A Rapid Prediction Method for Epileptic Seizures Using Machine Learning Algorithms

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Epilepsy affects over 3.4 million people in the United States alone. Approximately 200,000 new cases of epilepsy are diagnosed each year. The purpose of this project was to detect seizures at least 2 minutes prior to their occurrence through preictal, ictal, and interictal brainwave differentiation. The aim of this project was to use machine learning algorithms to develop a system that can detect the probability that a seizure will occur with higher than 90% accuracy. Feature extraction and classification methods were used to differentiate preictal, ictal, and interictal waves. Then, these features were used to program a type of machine learning algorithm called an artificial neural network that can predict seizure onset. These steps resulted in an algorithm that can detect a seizure with 97% accuracy. The system was able to analyze the EEG brain waves and use this to detect seizure onset. An artificial neural network will be able to provide the warning of seizure onset in order to give epileptic patients time to reach a safe environment. Overall, this multi-step analysis system can help epileptic patients suffering from seizures and decrease the chance on injury or death from a seizure.

Awards Won:

Fourth Award of $500

American Statistical Association: Third Award of $500

Drexel University: Full tuition scholarship $250,000

American Psychological Association: Third Award of $500