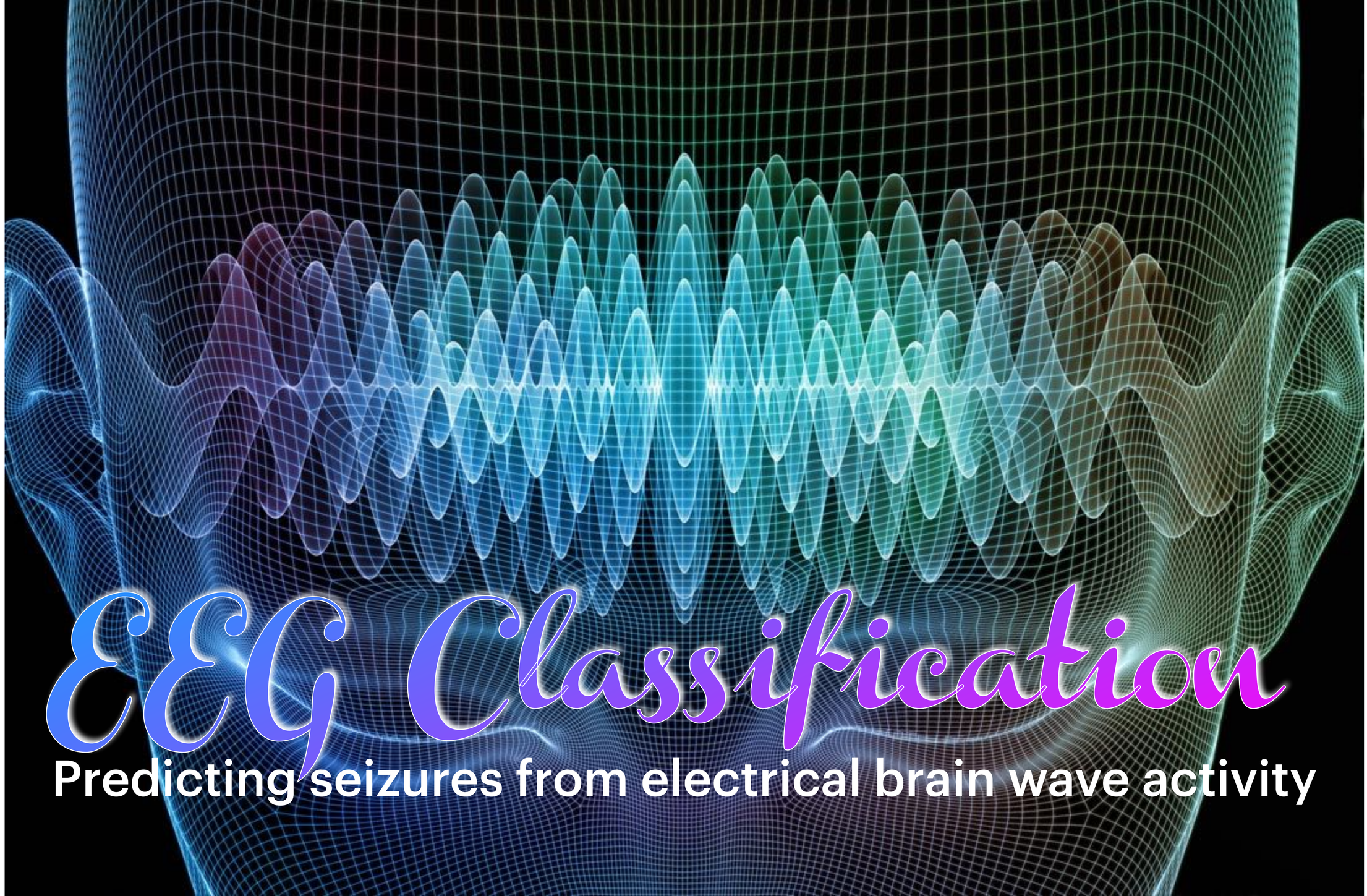
