

Data Description

Folder Description

There are two data folders, each respectively contain the:

- Training set (10 chronic pain participants, 6 healthy participants)
- Validation set (4 chronic pain participants, 3 healthy participants)

The data files are .mat files, and each file corresponds to a participant with chronic pain ('P' prefix in filename) or a healthy control participant ('C' prefix in filename) with integer id # evident in the file name. Each file has suffix 'N' or 'D' in its name to indicate the level of challenge of the exercise performed in the corresponding file, 'normal' or 'difficult' respectively.

File Description

Each file contains the body movement data for a single participant for all exercise sessions under one challenge level ('normal' or 'difficult'), in a $T \times 78$ matrix, where T is the number of data samples for that file. The 78 columns of the matrix are specified below:

[illegible]

Body Joint Arrangement

The arrangement of the 22 body joints is shown in Figure 1.

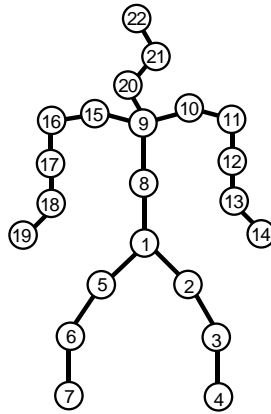


Figure 1: The arrangement of the 22 body joints.

Test Data

The test data for evaluation is kept with the challenge organizer. The structure of the folder, file and data stays the same with the training and validation sets. For each of the Movement Behaviour Classification and the Pain Recognition from Movement tasks:

- Movement Behavior Classification Task: The test data has size $W \times T \times d$,
 W = the total number of window segments over all exercise instances,
 T = the number of frames in each segment = 180,
 d = the number of dimensions of each frame = 78

and is created by using a sliding window segmentation of $T \times d$ matrices that correspond to unique participants. The 180-frames windows have 75% overlapping ratio. The segmentation was done separately for each exercise instance, and so no segment is an overlap between different exercises instances. It is optional to follow the above data segmentation strategy.

Your submitted model for this task should produce the metrics directly given the same structure of folder/file and data. The only difference is the name of files.

- Pain Recognition from Movement Task: The test data has size $I \times T \times d$,
 I = the total number of exercise instances,
 T = the number of frames in each instance = \sim (depend on the length of the exercise),
 d = the number of dimensions of each frame = 78

Your submitted model should produce a vector with size of $I \times 1$ (or $1 \times I$).

Citations and References

All submissions for the *Movement Behavior Classification Task* may refer to:

- [1] Aung et al. 2014. ‘Automatic recognition of fear-avoidance behavior in chronic pain physical rehabilitation’. (<https://dl.acm.org/citation.cfm?id=2686916>)
- [2] Aung et al. 2016. ‘The Automatic Detection of Chronic Pain-Related Expression: Requirements, Challenges and the Multimodal EmoPain Dataset’. (<https://ieeexplore.ieee.org/abstract/document/7173007>)
- [3] Wang et al. 2021. ‘Chronic-Pain Protective Behavior Detection with Deep Learning’. (<https://arxiv.org/abs/1902.08990>).
- [4] Wang et al. 2021. ‘Leveraging Activity Recognition to Enable Protective Behavior Detection in Continuous Data’. (<https://arxiv.org/abs/2011.01776>).

All submissions for the *Pain Recognition from Movement Task* may refer to:

- [5] Aung et al. 2016. ‘The Automatic Detection of Chronic Pain-Related Expression: Requirements, Challenges and the Multimodal EmoPain Dataset’. (<https://ieeexplore.ieee.org/abstract/document/7173007>)
- [6] Olugbade et al. 2014. ‘Bi-Modal Detection of Painful Reaching for Chronic Pain Rehabilitation Systems’. (<https://dl.acm.org/citation.cfm?id=2663261>),
- [7] Olugbade et al. 2015. ‘Pain level recognition using kinematics and muscle activity for physical rehabilitation in chronic pain’. (<https://ieeexplore.ieee.org/abstract/document/7344578>),
- [8] Olugbade et al. 2019. ‘How Can Affect Be Detected and Represented in Technological Support for Physical Rehabilitation?’ (<https://dl.acm.org/citation.cfm?id=3299095>).