Application of a Machine Learning Logistic Regression Algorithm in a Classification Model to Predict Epileptic Seizures

Liu, Christine

The objective of this study is to test electroencephalogram (EEG) segments to determine if a logistic regression classification algorithm can predict epileptic seizures based on the variance of electrodes of preictal and interictal data. The use of a logistic regression model for distinguishing preictal versus interictal EEG seizure data provides an accurate model. Logistic regression arranges the data based on its parameters theta, and tries to find a model that best represents the data. This model used the variance of the 15 electrodes to predict epileptic seizures. The classification algorithm was trained and then tested using leave-one-out cross-validation with 68 ten minute preictal and interictal data segments. This model is able to correctly identify interictal and preictal data segments with a 76.5% accuracy rate and 100% sensitivity. In a clinical context, this model would ideally be able to successfully predict 100% of epileptic seizures with approximately 3 out of 10 false positives. In summary, this project provides a more accurate logistic regression classification model that is able to use the variance in electrodes to accurately predict epileptic seizures 10 minutes before they occur.

Awards Won:

Second Award of $2,000