Supplementary Material

Miguel Xochicale

June 4, 2021

Abstract

Report for supplementary material where section 1 describes datasets and section 2 shows surface plots of 3D RQA ENTR values for 3 participants (p01, p02 and p03).

Contents

1 Datasets

Datasets are for (a) window size of 100, 250, 500 and 750 samples (w100, w250, w500, w750); (b) smoothness: sg0, sg1 and sg2; (c) movement: Horizontal Normal (HN), Horizontal Faster (HF), Vertical Normal (VN) and Vertical Faster (VF); and (d) sensors: Sensor attached to Human (HS01), sensor attached to Robot (RS01).

The location of the dataset is shown below with the first two lines of xdatav00.dt denoting labels.

```
~/srep2021/data/dataset$ tree --si
[ 46M]  xdata_v00.dt
.
.
.
"Participant" "Activity" "Sensor" "Sample" "Time"
"sg0zmuvGyroY" "sg1zmuvGyroY" "sg2zmuvGyroY"
"sg0zmuvGyroZ" "sg1zmuvGyroZ" "sg2zmuvGyroZ"
...
"p01" "HN" "HS01" 1 0
0.0110396263359954 0.00606430191548277 0.0385586376765087
0.00467559072085554 0.00509907428630649 0.168927517477539
...
```

2 3D RQA ENTR values

Location of code, data and figures for 3D RQA ENTR values is shown below

```
## Code
$HOME/srep2021/code/rscripts/G_3Drqa
‘> source(  paste( getwd(), ’/C_3Drqa_plots_epsilons.R’, sep=’’), echo=TRUE )‘

## Data
$HOME/srep2021/data/rqa$ tree -s

## Figures
$HOME/srep2021/docs/figures/rqa/src/3drqa_epsilons$ tree -s
```

For the following plots, datasets for NN participants where NN is 01, 02 and 03 are:

```
RQAs_pNNw100.dt
RQAs_pNNw250.dt
RQAs_pNNw500.dt
RQAs_pNNw750.dt
```

2.1 Participant 01

Figures 1 and 2 are for a window size of 100 samples. Figures 3 and 4 are for a window size of 250 samples. Figures 5 and 6 are for a window size of 500 samples. Figures 7 and 8 are for a window size of 750 samples.

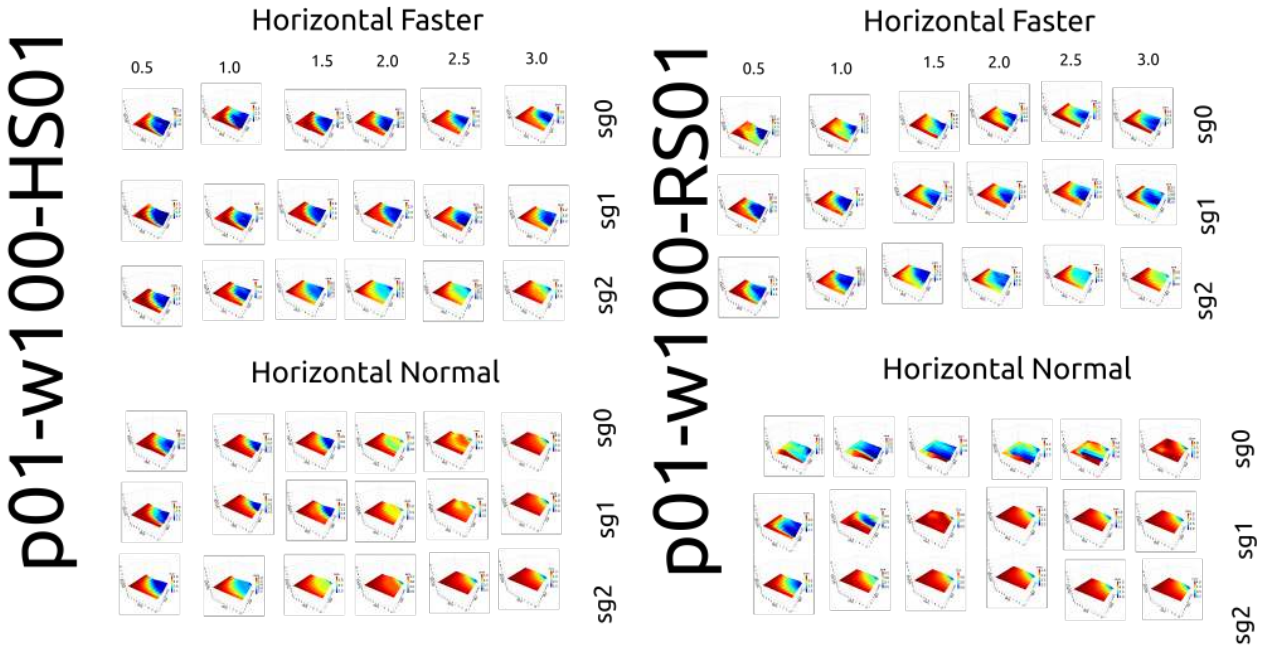

Figure 1: **RQA-Entr for participant 01 performing horizontal movements for a window size of 100 samples.** Code and data to reproduce the figure is available in [1].

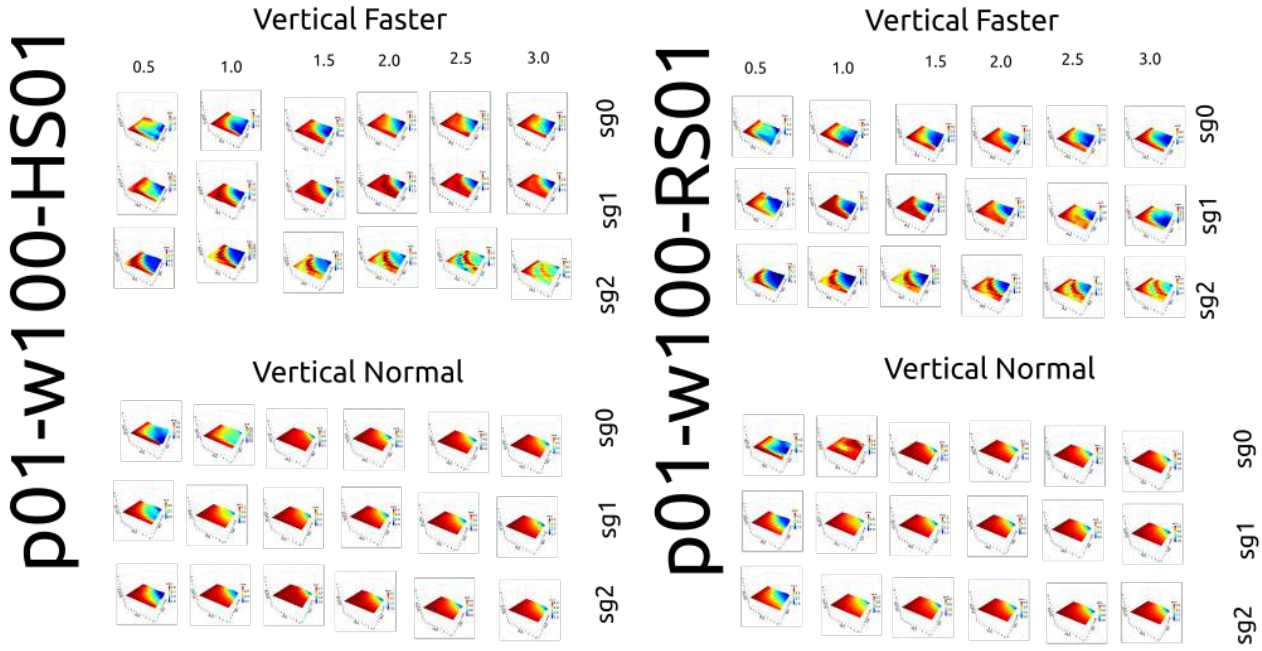

Figure 2: **RQA-Entr for participant 01 performing vertical movements for a window size of 100 samples.** Code and data to reproduce the figure is available in [1].

