

Brain Network Difference between Mild Cognitive Impairment and Alzheimer's Disease Dementia Using EEG

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Introduction

- Alzheimer's disease (AD) is the most common neurodegenerative disease.
- Early detection of the disease in mild cognitive impairment (MCI) or prodromal AD stage is important for effective treatment and the proper use of expected disease modifying therapies.
- Electroencephalography (EEG) is one of the general methods to explore brain activities.
- It is commonly used in the clinical environment and several studies proposed various EEG features as a biomarker for brain disorder.

Results

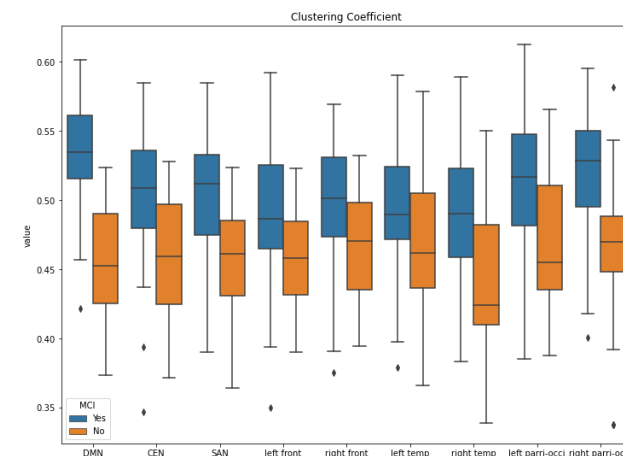
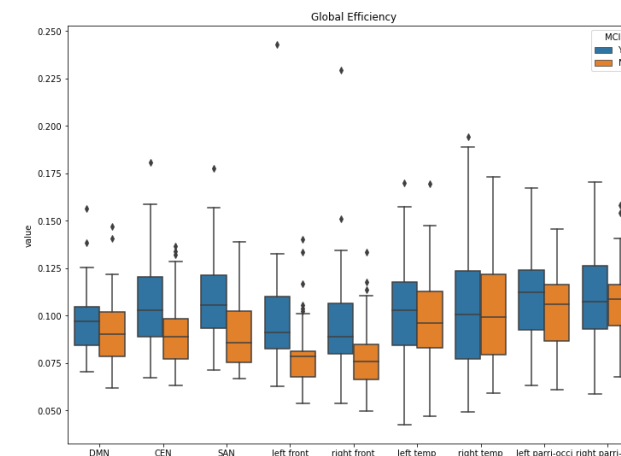
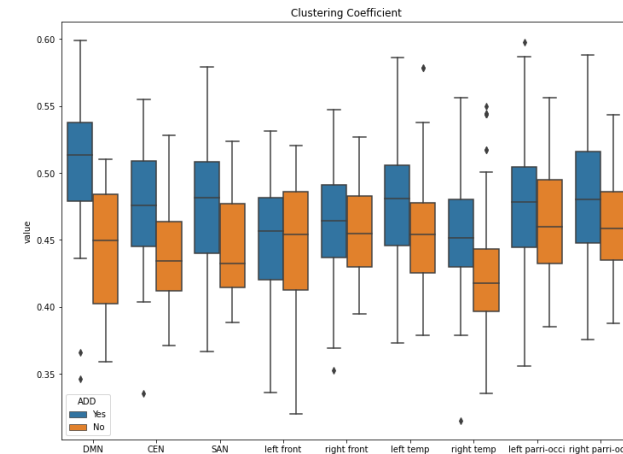
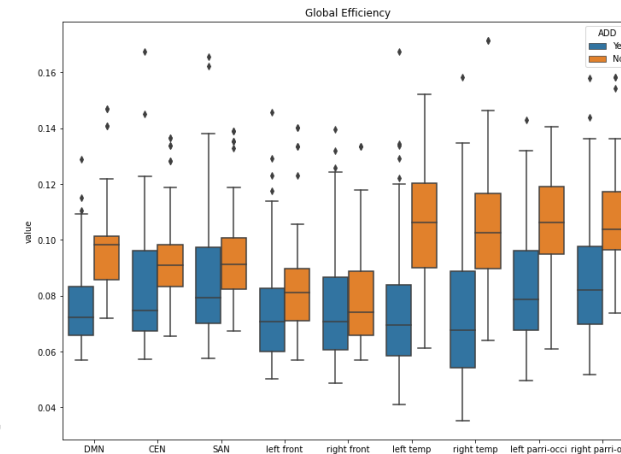
- Global efficiency of AD dementia group was lower than that of normal control group in all subregions.
- Clustering coefficient was higher in AD dementia group.
- Both features of MCI group were greater compared to the normal control group.
- Overall results of clustering coefficient were similar to that of AD dementia.
- Global efficiency of MCI group showed rather higher than normal control group.

Methods

- 66 AD dementia (72.3 ± 7.0 years) and 55 MCI (70.8 ± 5.0 years) subjects
- The same number of age and sex controlled normal subjects
- The functional connectivity calculated from the 68 ROIs which were converted from EEG of 19 channels
- Partially connected brain network using the top 25% functional connectivity values
- Three functional subregions: default mode network, central executive network, salience network
- Six regional subregions: left frontal, right frontal, left temporal, right temporal, left parietal-occipital, right parietal-occipital lobes
- Two network features: global efficiency and clustering coefficient

Conclusions

- In this study, we found different brain network change between normal control, patients with MCI and AD dementia.
- Noninvasive EEG biomarker would be used as a possible source for AD biomarkers for early detection of AD.



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References

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