Deep Learning of Human Brain Activations

Decoding brain functional connectivity implicated in Alzheimer’s Disease and Mild Cognitive Impairment

Student: Chan Yi Hao                     Supervisor: Professor Jagath C Rajapakse

- Neural networks have been used for brain state classifications.
- Most studies use a complete set of features (~30k) as input even though functional MRI datasets are often small (~1,000 scans) and using too many features will cause the model to overfit easily.
- Using neural network interpretability techniques such as DeepLIFT, we propose a methodology of recursively removing the least salient features.
- Arrived at models that achieved state-of-the-art results (86% - 92%) with higher accuracies than the original models.

The common distinctive salient brain regions were found to lie in the **uncus** and **medial temporal lobe** which closely correspond with previous studies.

**APPLICATIONS**

- This methodology can be applied to **neuroimaging data** across different imaging modalities and other neurological and neuropsychiatric disorders.
- Knowledge of such characteristic features of a brain state can help narrow down the focus of clinicians and design diagnostic systems with higher accuracy.