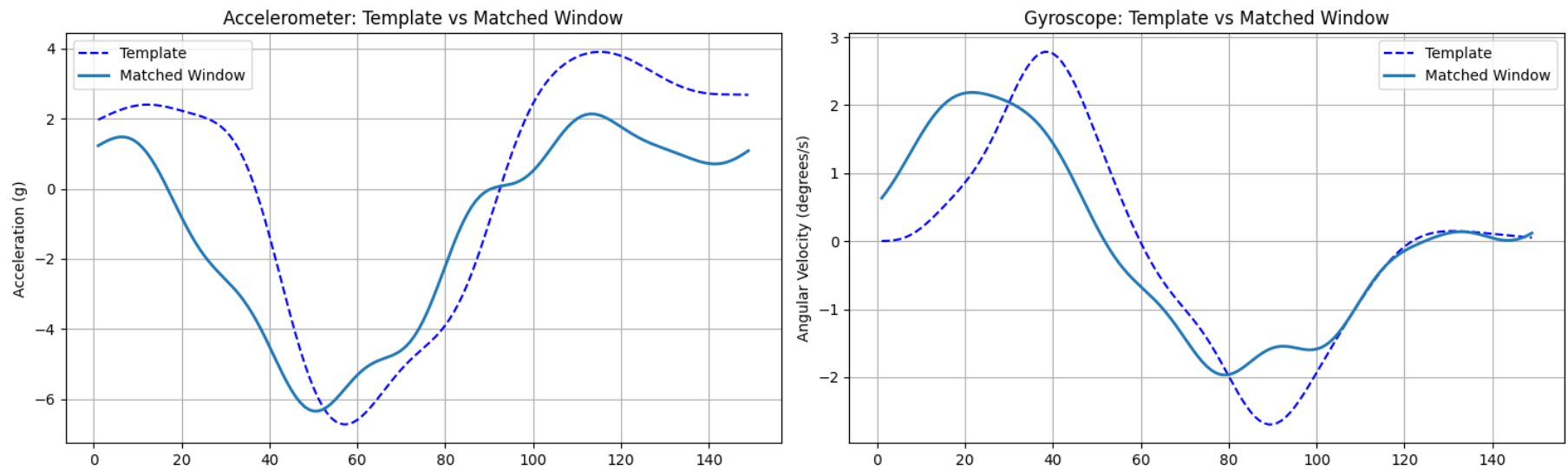
SLEEPING RIGHT TILT

RIGHT_TILT

Accelerometer: Template vs Matched Window

Gyroscope: Template vs Matched Window

RIGHT_TILT

Accelerometer: Template vs Matched Window

Gyroscope: Template vs Matched Window
