## 1 HYPERPARAMETERS SEARCH AND SELECTION

Table S1 and Table S2 show the hyperparameters considered for the offline and online algorithms respectively.

### Table S1. Hyperparameters considered for the CPD algorithms in the offline setting. NW is the sub-sequence length. TC is the temporal constraint.

| Offline Models | Data Scalers | NW   | TC   | Step-Size | Autoencoder       | Extraction Algorithm |
|----------------|--------------|------|------|-----------|-------------------|----------------------|
| LS-USS         | All Datasets | All datasets | EMG Datasets | UCI       | All datasets | All Datasets | All Datasets |
|                | No Scaler    | 50   | 300  | 1000  | 800      | -           | -         | Fully Connected |
|                | Standard Scaler | 100 | 400  | 1500  | 1200      | -         | -          | Convolutional |
|                | Robust Scaler | 150 | 500  | 2000  | 1600      | -         | -          | REA         |
|                | Min Max Scaler | 200 | 300  | 1000  | 800      | -           | -         | LREA        |

| FLUSS          | No Scaler    | 50   | 300  | 1000  | 800      | -           | -         | REA         |
|                | Standard Scaler | 100 | 400  | 1500  | 1200      | -         | -          | LREA        |
|                | Robust Scaler | 150 | 500  | 2000  | 1600      | -         | -          | REA         |

| LFMD           | No Scaler    | 50   | 300  | 1000  | 800      | -           | -         | LTEA        |
|                | Standard Scaler | 100 | 400  | 1500  | 1200      | -         | -          | LTEA        |
|                | Robust Scaler | 150 | 500  | 2000  | 1600      | -         | -          | LTEA        |
|                | Min Max Scaler | 200 | 300  | 1000  | 800      | -           | -         | LTEA        |

### Table S2. Hyperparameters considered for the CPD algorithms in the online setting. NW is the sub-sequence length. TC is the temporal constraint. The threshold parameter is the threshold used in the LTEA extraction algorithm.

| Online Models | Data Scalers | NW   | TC   | Step-size | Autoencoder       | Extraction Algorithm |
|---------------|--------------|------|------|-----------|-------------------|----------------------|
| LS-USS        | All Datasets | All datasets | EMG datasets | UCI       | All datasets | All Datasets | All Datasets |
|               | No Scaler    | 50   | 300  | 1000  | 800      | -           | -         | -0.5       |
|               | Standard Scaler | 100 | 400  | 1500  | 1200      | -         | -          | -1.0       |
|               | Robust Scaler | 150 | 500  | 2000  | 1600      | -         | -          | -1.5       |
|               | Min Max Scaler | 200 | 300  | 1000  | 800      | -           | -         | -3.0 |

| LS-USS - Online | No Scaler    | 50   | 300  | 1000  | 800      | -           | -         | -0.5       |
|                 | Standard Scaler | 100 | 400  | 1500  | 1200      | -         | -          | -1.0       |
|                 | Robust Scaler | 150 | 500  | 2000  | 1600      | -         | -          | -1.5       |
|                 | Min Max Scaler | 200 | 300  | 1000  | 800      | -           | -         | -3.0 |

| FLUSS (ε-real time) | No Scaler    | 50   | 300  | 1000  | 800      | -           | -         | -0.5       |
|                     | Standard Scaler | 100 | 400  | 1500  | 1200      | -         | -          | -1.0       |
|                     | Robust Scaler | 150 | 500  | 2000  | 1600      | -         | -          | -1.5       |
|                     | Min Max Scaler | 200 | 300  | 1000  | 800      | -           | -         | -3.0 |

| FLOSS           | No Scaler    | 50   | 300  | 1000  | 800      | -           | -         | -0.5       |
|                 | Standard Scaler | 100 | 400  | 1500  | 1200      | -         | -          | -1.0       |
|                 | Robust Scaler | 150 | 500  | 2000  | 1600      | -         | -          | -1.5       |
|                 | Min Max Scaler | 200 | 300  | 1000  | 800      | -           | -         | -3.0 |

| LFMD            | No Scaler    | 50   | 300  | 25    | 200      | -           | -         | -0.5       |
|                 | Standard Scaler | 100 | 400  | 100  | 250      | -         | -          | -1.0       |
|                 | Robust Scaler | 150 | 500  | -     | 150      | -         | -          | -1.5       |
|                 | Min Max Scaler | 200 | 300  | -     | 150      | -           | -         | -3.0 |
Tables S3 and S4 show the hyperparameters selected for the offline and online algorithms after doing hyperparameter search. The selected parameters are the ones used for the comparisons between the different models in Section VI and VII.

