

HCI Project

Motor Imagery Based Photo Viewer

Team ID: 25

Team Members:

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1) Data preparation (training and testing sets) and preprocessing used.

- Using dataset **BCICIV_2a_gdf** contains 9 files (A01T.gdf to A09T.gdf) and 9 files (A01E.gdf to A09E.gdf).
- Read data raw by raw (file file) using **read_raw_gdf**.
- Drop EOG channels using **drop_channels** ['EOG-left', 'EOG-central', 'EOG-right'].
- Apply **ICA** to remove eye blink artifacts.
- get **events** from data (Events ID {'1023': 1, '1072': 2, '276': 3, '277': 4, '32766': 5, '768': 6, '769': 7, '770': 8, '771': 9, '772': 10}) from description of data **event 7** expresses **left hand** signal and **event 8** expresses **right hand** signal.
- get **epochs** from data using (raw, events [0], event_id= [7, 8], tmin=0.1, tmax=0.7 and on_missing='warn').
- get **labels** = epochs.events[:, -1].
- get **features** = epochs.get_data ().
- define **alpha_band** = (8, 12) and **beta_band** = (13, 30)
- Apply **bandpass filtering** to each epoch one by alpha band and one by beta band.

- concatenated alpha_filtered_features and beta_filtered_features in **concatenated_features**.

2) Feature extraction methods used.

- Using **CSP** method using n_components = 22

3) Classifier used and its parameters and results.

i. **SVM Model**

with parameters ('C': 10, 'gamma': 'scale')

ii. **Random Forest Model**

with parameters ('max_depth': None, 'n_estimators': 300)

iii. **KNN Model**

With parameters ('n_neighbors': 7, 'weights': 'uniform')

iv. **Logistic Regression Model**

With parameters ('C': 1, 'penalty': 'l2')

	SVM	Random Forest	KNN	Logistic Regression
Accuracy	86.118%	87.147%	84.576%	84.961%
Precision (7)	0.89	0.89	0.88	0.90
Precision (8)	0.60	0.67	0.53	0.53
Recall (7)	0.95	0.96	0.95	0.92
Recall (8)	0.38	0.39	0.31	0.48
F1-Score (7)	0.92	0.93	0.91	0.91
F1-Score (8)	0.47	0.49	0.39	0.50

4) Screen shots for your running interface.