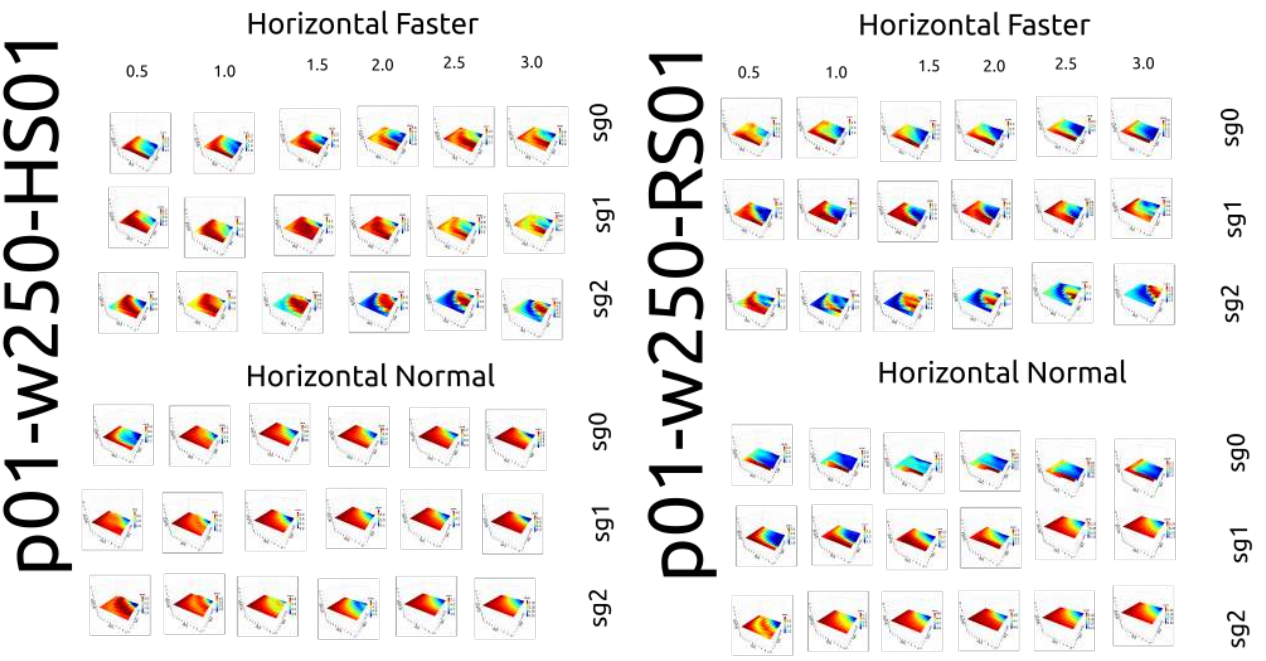

Figure 3: **RQA-Entr for participant 01 performing horizontal movements for a window size of 250 samples.** Code and data to reproduce the figure is available in [1].

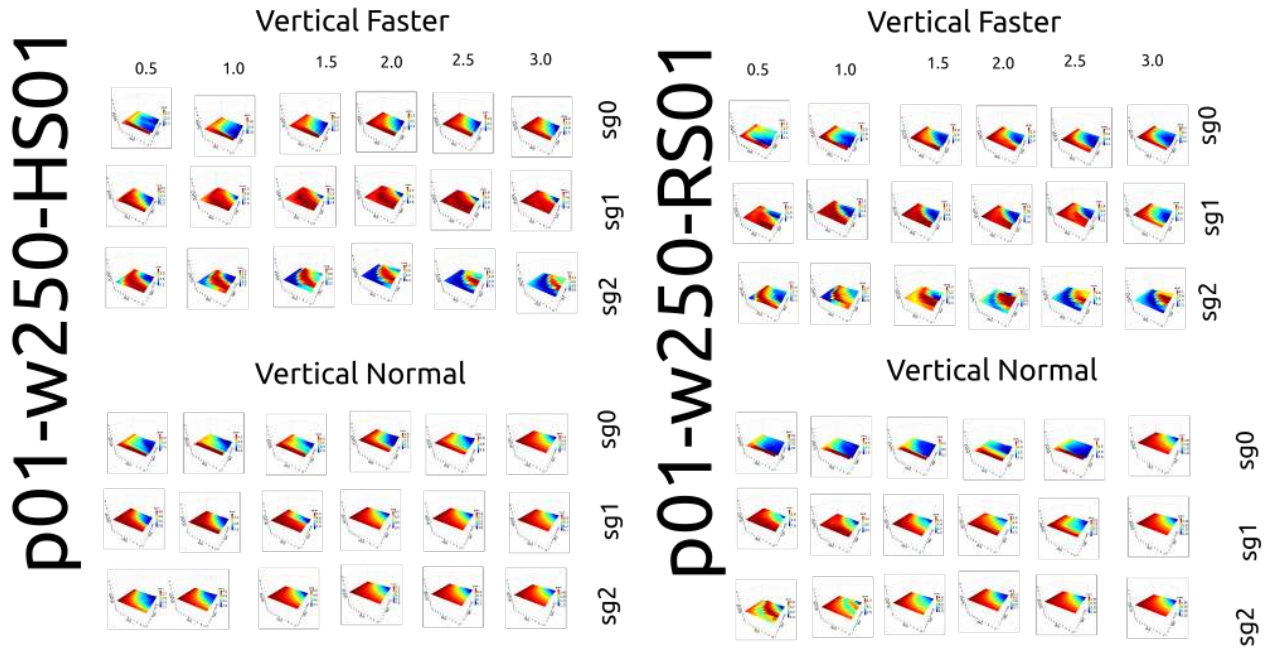

Figure 4: **RQA-Entr for participant 01 performing vertical movements for a window size of 250 samples.** Code and data to reproduce the figure is available in [1].

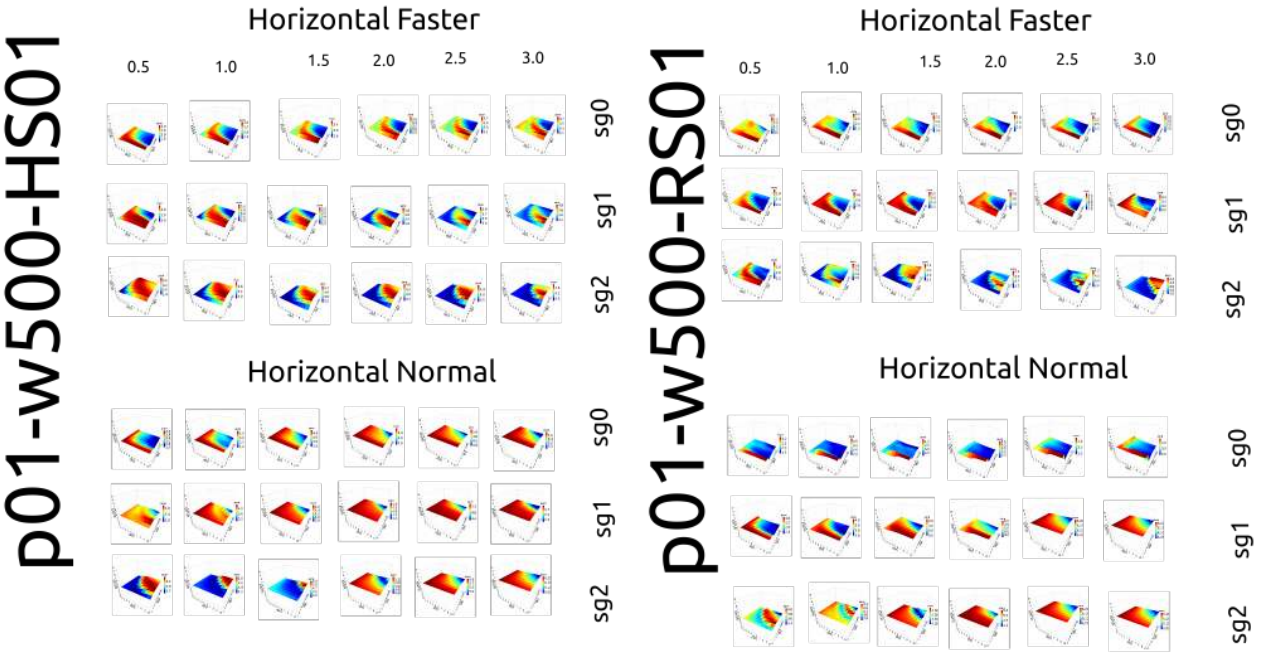

Figure 5: **RQA-Entr for participant 01 performing horizontal movements for a window size of 500 samples.** Code and data to reproduce the figure is available in [1].