### UCI

| CPD Algorithm | Extraction Algorithm | Data Scaler          | NW  | TC  | Step-size | Autoencoder       |
|---------------|----------------------|----------------------|-----|-----|-----------|-------------------|
| LFMD          | LREA                 | Robust Scaler        | 50  | -   | 250       | Fully Connected   |
| LS-USS        | REA                  | Min Max Scaler       | 50  | 800 | 1         | Fully Connected   |
| FLUSS         | LREA                 | Robust Scaler        | 50  | 1200| 1         | -                 |

### EMG Artificial

| CPD Algorithm | Extraction Algorithm | Data Scaler          | NW  | TC  | Step-size | Autoencoder       |
|---------------|----------------------|----------------------|-----|-----|-----------|-------------------|
| LFMD          | REA                  | Standard Scaler      | 200 | -   | 500       | Conv. Model       |
| LS-USS        | LREA                 | Standard Scaler      | 50  | 1500| 1         | Conv. Model       |
| FLUSS         | LREA                 | Standard Scaler      | 50  | 1500| 1         | -                 |

### EMG

| CPD Algorithm | Extraction Algorithm | Data Scaler          | NW  | TC  | Step-size | Autoencoder       |
|---------------|----------------------|----------------------|-----|-----|-----------|-------------------|
| LFMD          | LREA                 | Standard Scaler      | 50  | -   | 100       | Fully Connected   |
| LS-USS        | LREA                 | Robust Scaler        | 50  | 2000| 1         | Conv. Model       |
| FLUSS         | LREA                 | Standard Scaler      | 50  | 1500| 1         | -                 |

### Dance Artificial

| CPD Algorithm | Extraction Algorithm | Data Scaler          | NW  | TC  | Step-size | Autoencoder       |
|---------------|----------------------|----------------------|-----|-----|-----------|-------------------|
| LFMD          | LREA                 | Min Max Scaler       | 100 | -   | 100       | Fully Connected   |
| LS-USS        | LREA                 | No Scaler            | 50  | 800 | 1         | Conv. Model       |
| FLUSS         | LREA                 | Standard Scaler      | 50  | 800 | 1         | -                 |

### Dance

| CPD Algorithm | Extraction Algorithm | Data Scaler          | NW  | TC  | Step-size | Autoencoder       |
|---------------|----------------------|----------------------|-----|-----|-----------|-------------------|
| LFMD          | LREA                 | Min Max Scaler       | 400 | -   | 100       | Fully Connected   |
| LS-USS        | LREA                 | Min Max Scaler       | 400 | 1600| 1         | Fully Connected   |
| FLUSS         | REA                  | Robust Scaler        | 400 | 800 | 1         | -                 |

Table S3. Hyperparameters selected for the compared CPD algorithms in the offline setting. NW is the sub-sequence length. TC is the temporal constraint.

## 2 TIME SERIES SEGMENTATION EXAMPLES
### UCI

| CPD Algorithm | Extraction Algorithm | Data Scaler | NW | TC | Step-size | Autoencoder | Threshold |
|---------------|----------------------|-------------|----|----|-----------|-------------|-----------|
| LFMD          | LTEA                 | Min Max Scaler | 100 | -  | 100       | Fully Connected | -2        |
| FLUSS         | LTEA                 | Robust Scaler  | 50  | 1600 | 1         | -           | -1        |
| FLOSS         | LTEA                 | Robust Scaler  | 150 | 1600 | 1         | -           | -1        |
| LS-USS        | LTEA                 | Min Max Scaler | 150 | 800  | 1         | Fully Connected | -1.5      |
| LS-USS Online | LTEA                 | Robust Scaler  | 50  | 1200 | 1         | Fully Connected | -0.5      |

