Harmful Brain Activity Classification

Classify seizures and other patterns of harmful brain activity in critically ill patients

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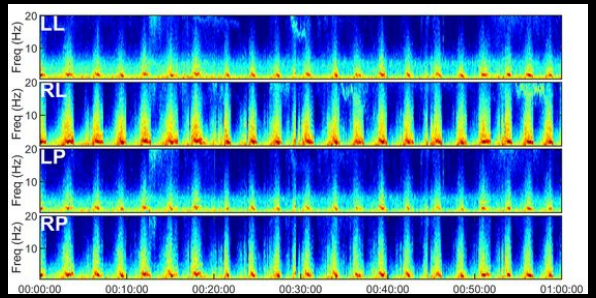
Dataset

https://www.kaggle.com/competitions/hms-harmful-brain-activity-classification/overview



Critical Care EEG Monitoring Research Consortium

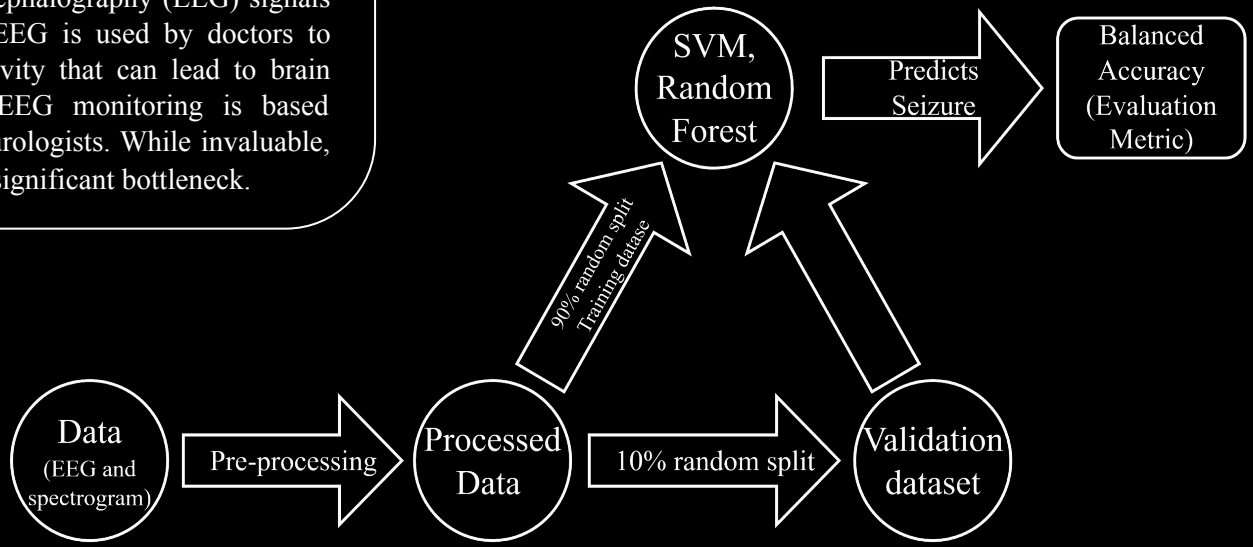
Relevant papers

1. Jin Jing, Zhen Lin, Chaoqi Yang, Ashley Chow, Sohier Dane, Jimeng Sun, M. Brandon Westover. (2024). HMS - Harmful Brain Activity Classification . Kaggle. https://kaggle.com/competitions/hms-harmful-brain-activity-classification.
2. Hirsch, L. J., Fong, M. W. K.(2021). American Clinical Neurophysiology Society's Standardized Critical Care EEG Terminology: 2021 Version. Journal of clinical neurophysiology : official publication of the American Electroencephalographic Society, 38(1), 1–29. https://doi.org/10.1097/WNP.0000000000000806
3. Shoeibi, A., Khodatars, M.,(2021). Epileptic Seizures Detection Using Deep Learning Techniques: A Review. International journal of environmental research and public health, 18(11), 5780. https://doi.org/10.3390/ijerph18115780.
4. Farooq MS, Zulfiqar A, Riaz S. Epileptic Seizure Detection Using Machine Learning: Taxonomy, Opportunities, and Challenges. Diagnostics. 2023; 13(6):1058. https://doi.org/10.3390/diagnostics13061058.

Background Idea

Our goal is to detect and classify seizures and other types of harmful brain activity by using a model trained on electroencephalography (EEG) signals recorded from critically ill hospital patients. EEG is used by doctors to identify seizures and other types of brain activity that can lead to brain damage in severely ill patients. Currently, EEG monitoring is based primarily on manual analysis by specialised neurologists. While invaluable, this time-consuming and expensive process is a significant bottleneck.

Workflow



What to do by Midway

1. Literature review.
2. Data pre-processing.
3. Implement classic machine learning (SVM and Random forest) algorithms to achieve the best results.

Post midway work

If our primary goals are completed, we will move forward to

1. Learn more about deep learning.
2. Implementation of deep learning model.

Work division

1. Rahul: Data pre-processing.
2. Rabmit: Implementation of different machine learning algorithms.
3. Both: Literature review, Presentation and Report.

Expected results

To detect and classify seizures and other types of harmful brain activity.