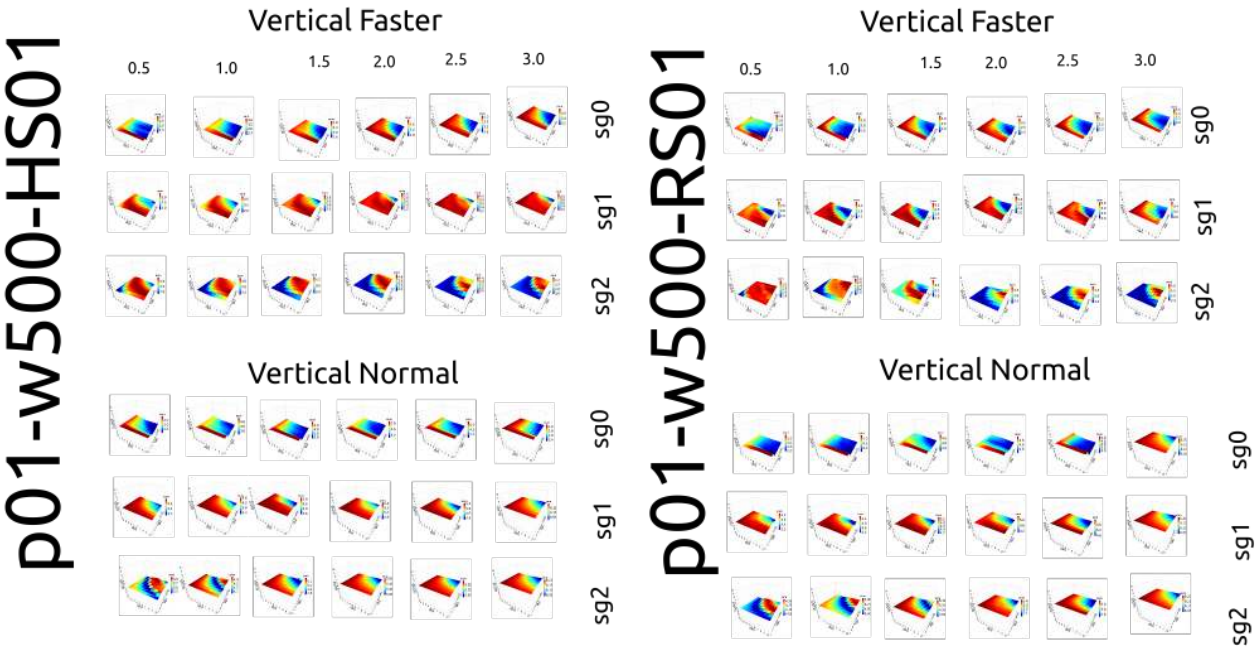

Figure 6: **RQA-Entr for participant 01 performing vertical movements for a window size of 500 samples.** Code and data to reproduce the figure is available in [1].

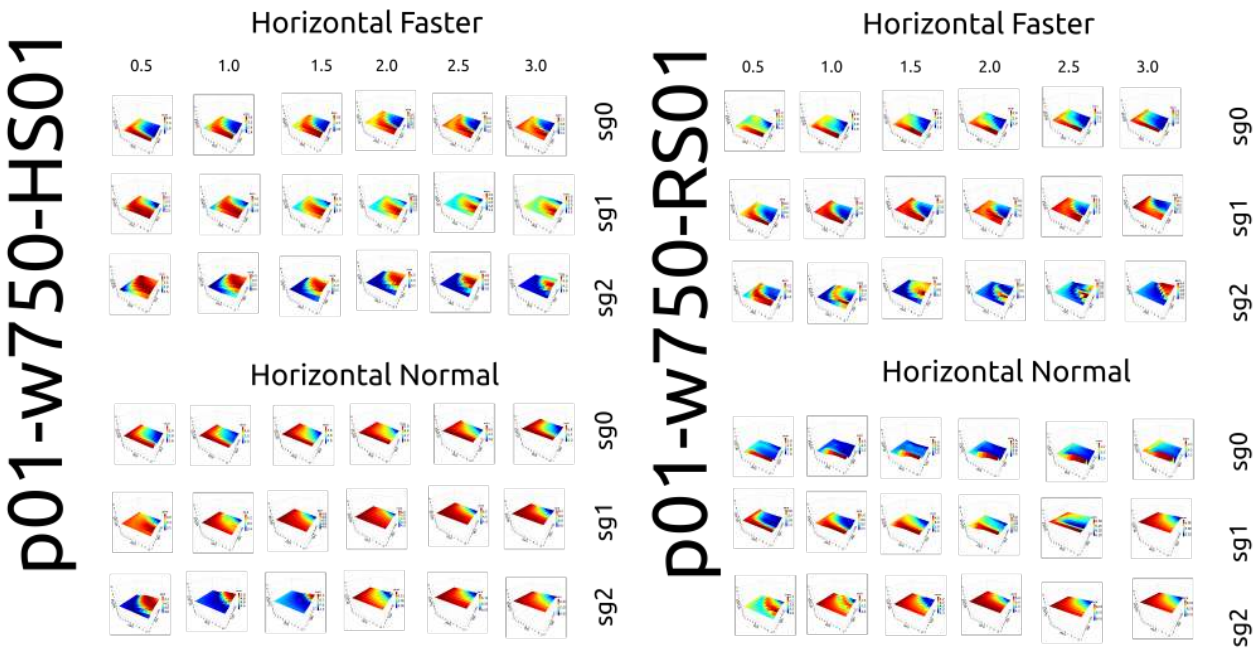

Figure 7: **RQA-Entr for participant 01 performing horizontal movements for a window size of 750 samples.** Code and data to reproduce the figure is available in [1].

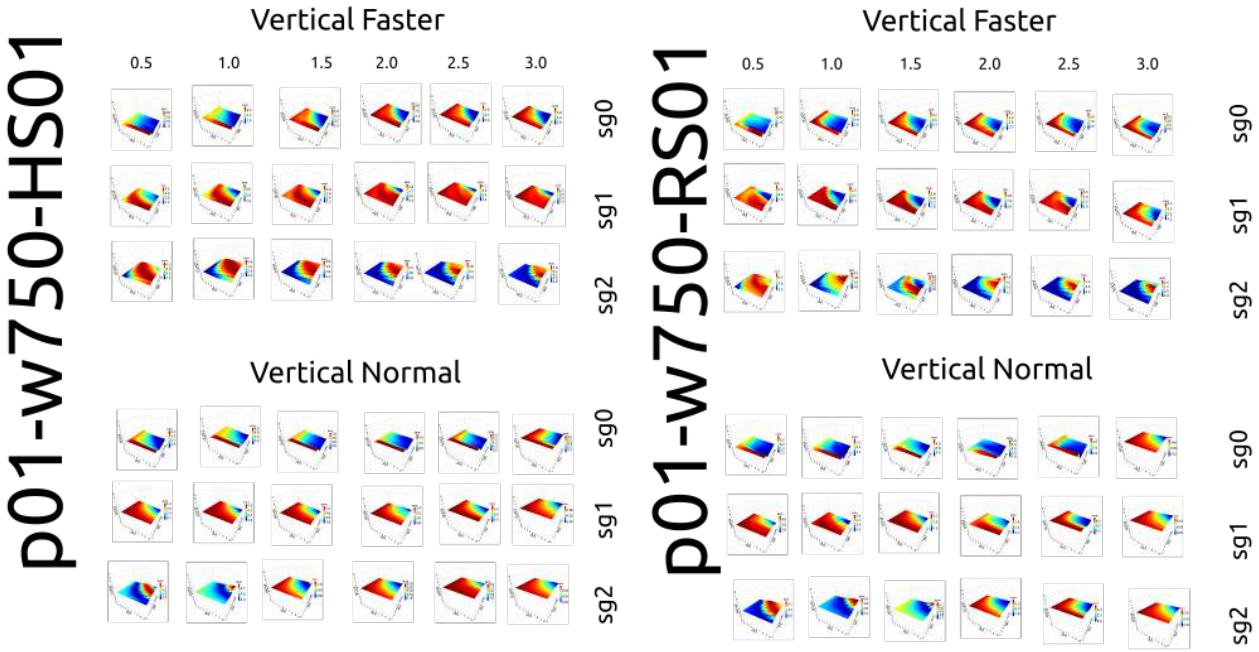

Figure 8: **RQA-Entr for participant 01 performing vertical movements for a window size of 750 samples.** Code and data to reproduce the figure is available in [1].

2.2 Participant 02

Figures 9 and 10 are for a window size of 100 samples. Figures 11 and 12 are for a window size of 250 samples. Figures 13 and 14 are for a window size of 500 samples. Figures 15 and 16 are for a window size of 750 samples.

