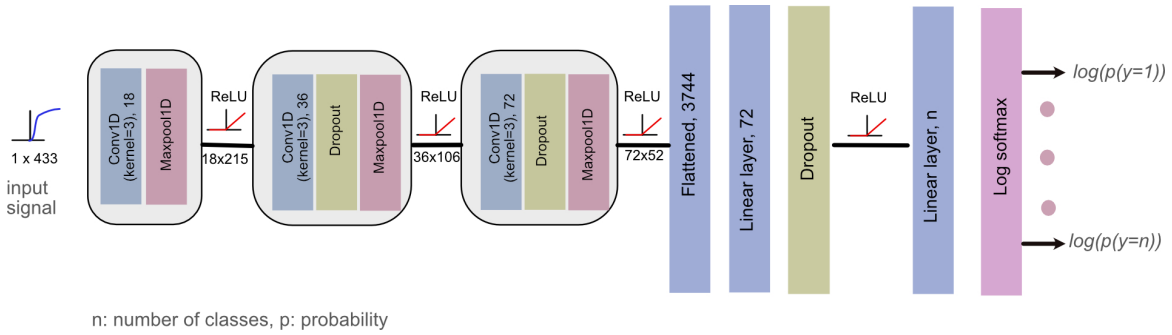
HSI Analysis ML

Deep learning and machine learning methods for hyper-spectral imaging data



n: number of classes, p: probability

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Requirements

- Miniconda
- Linux/Unix only
- pyTorch >1.5
- CUDA > 10.0
- scikit-learn
- matplotlib
- datatable

Setup

- Install miniconda
- Run `bash initial_setup.sh`

Data

- Both training and test data are provided in the `data` folder
- Training data and test data for noExclusion and balanced datasets

Results

- Computed results are also included in `metrics_outputs` folder as `.json file` produced from the provided codes
- `noExclusion` dataset (Table 2, Supplementary Tables 2-3) and `balanced` dataset (Supplementary Tables 4-6)

Training and testing classical machine learning approaches

- To reproduce Supplementary Tables 2 and Table 3, please run: `bash Supplementary_Table2_Table3.sh`

- To reproduce Supplementary Tables 5 and Table 6, please run: `bash Supplementary_Table5_Table6.sh`

RESULTS SAVED IN: `results_Classical_ML folder`

Includes:

- KNN
- SVM (with rbf kernel set)

Training a deep learning model

- For 3-way and 2-way 1D CNN classsification

  ```
  bash script_train.sh
  ```

Testing a deep learning model

Note: please train the model before running this, seeds are allocated for reproducibility

- To reproduce table 2 in original manuscript, please run: `bash Table2.sh`

RESULTS SAVED IN: `results_noExlusion_test_data* folder`

- To reproduce table 4 in supplementary manuscript, please run: `bash Supplementary_Table4.sh`

RESULTS SAVED IN: `results_balanced_test_data* folder`

Note: Use of pytorch with CUDA is recommended to obtain 1D-CNN results reported in the paper.

If you find any inconsistencies in results or code then please report to Sharib Ali