This code is used to reproduce the results in the submission, "Relation Learning Using Temporal Episodes for Motor Imagery Brain-Computer Interfaces".

Requirements

- Python 3
- PyTorch
- Keras

Dataset Preparation

- BCI Competition IV-2a
- BCI Competition IV-2b
- BCI Competition III IVa

BCI Competition IV-2a and BCI Competition IV-2b are automatically downloaded by "ipynb" files. For the BCI Competition III IVa, you need to manually download it via the hyper-link above and put it into the Google drive or local fold "/content/drive/MyDrive/fewshotonlineBCI/CompetitionIII_IVa".

Running the code

We recommend running the code on Colab, an online platform provided by Google. Alternatively, the code can also be run locally using Jupyter Notebook. Each "ipynb" can be executed independently in two steps:

1) Open the "ipynb" file you feel interest in using Colab or Jupyter Notebook.
2) Follow the detailed instruction displayed within "ipynb".

Reference list below is to help match experiments in the manuscript and their corresponding "ipynb" files.

- Offline evaluation
  - IV-2a
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    Code\ Offline evaluation\IV-2a\Others_IV_2a. ipynb
    Code\ Offline evaluation\IV-2a\Combine_IV_2a. ipynb
    Code\ Offline evaluation\IV-2a\Basic_A_IV_2a. ipynb
    Code\ Offline evaluation\IV-2a\Basic_B_IV_2a. ipynb
    Code\ Offline evaluation\IV-2a\Fine_tuning_IV_2a. ipynb
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    Code\ Offline evaluation\IV-2a\DRDA_IV_2a. ipynb
    Code\ Offline evaluation\IV-2a\Model_A_IV_2a. ipynb

  - IV-2b
    Code\ Offline evaluation\IV-2b\Few_IV_2b. ipynb
    Code\ Offline evaluation\IV-2b\Others_IV_2b. ipynb
    Code\ Offline evaluation\IV-2b\Combine_IV_2b. ipynb
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    Code\ Offline evaluation\IV-2b\DRDA_IV_2b. ipynb
    Code\ Offline evaluation\IV-2b\Model_A_IV_2b. ipynb

  - III-IVa
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- Stimulating online evaluation
  - IV-2a

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    Code\ Stimulating online evaluation\IV-2a\Combine_IV_2a. ipynb
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  - IV-2b

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  - III-IVa

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- K-way setting
  - Fine-tuning

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    Code\ K_way\Fine_tuning_Kway_0. ipynb

- DRDA
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  Code\ K_way\DRDA_Kway_0. ipynb

- Model A
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  Code\ K_way\Model_A_Kway_0. ipynb

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- Temporal kernel length
  - Model A
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    Code\Temporal kernel length\Model_A_TKL_0. ipynb

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- Visualization
  - Learning curve
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    Code\Visualization\Learning curves\ Model_A. ipynb

  - Temporal kernel weights
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    Code\Visualization\Temporal kernel weights\Random_order. ipynb