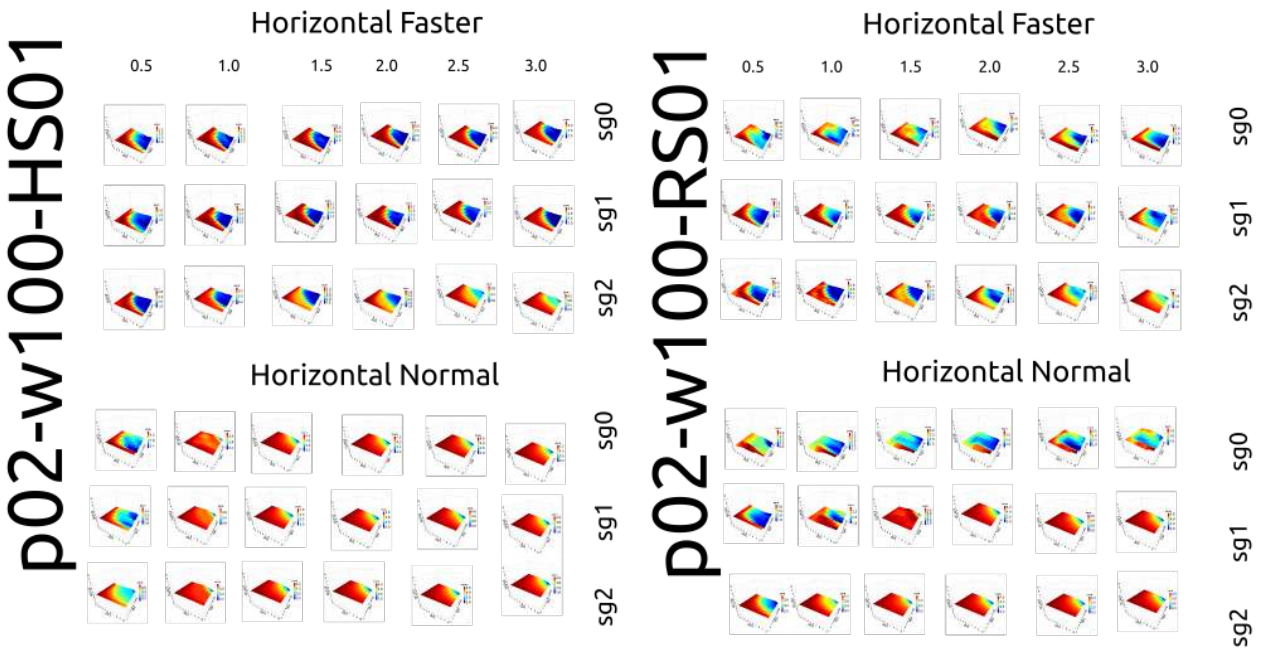

Figure 9: **RQA-Entr for participant 02 performing horizontal movements for a window size of 100 samples.** Code and data to reproduce the figure is available in [1].

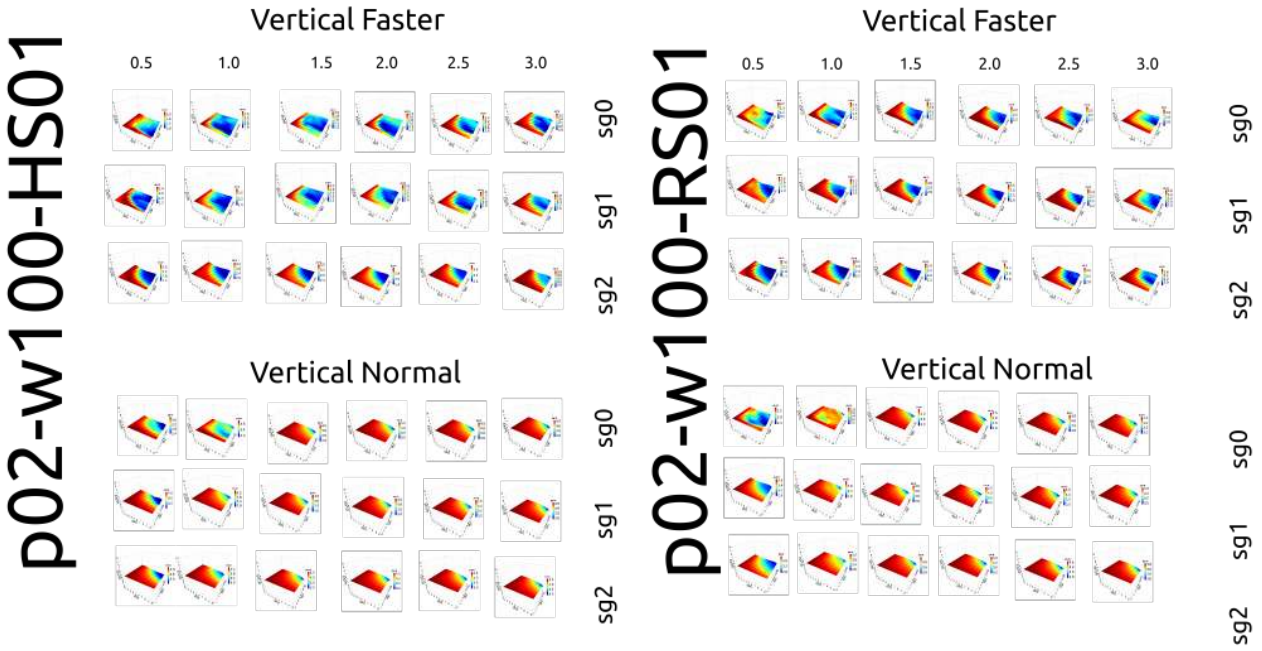

Figure 10: **RQA-Entr for participant 02 performing vertical movements for a window size of 100 samples.** Code and data to reproduce the figure is available in [1].

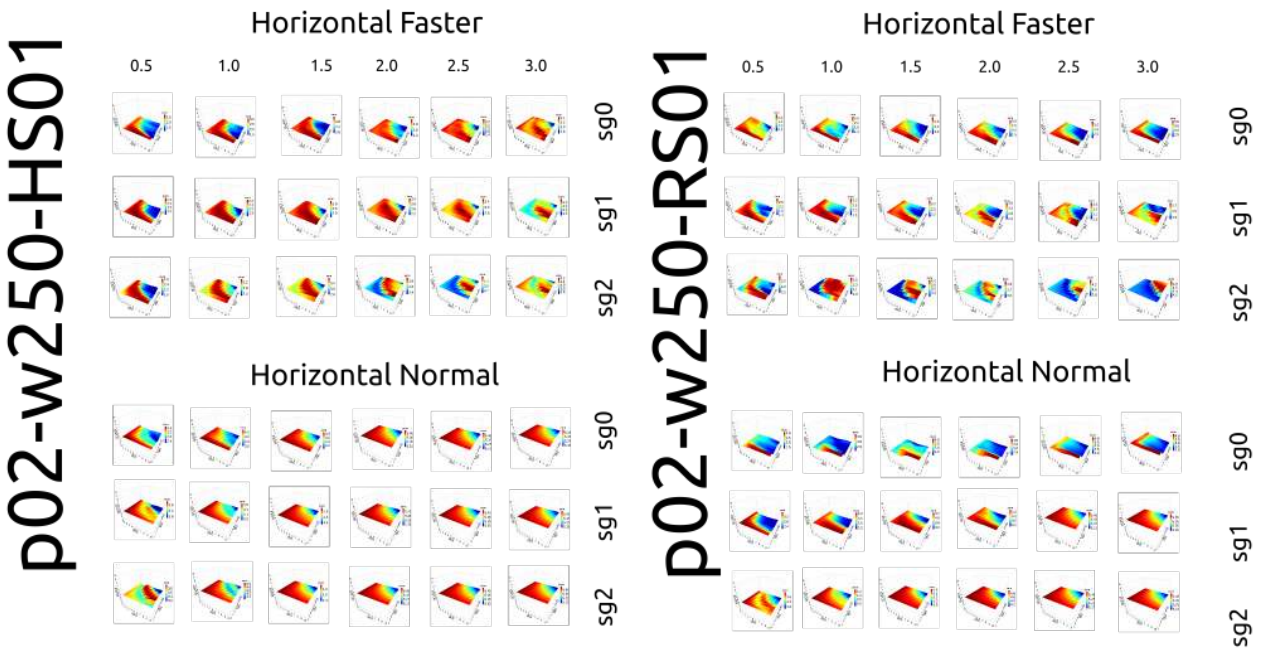

Figure 11: **RQA-Entr for participant 02 performing horizontal movements for a window size of 250 samples.** Code and data to reproduce the figure is available in [1].

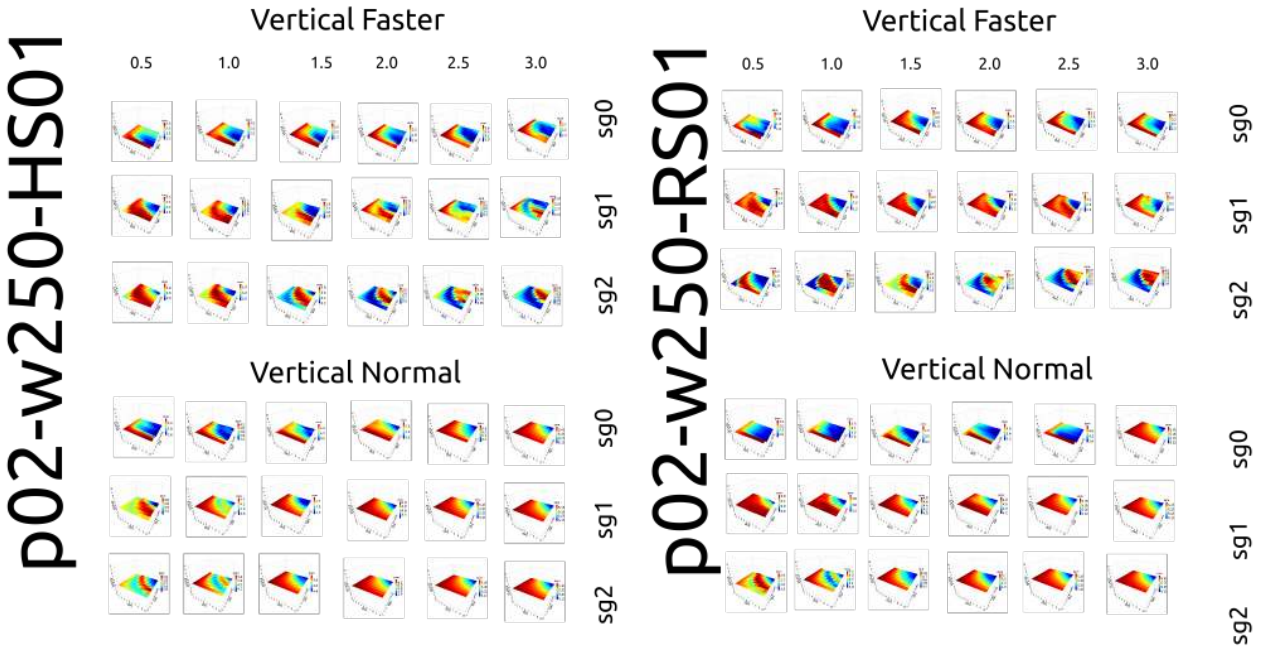

Figure 12: **RQA-Entr for participant 02 performing vertical movements for a window size of 250 samples.** Code and data to reproduce the figure is available in [1].