### EMG Artificial

| CPD Algorithm | Extraction Algorithm | Data Scaler | NW  | TC | Step-size | Autoencoder | Threshold |
|---------------|----------------------|-------------|-----|----|-----------|-------------|-----------|
| LFMD          | LTEA                 | Standard Scaler | 300 | -  | 100       | Fully Connected | -0.5      |
| FLUSS         | LTEA                 | Standard Scaler | 50  | 1500 | 1         | -           | -1        |
| FLOSS         | LTEA                 | Standard Scaler | 100 | 2000 | 1         | -           | -0.5      |
| LS-USS        | LTEA                 | Standard Scaler | 50  | 2000 | 1         | Conv. Model  | -0.5      |
| LS-USS Online | LTEA                 | Standard Scaler | 50  | 1500 | 1         | Conv. Model  | -1        |

### EMG

| CPD Algorithm | Extraction Algorithm | Data Scaler | NW  | TC | Step-size | Autoencoder | Threshold |
|---------------|----------------------|-------------|-----|----|-----------|-------------|-----------|
| LFMD          | LTEA                 | Standard Scaler | 500 | -  | 500       | Fully Connected | -1.5      |
| FLUSS         | LTEA                 | Standard Scaler | 50  | 1000 | 1         | -           | -2        |
| FLOSS         | LTEA                 | Standard Scaler | 200 | 1000 | 1         | -           | -0.5      |
| LS-USS        | LTEA                 | Standard Scaler | 300 | 1000 | 1         | Fully Connected | -2        |
| LS-USS Online | LTEA                 | Standard Scaler | 200 | 1500 | 1         | Fully Connected | -2        |

### Dance Artificial

| CPD Algorithm | Extraction Algorithm | Data Scaler | NW  | TC | Step-size | Autoencoder | Threshold |
|---------------|----------------------|-------------|-----|----|-----------|-------------|-----------|
| LFMD          | LTEA                 | Min Max Scaler | 50  | -  | 50        | Fully Connected | -0.5      |
| FLUSS         | LTEA                 | Min Max Scaler | 100 | 800  | 1         | -           | -0.5      |
| FLOSS         | LTEA                 | No Scaler   | 50  | 800  | 1         | -           | -0.5      |
| LS-USS        | LTEA                 | Min Max Scaler | 50  | 800  | 1         | Conv. Model  | -0.5      |
| LS-USS Online | LTEA                 | Min Max Scaler | 50  | 800  | 1         | Conv. Model  | -0.5      |

### Dance

| CPD Algorithm | Extraction Algorithm | Data Scaler | NW  | TC | Step-size | Autoencoder | Threshold |
|---------------|----------------------|-------------|-----|----|-----------|-------------|-----------|
| LFMD          | LTEA                 | Min Max Scaler | 125 | -  | 200       | Fully Connected | -1.5      |
| FLUSS         | LTEA                 | Robust Scaler | 200 | 1200 | 1         | -           | -1.5      |
| FLOSS         | LTEA                 | Robust Scaler | 125 | 1200 | 1         | -           | -2        |
| LS-USS        | LTEA                 | Robust Scaler | 200 | 1200 | 1         | Fully Connected | -2        |
| LS-USS Online | LTEA                 | Min Max Scaler | 200 | 1600 | 1         | Fully Connected | -1.5      |

Table S4. Hyperparameters selected for the compared CPD algorithms in the online setting. NW is the sub-sequence length. TC is the temporal constraint. The threshold parameter is the threshold used in the LTEA extraction algorithm.
**Figure S1.** Top: Channel 0 of subject 4 in the UCI dataset. Middle: Segmentation using LS-USS – LREA- Bottom: Segmentation using LS-USS – LTEA
Figure S2. Top: Channel 0 of gesture19 in the EMG Artificial dataset. Middle: Segmentation using LS-USS – LREA. Bottom: Segmentation using LS-USS – LTEA.
Figure S3. Top: Channel 0 of participant3, evaluation3 in the EMG dataset. Middle: Segmentation using LS-USS – LREA- Bottom: Segmentation using LS-USS – LTEA.
Figure S4. Channel 0 of d41 in the Dance Artificial dataset. Middle: Segmentation using LS-USS – LREA-Bottom: Segmentation using LS-USS – LTEA.
**Figure S5.** Top: Channel 0 of d24 in the Dance dataset. Middle: Segmentation using LS-USS – LREA. Bottom: Segmentation using LS-USS – LTEA (shows the effects of setting the threshold parameter to high).