

-CAPSTONE 2 PROJECT PROPOSAL-

PATTERNS AND RELATIONSHIPS IN EEG READOUT DATA AND PREDICTING FUTURE EPILEPTIC EPISODES FOR ONSET EPILEPSY DISORDERS

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Problem Statement:

Epilepsy is a neurological disorder characterized by recurrent, unprovoked seizures, affecting millions of people worldwide. Early and accurate prediction of impending seizures is crucial for timely intervention and improved patient outcomes. This project aims to develop a predictive model utilizing EEG data to identify patterns associated with seizure events.

Context:

Epilepsy is one of many neurological disorders that affects millions worldwide, with no apparent cure and in many cases no explanation for how a seizure or pattern of seizures in an individual has occurred. While advancements are continually being made in the mental health industry to curb or slow down the abnormal neural activity, there is still a shroud of mystery that surrounds this disorder.

Criteria for Success:

This project will be deemed 'successful' if the following criteria are met:

- Patternization is achieved based on EEG Data acquired, and insights can clearly be derived.
- Predictive analysis obtained using insights, with clear results.

Scope of Solution Space:

I will focus extensively on EEG Readouts and the data contained therein, using this as my key identifier for the project and what I base my relationships on for the project.

- How are the readouts related?
- Are different areas of the brain associated with certain levels of EEG data?
- Other data vs EEG data comparison for insight

Constraints within the Solution Space:

I have located a fair amount of data for this project so far, so one would think that would be a positive. However the sheer amount of this data and combining it and joining it could be an issue as well as time consuming considering the scope of this project. Pruning/excluding some of the datasets may prove to be conducive for this particular project.

Secondly I am constrained and limited to public datasets and ones easily acquired through Kaggle and a few other web spaces. Nothing wrong with this, however I feel it may limit my capability and potential for creative insights as some of the better datasets are unavailable at this time.

Key Stakeholders:

Normally, though highly dependent on where this would be submitted-> Director of Neuroscience for Hospital and others interested, Direct Manager, Data Science Team potentially collaborating on with.

Data Sources:

Epilepsy prediction (Kaggle) -

<https://www.kaggle.com/datasets/gokulramesh/epilepsy-prediction>

EEG for Age Prediction (Kaggle) -

<https://www.kaggle.com/datasets/ayurgo/data-eeeg-age-v1/code>

EEG Motor Movement/Imagery Dataset (PhysioNet) -

<https://physionet.org/content/eegmmidb/1.0.0/>

Epileptic Seizure Recognition (UCI ML Repository) -

<https://archive.ics.uci.edu/dataset/388/epileptic+seizure+recognition>