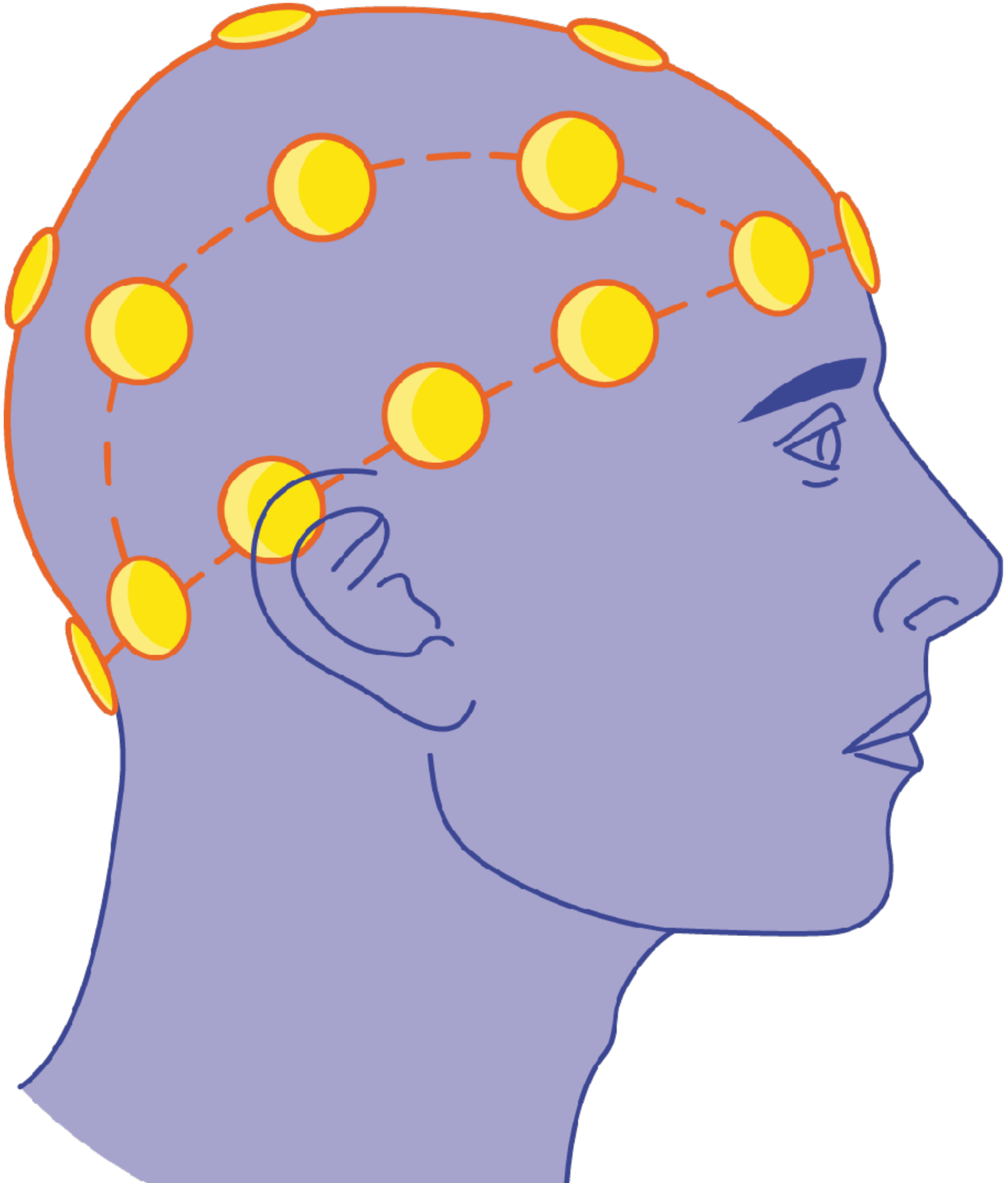