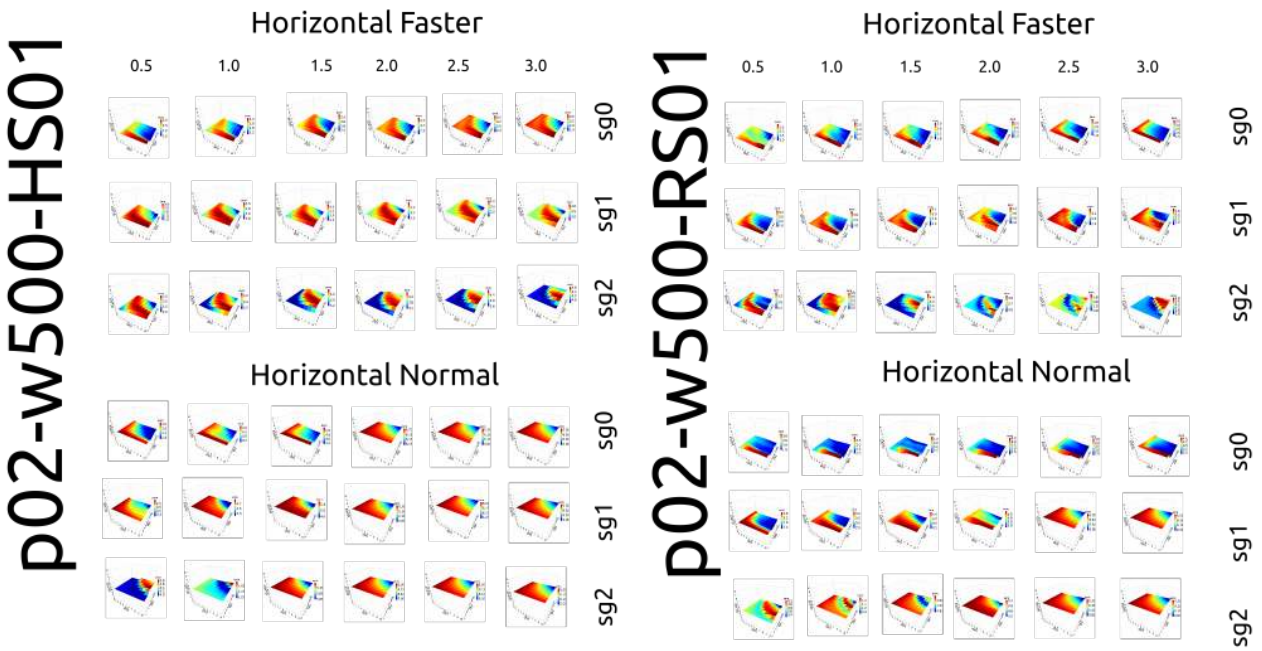

Figure 13: **RQA-Entr for participant 02 performing horizontal movements for a window size of 500 samples.** Code and data to reproduce the figure is available in [1].

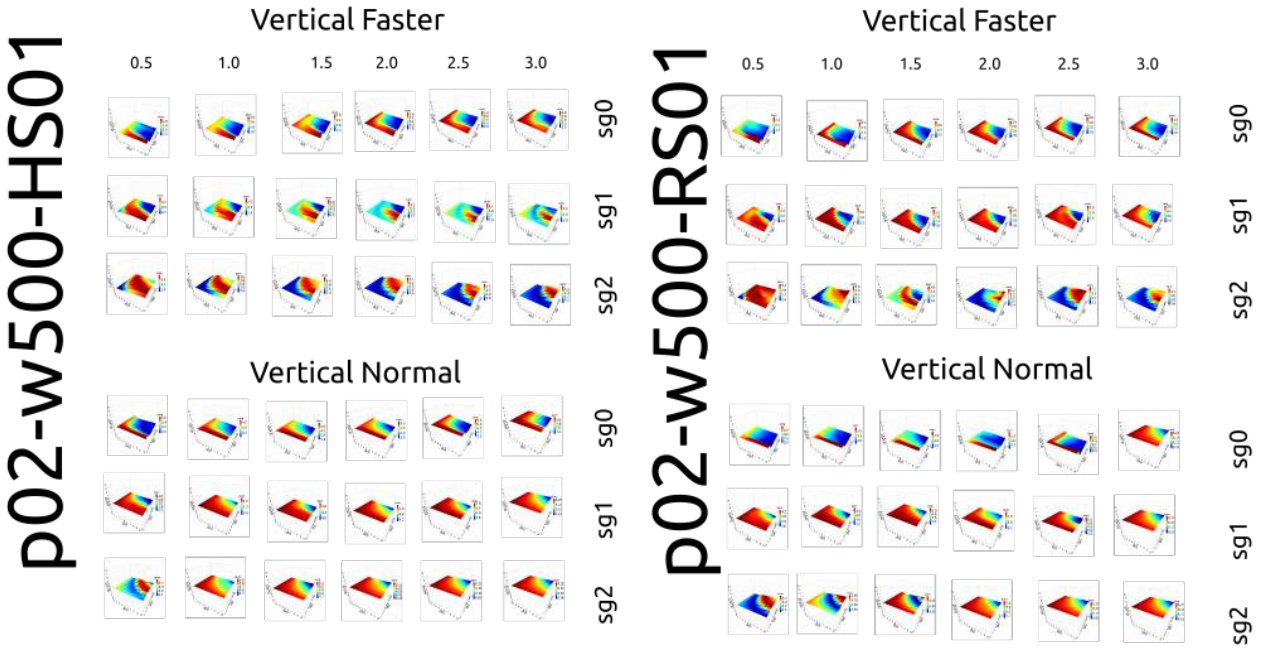

Figure 14: **RQA-Entr for participant 02 performing vertical movements for a window size of 500 samples.** Code and data to reproduce the figure is available in [1].

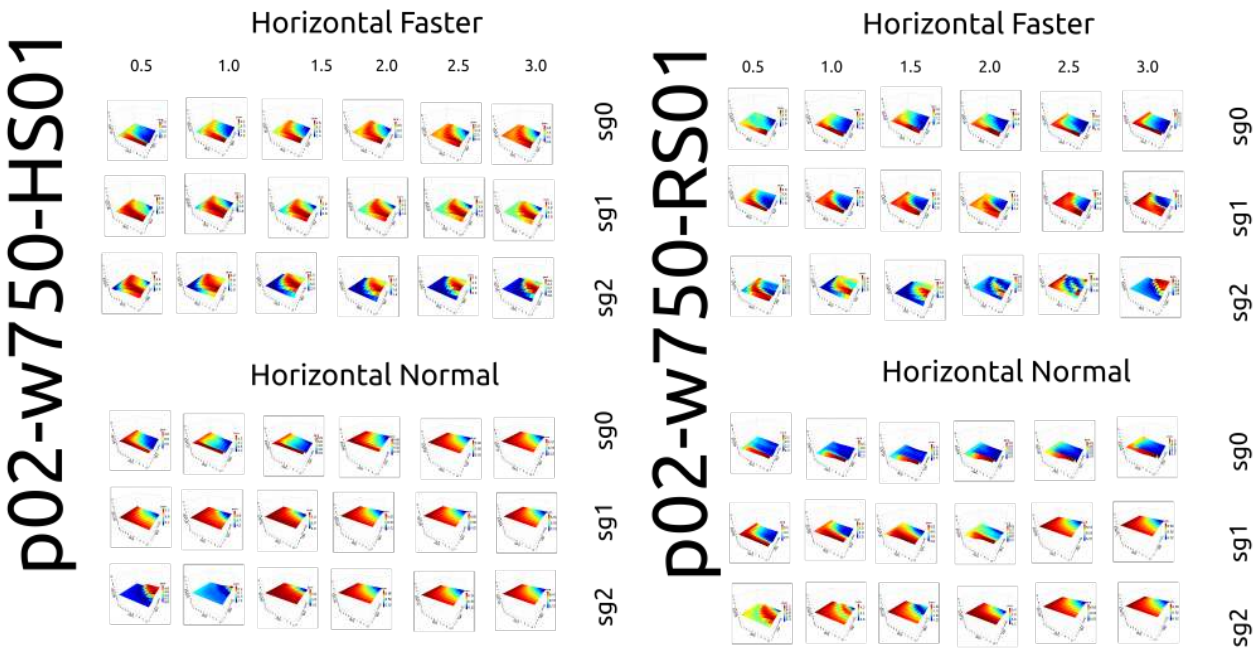

Figure 15: **RQA-Entr for participant 02 performing horizontal movements for a window size of 750 samples.** Code and data to reproduce the figure is available in [1].