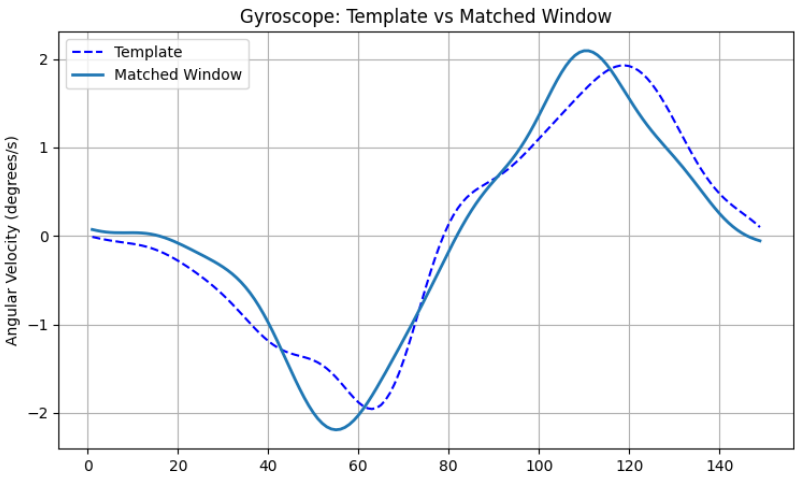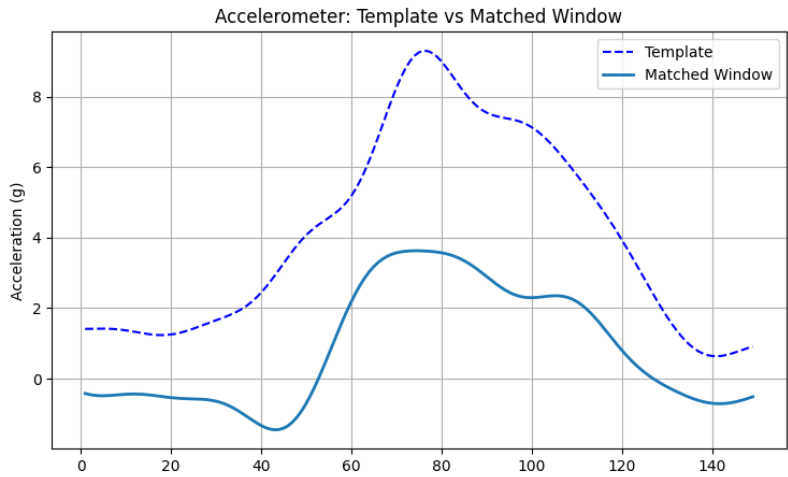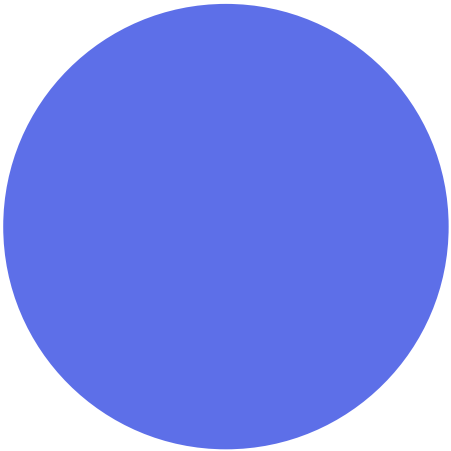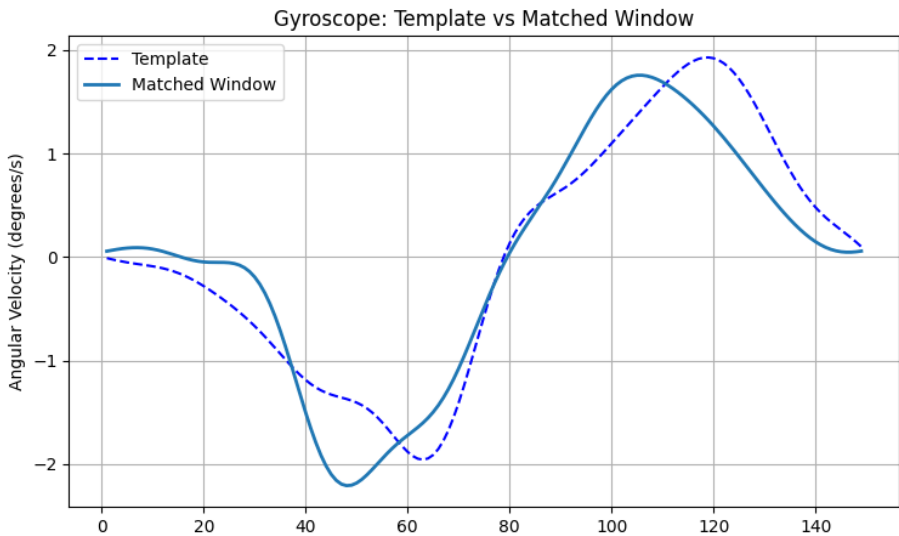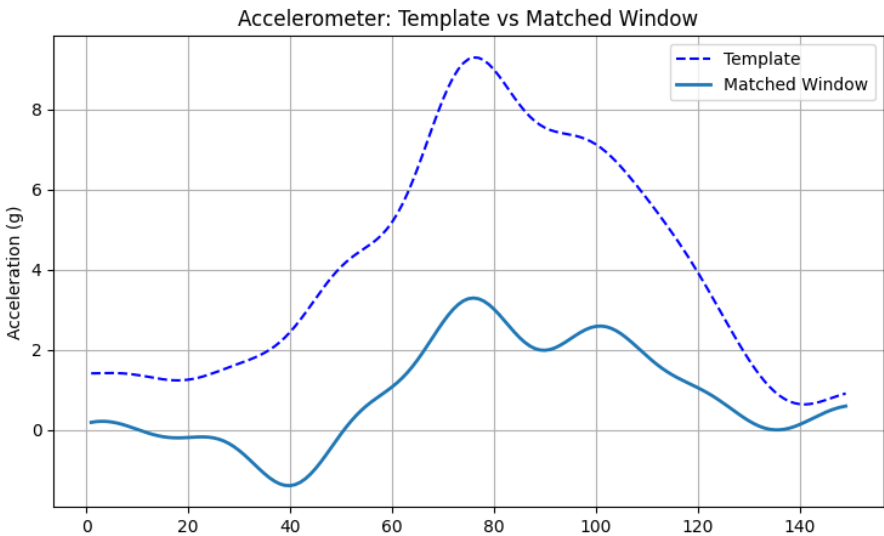
THANK YOU

Murtaza Mister

Eshwar Chaitanya Sarampati