EEG Classification
Predicting seizures from electrical brain wave activity

Epileptic Seizure

sudden change in behavior due to a change in the electrical functioning of the brain

https://www.aans.org/en/Patients/Neurosurgical-Conditions-and-Treatments/Epilepsy



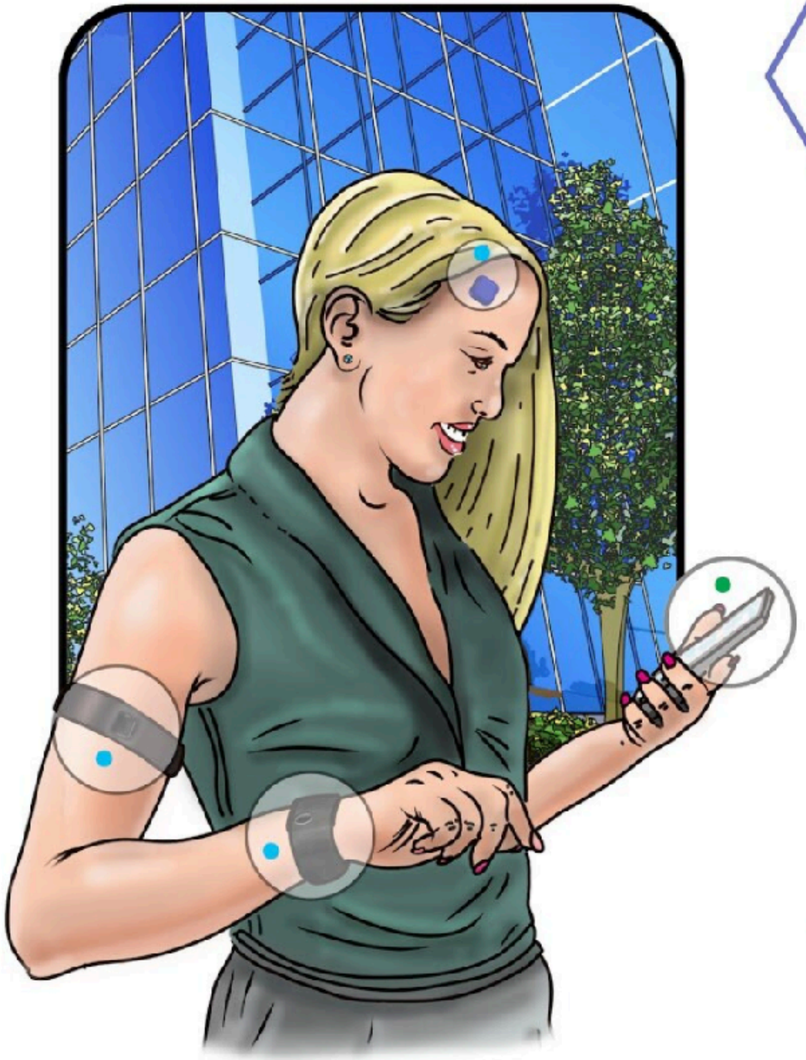
EEG

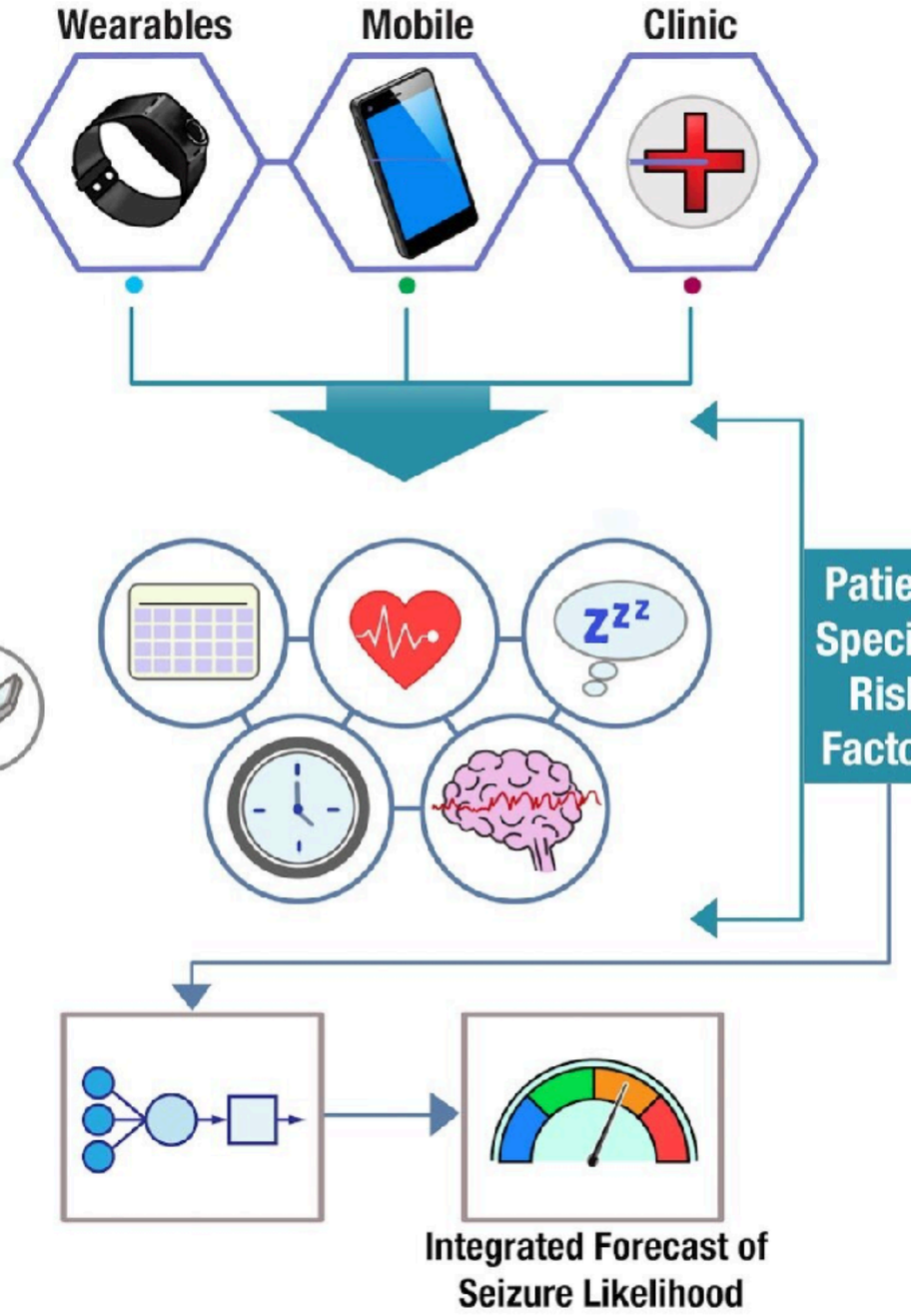
Data that is collected using non-invasive electrode placement on the scalp

https://www.aans.org/en/Patients/Neurosurgical-Conditions-and-Treatments/Epilepsy

