MENTAL DISORDER PREDICTION

Post-traumatic stress disorder (PTSD) is a disorder that develops in some people who have experienced a shocking, scary, or dangerous event (<https://www.nimh.nih.gov>). Post-concussive syndrome (PCS) describes the constellation of symptoms that commonly occur after mild traumatic brain injury (TBI), and patients who suffer more than one brain injury are at increased risk (https://www.ncbi.nlm.nih.gov). It is highly common in individuals who had a traumatic brain injury, especially combat veterans. Such subjects tend to show overlapping symptoms of both PCS and PTSD.

In this project, we are going to use a dataset that contains signals between two brain regions that are obtained from brain images (scanned in Auburn University – MRI Center). Eighty-seven active-duty male US Army soldiers were recruited for this study from Fort Benning, GA, and Fort Rucker, AL, USA. Among the participants, 28 were combat controllers, 17 were diagnosed with PTSD alone, and 42 were diagnosed with both PCS and PTSD. All groups were matched for age, race, education, and deployment history.

The goal of the project is to use classification techniques to automatize the detection of these mental health problems using brain signals. Since this is a high-dimensional setting, we also would like to account for the feature importance and would like to extract the brain regions/lobes associated with it.

The model can be helpful for the medical doctors to detect the patient by looking at their MRI images. This could also lead to medical studies on generalization to general clinical population.

We will use ‘accuracy’, ‘sensitivity’ and ‘specificity’ as our performance metrics. Others could be feature importance measurements such as ‘Gini index’.