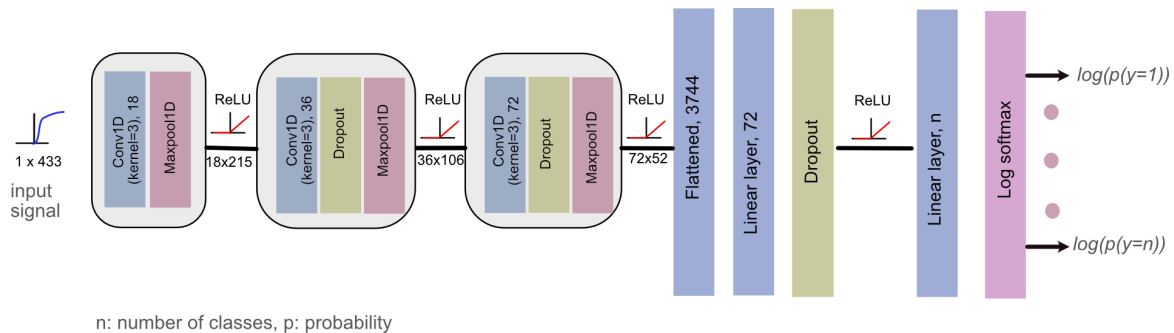


# HSI Analysis ML

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



**Contributor:** Dr. Sharib Ali [shairb.ali@eng.ox.ac.uk](mailto:shairb.ali@eng.ox.ac.uk)

**Collaborator:** Dale Waterhouse [d.waterhouse@ucl.ac.uk](mailto:d.waterhouse@ucl.ac.uk)

## 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 classification

`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_balanced_test_data*` folder

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

**RESULTS SAVED IN:** `results_noExlusion_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](#)*