Wearable Technology

- life enhancing
- live saving





https://www.kaggle.com/c/seizure-prediction/overview

Methodology

Raw EEG Data

- 8,002 recordings
- Kaggle

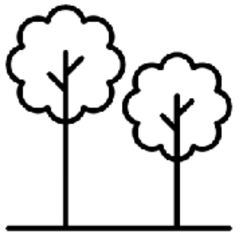
Collect Data

Python

- Feature Engineering

Preprocess

Extra Trees



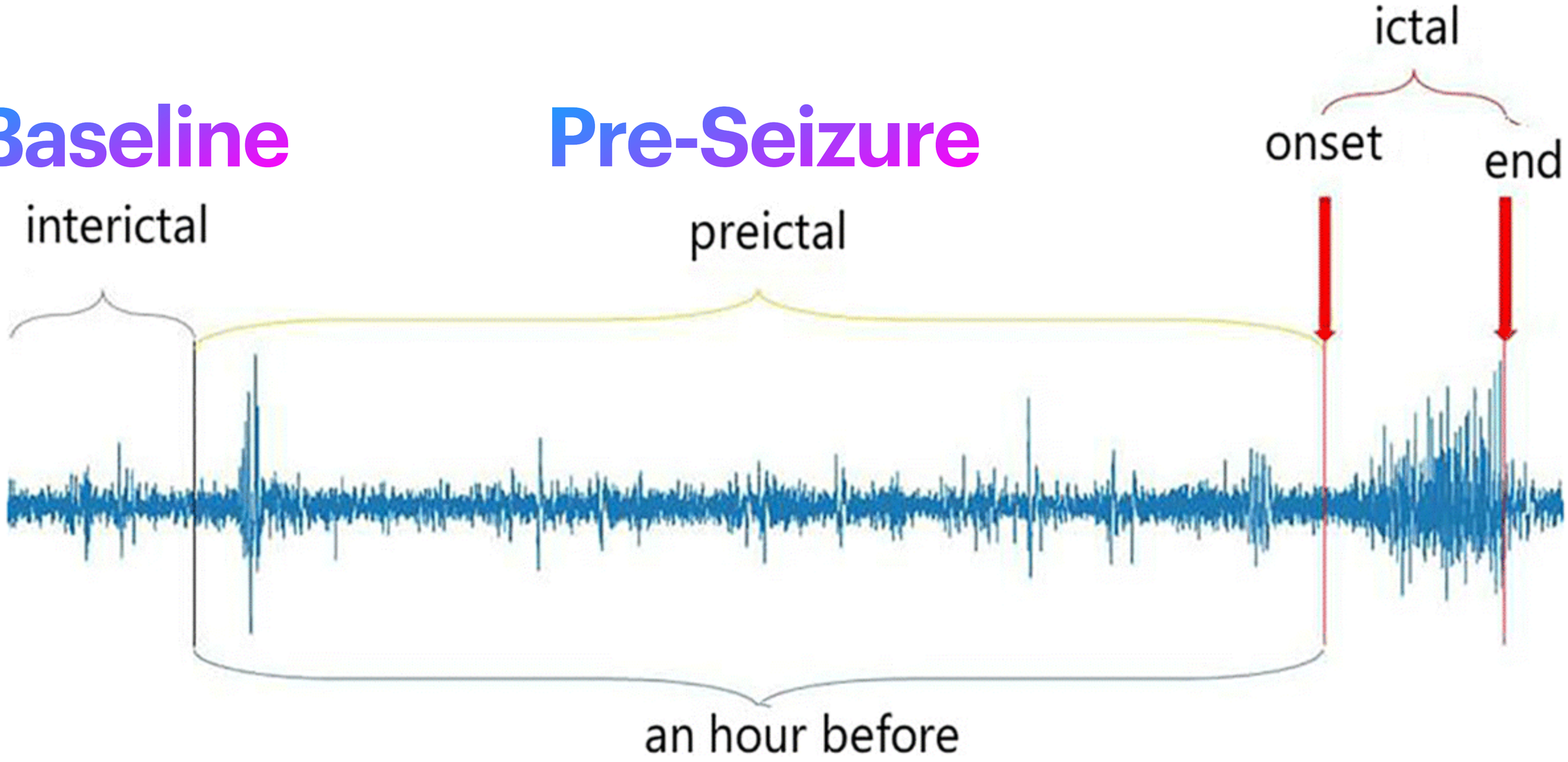
- Five - Fold Cross Validation

Model

Classification

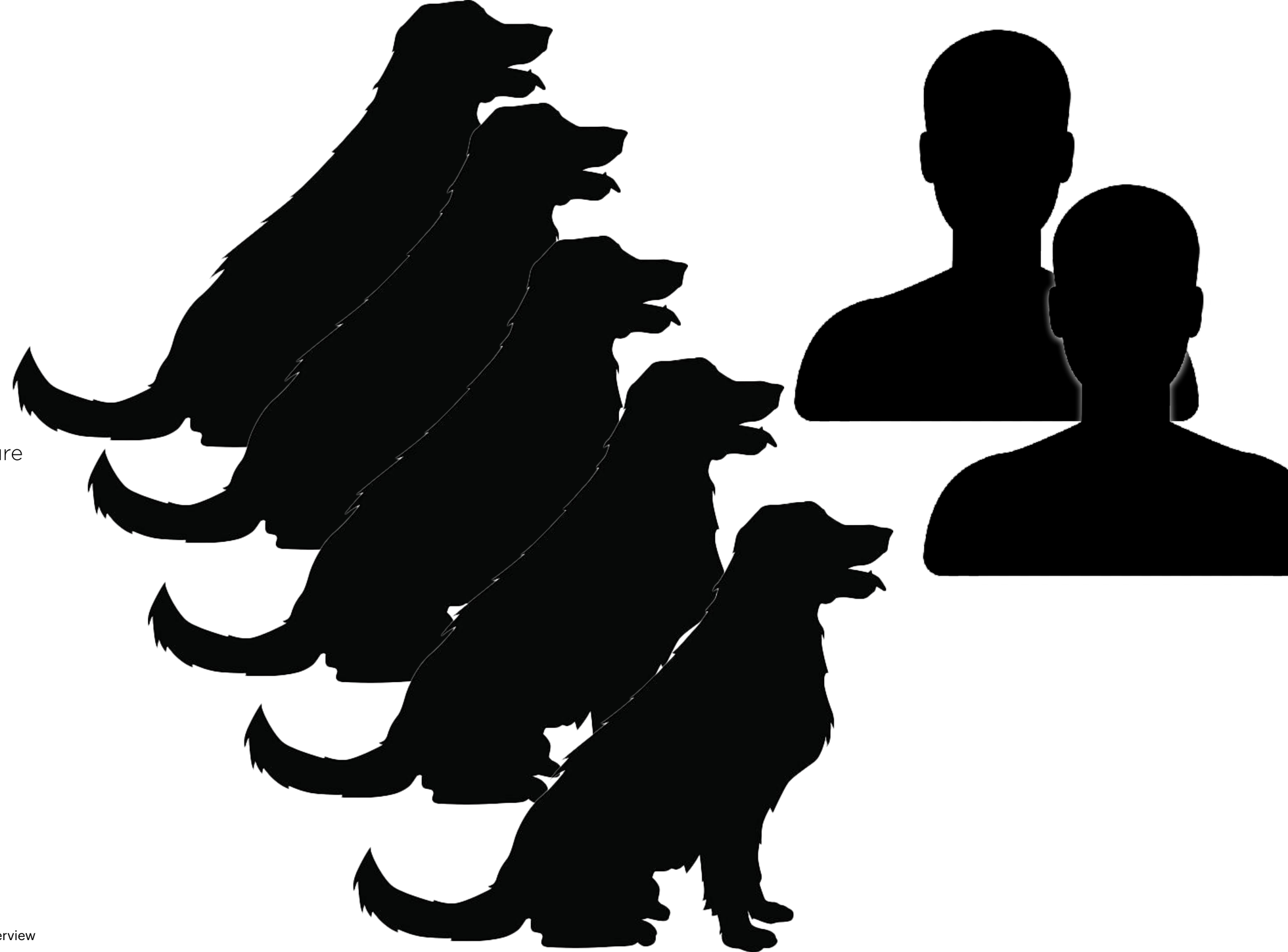
Baseline

Pre-Seizure



Data

