MEG-BASED CLASSIFICATION OF MILD COGNITIVE IMPAIRMENT IN A PASSIVE AUDIOVISUAL TASK

THAPAR INSTITUTE
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(Deemed to be University)

OBJECTIVES

• Characterize attentional impairments in MCI using MEG data

• Develop machine learning models to:

1) Distinguish between resting state and task state in healthy and MCI subjects

2) Detect anomalies indicative of MCI across various experimental conditions

IMPLEMENTATION

• Data: MEG recordings from 16 healthy and 5 MCI subjects

• Experimental conditions: eyes closed, eyes open, 1st click, 2nd click

• Preprocessing: Temporal filtering, demeaning, artifact correction

• Feature extraction: Power Spectral Density (PSD) and Event-Related Potentials (ERPs)

• Iterative Channel Selection for optimal subset identification

• Machine learning:

1) Binary classification: Random Forest Classifier

2) Anomaly detection: One-Class SVM
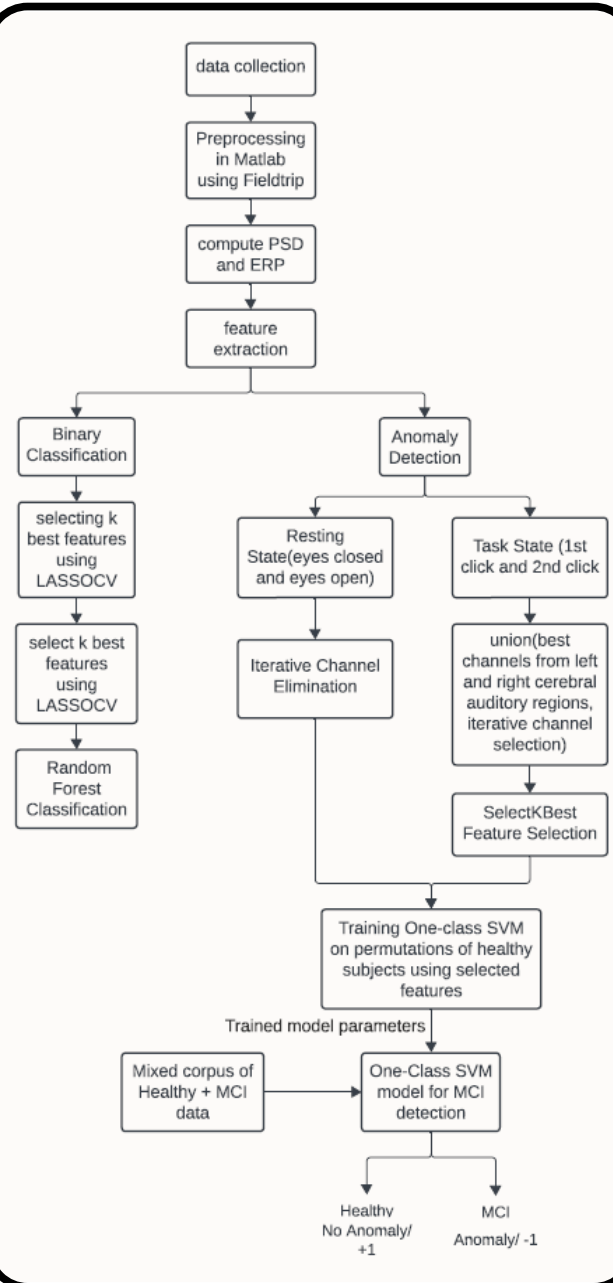
SKILLS LEARNT

• MNE and FieldTrip toolboxes

• Time Frequency Analyses of EEG data

• Anomaly Detection for imbalanced data using permutative Leave-One Out Cross Validation

• LASSOCV and GridSearchCV for feature selection

RESULTS

Binary Classification (resting vs. task states)	Accuracy
Healthy subjects	0.94 ± 0.07
MCI subjects	0.70 ± 0.24
Anomaly Detection (Healthy vs. MCI)	
Eyes Closed	0.52 ± 0.07
Eyes Open	0.81 ± 0.08
1st Click	0.75 ± 0.08
2nd Click	0.83 ± 0.08