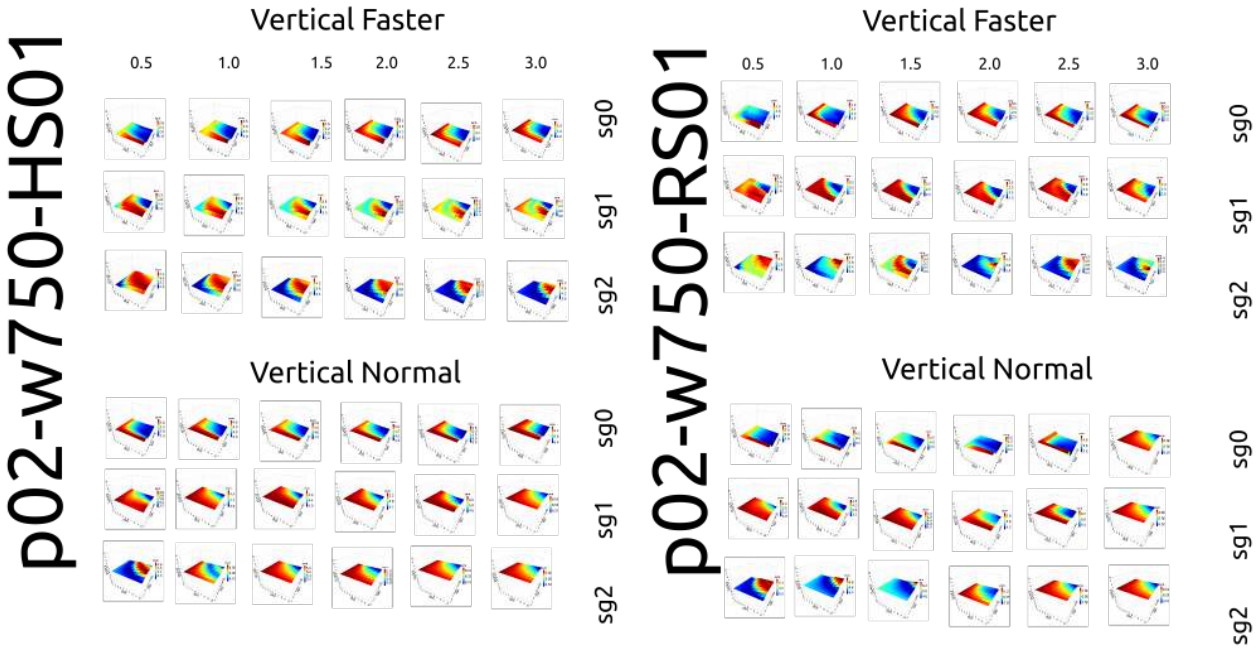

Figure 16: **RQA-Entr for participant 02 performing vertical movements for a window size of 750 samples.** Code and data to reproduce the figure is available in [1].

2.3 Participant 03

Figures 17 and 18 are for a window size of 100 samples. Figures 19 and 20 are for a window size of 250 samples. Figures 21 and 22 are for a window size of 500 samples. Figures 23 and 24 are for a window size of 750 samples.

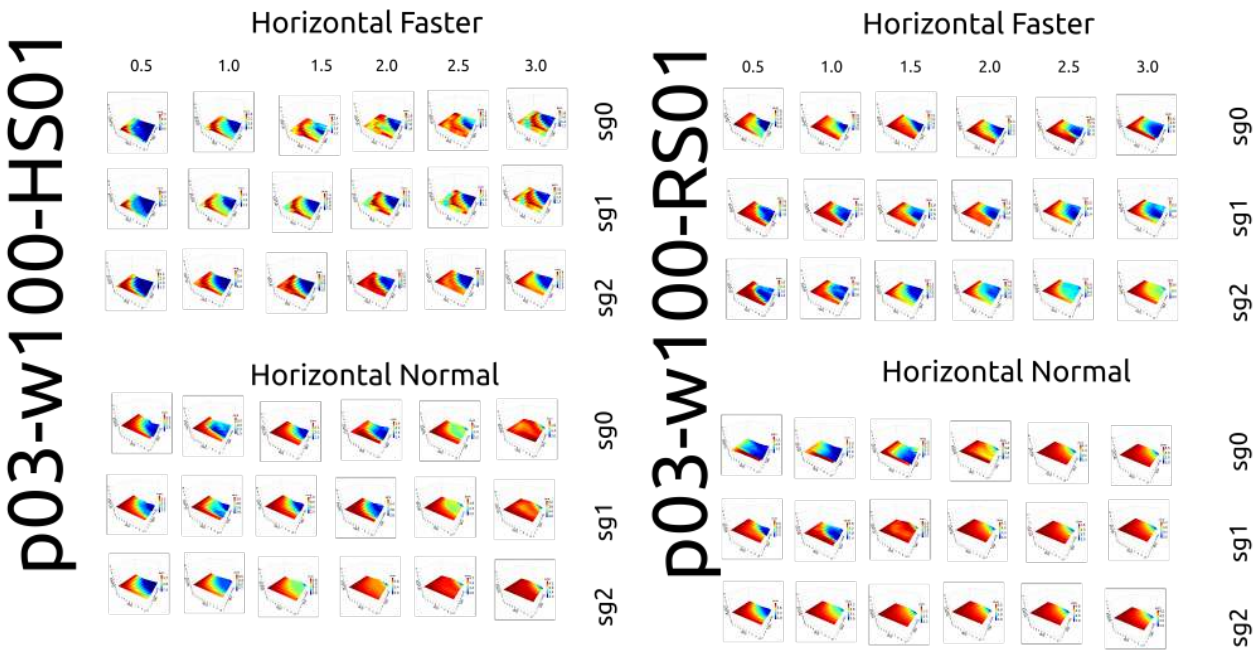

Figure 17: **RQA-Entr for participant 03 performing horizontal movements for a window size of 100 samples.** Code and data to reproduce the figure is available in [1].

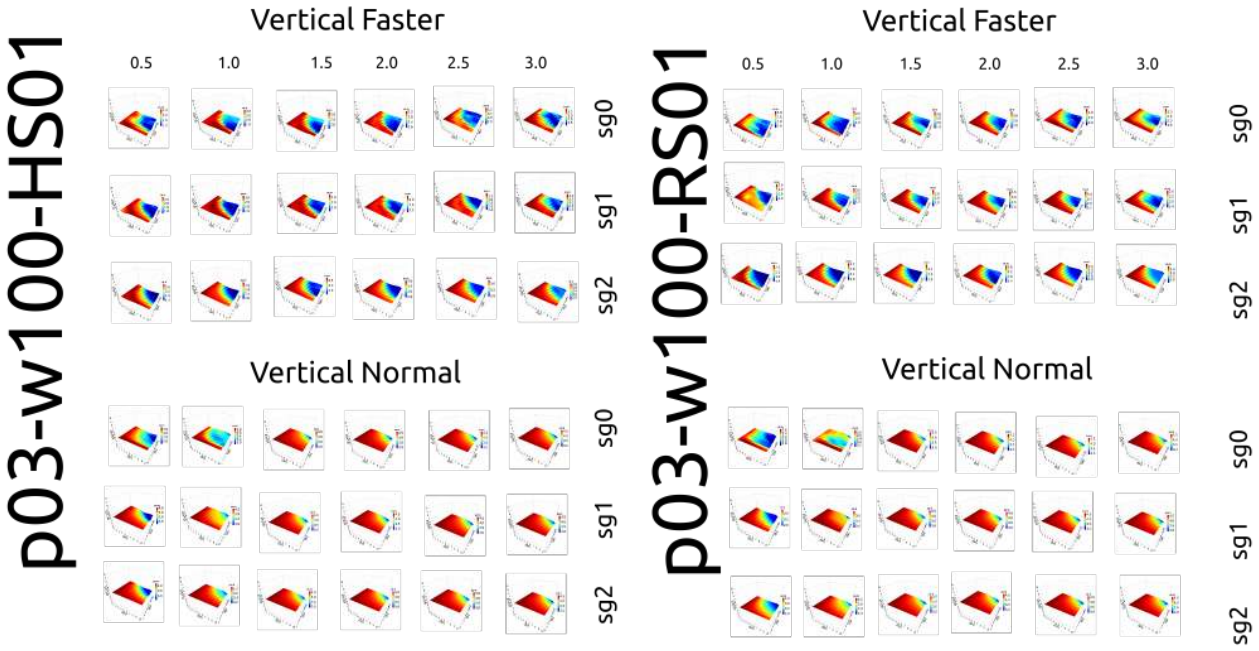

Figure 18: **RQA-Entr for participant 03 performing vertical movements for a window size of 100 samples.** Code and data to reproduce the figure is available in [1].

