

Harmful Brain Activity Classification

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October 7, 2024

- This dataset contains electroencephalography (EEG) signals from hospital patients, collected by Harvard Medical School. It was originally part of a Kaggle competition that ended on April 8, 2024.
- The goal of analyzing this dataset is to detect six patterns of harmful brain activity, including seizure (SZ), generalized periodic discharges (GPD), lateralized periodic discharges (LPD), lateralized rhythmic delta activity (LRDA), and generalized rhythmic delta activity (GRDA).

- Detect and classify harmful brain activities from EEG signals.
- Potential to improve neurocritical care.
- Key target: Seizures and other harmful brain activities.

Automating Brain Activity Analysis

- Seizures (SZ)
- Generalized Periodic Discharges (GPD)
- Lateralized Periodic Discharges (LPD)
- Lateralized Rhythmic Delta Activity (LRDA)
- Generalized Rhythmic Delta Activity (GRDA)
- Other types of harmful brain activities

- EEG Time Series Data: 50-second windows of EEG data sampled at 200 Hz, with signals from 19 electrodes.
- Spectrogram Data: Frequency content from longer EEG windows, aiding in understanding rhythmic brain activity.

- Relative Band Powers
- Spectral Edge Frequency
- Hjorth Parameters (Mobility and Complexity)
- Statistical Measures: Mean, Standard Deviation, Skewness, Kurtosis.

- Filter EEG signals: Remove noise outside 0.5–40 Hz range.
- Extract the middle 10 seconds of EEG data.
- Feature extraction from filtered signals and spectrograms.

- Automating EEG analysis will help reduce manual workload.
- Quick and accurate detection of brain damage can save lives.
- Significant impact on epilepsy treatment, neurocritical care, and drug development.

- The dataset offers rich information for detecting harmful brain activity.
- Encourages further exploration of EEG and spectrogram data to improve classification models.