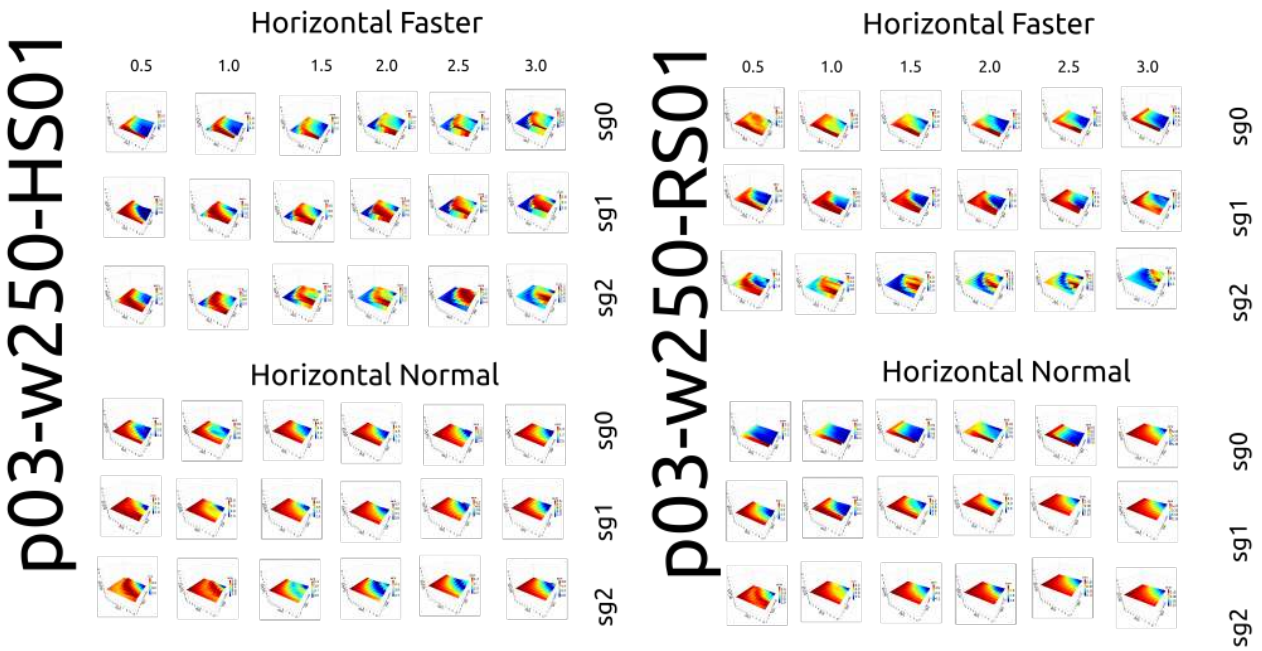

Figure 19: **RQA-Entr for participant 03 performing horizontal movements for a window size of 250 samples.** Code and data to reproduce the figure is available in [1].

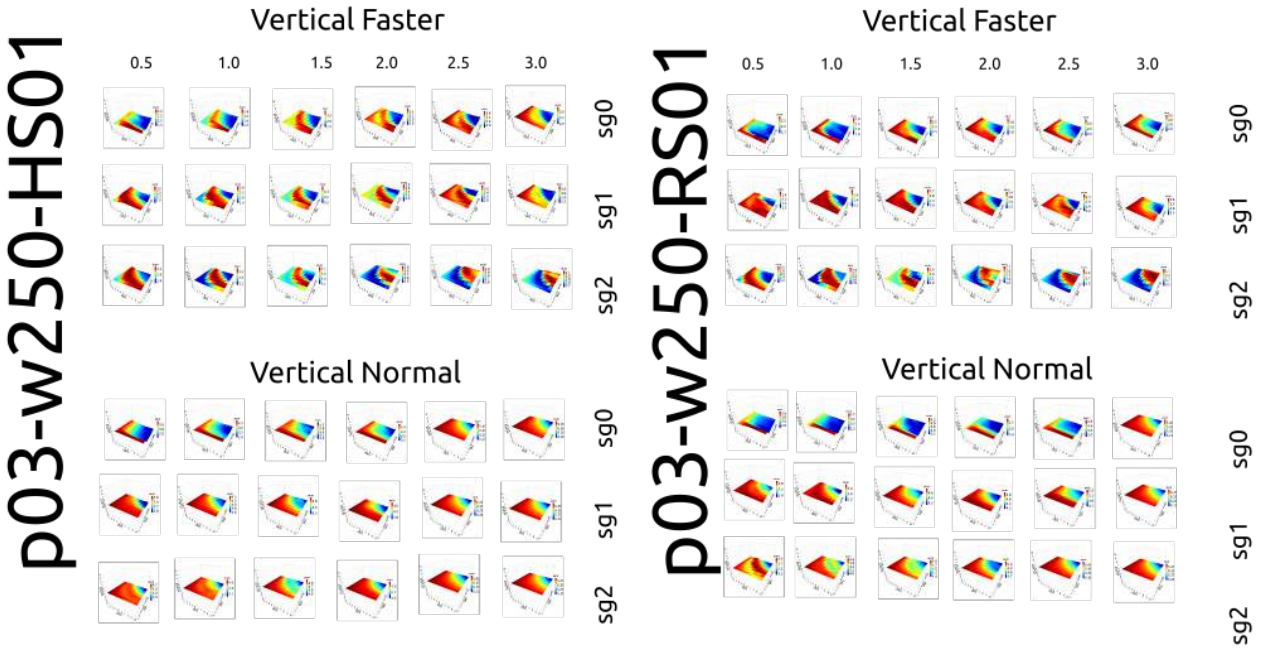

Figure 20: **RQA-Entr for participant 03 performing vertical movements for a window size of 250 samples.** Code and data to reproduce the figure is available in [1].

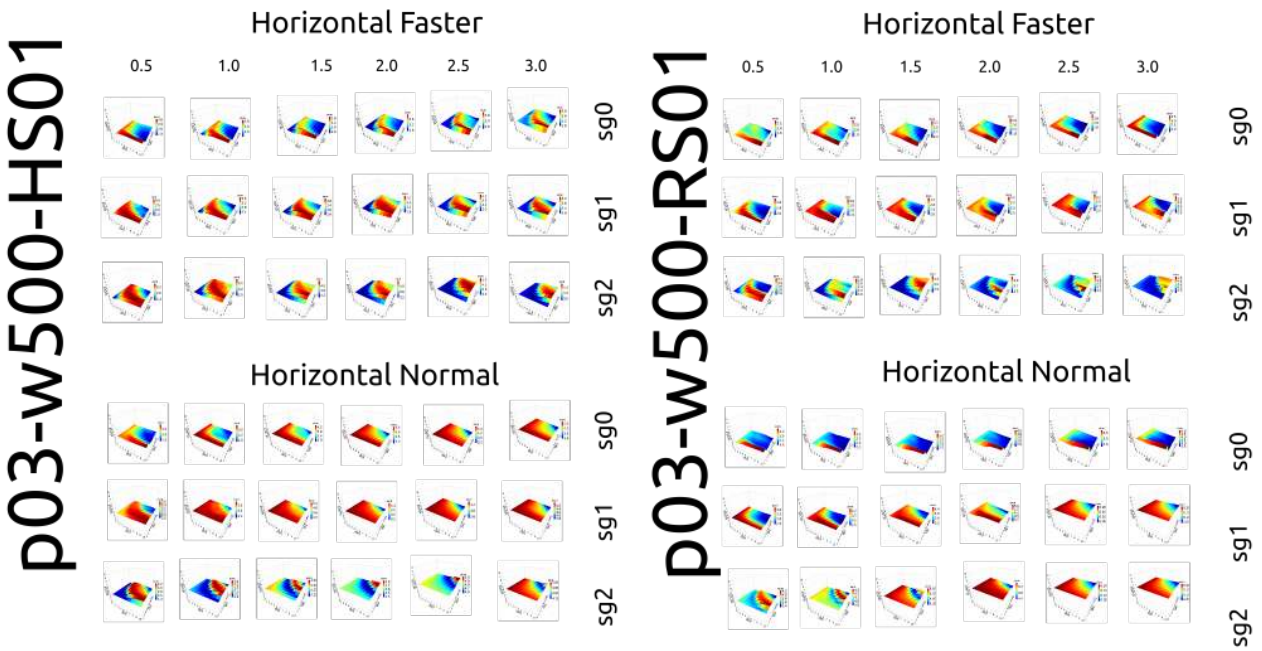

Figure 21: **RQA-Entr for participant 03 performing horizontal movements for a window size of 500 samples.** Code and data to reproduce the figure is available in [1].

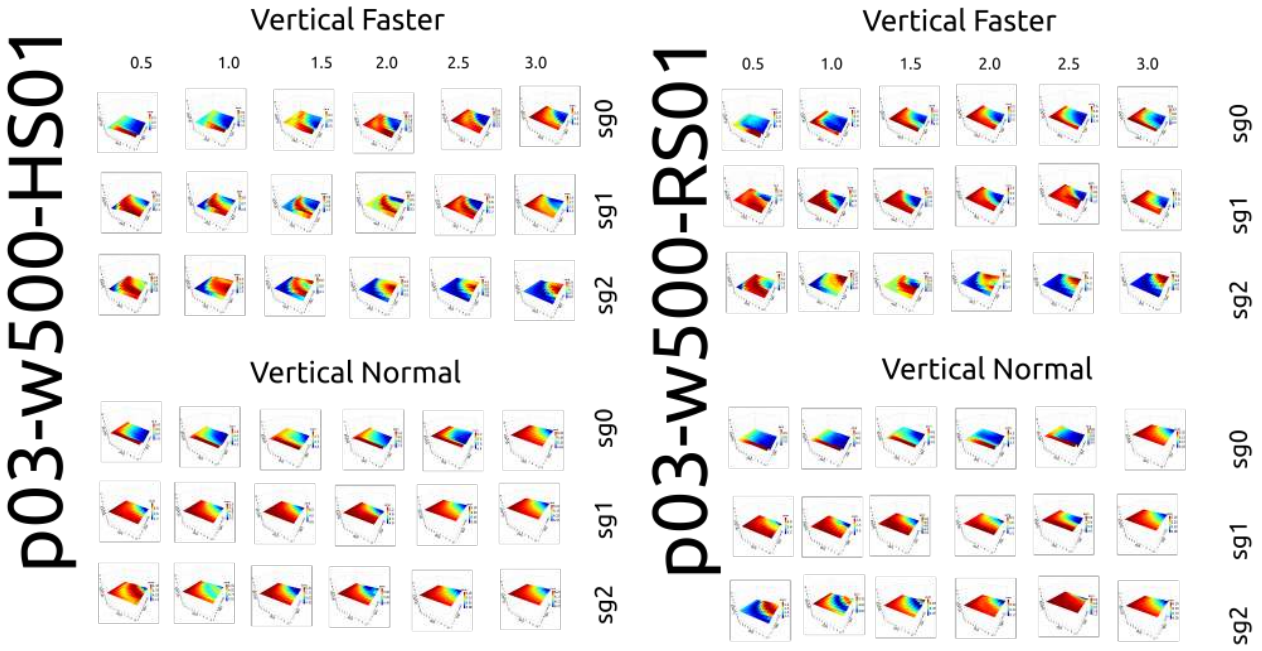

Figure 22: **RQA-Entr for participant 03 performing vertical movements for a window size of 500 samples.** Code and data to reproduce the figure is available in [1].

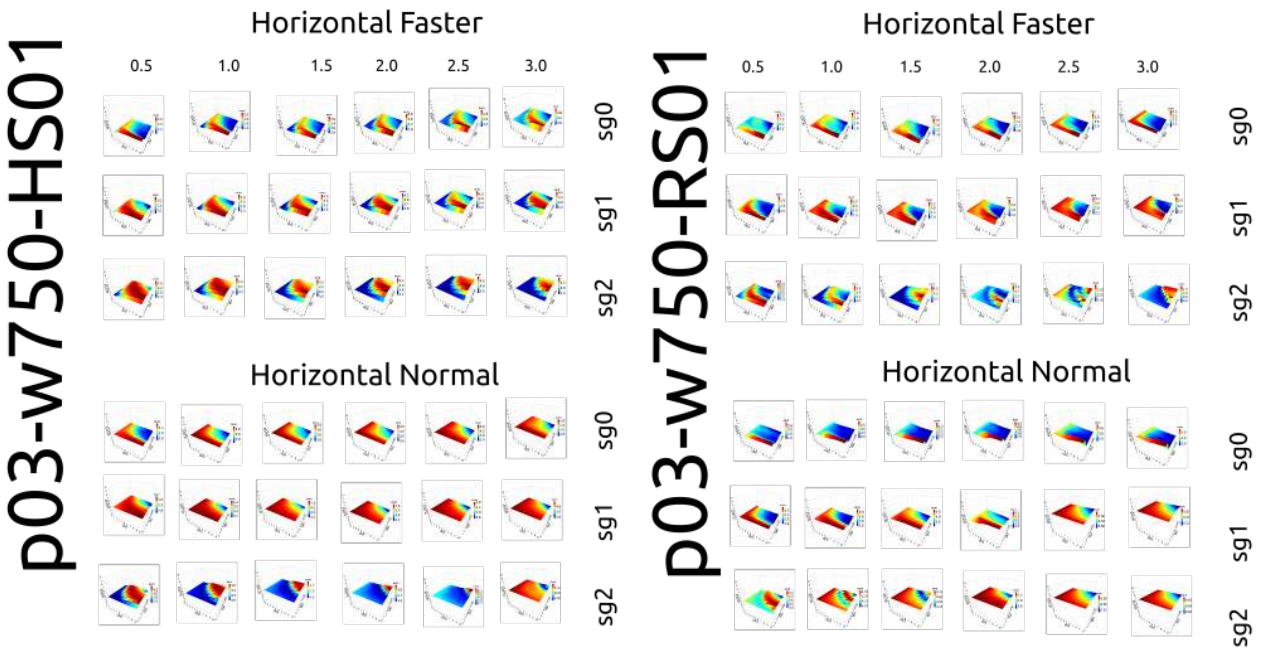

Figure 23: **RQA-Entr for participant 03 performing horizontal movements for a window size of 750 samples.** Code and data to reproduce the figure is available in [1].

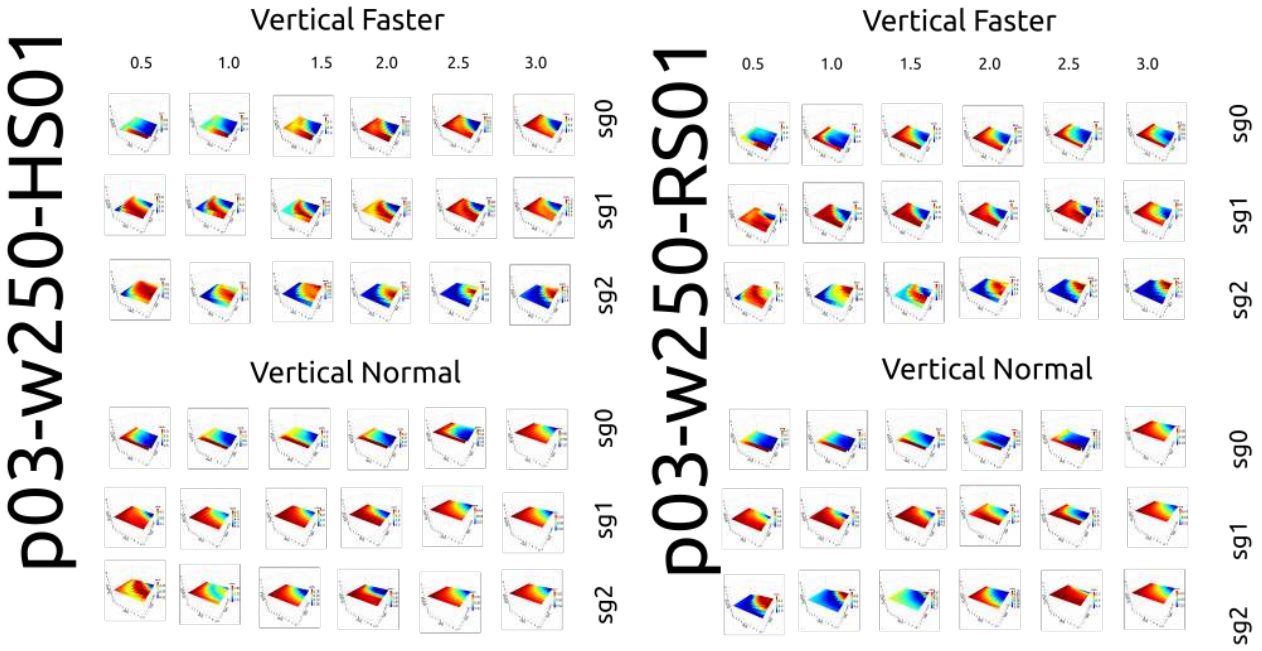

Figure 24: **RQA-Entr for participant 03 performing vertical movements for a window size of 750 samples.** Code and data to reproduce the figure is available in [1].

References

[1] Xochicale Miguel. Github repository: Nonlinear methods to quantify movement variability in human-humanoid interaction activities. https://github.com/mxochicale/srep2021, 2021.