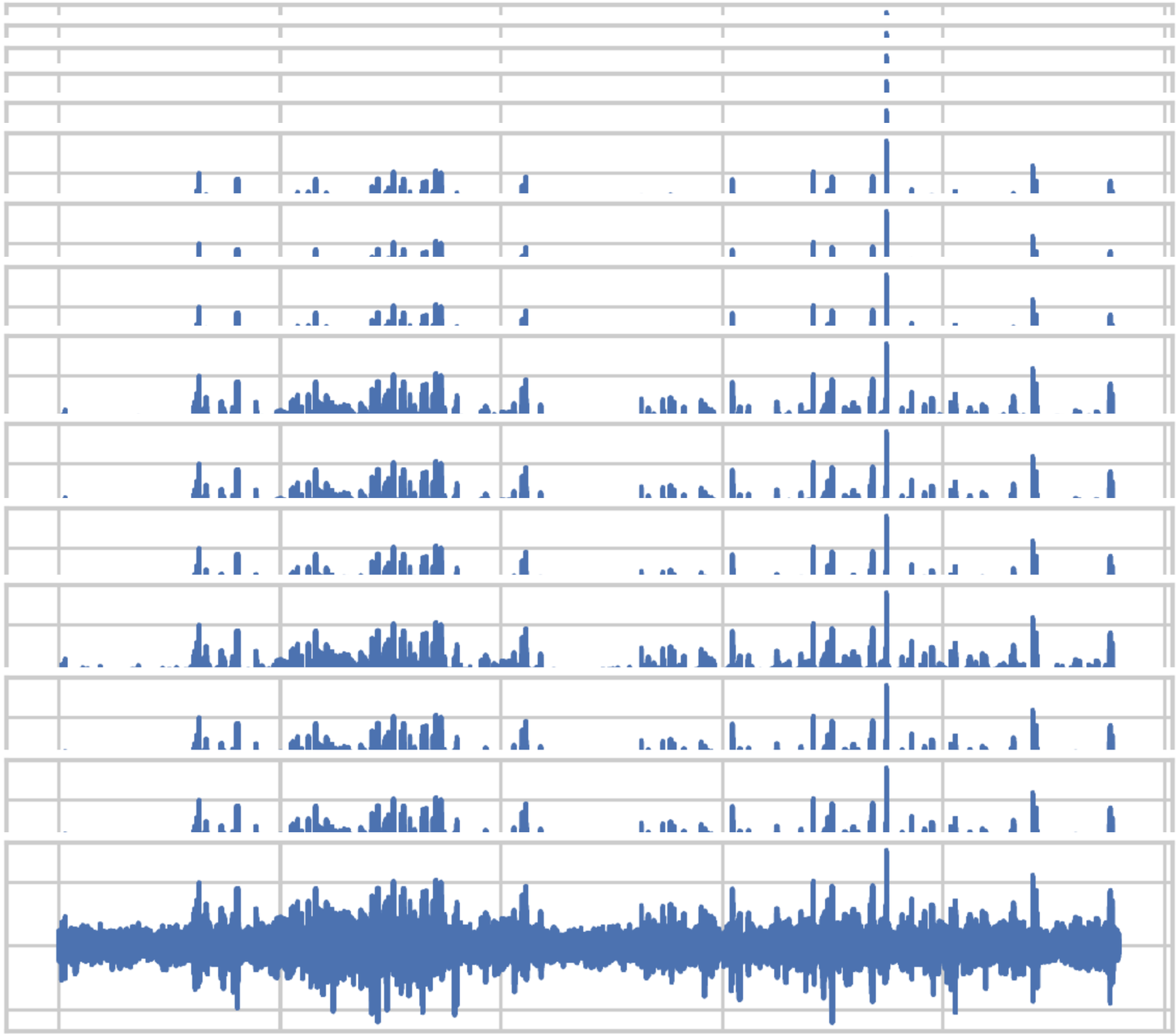
American Epilepsy Society Seizure Prediction Challenge



https://www.kaggle.com/c/seizure-prediction/overview

Data

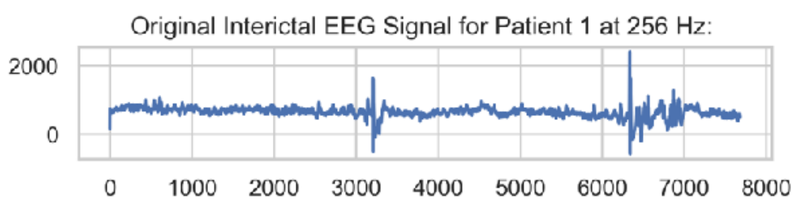
15 - 24 Electrodes per 10 minute recording

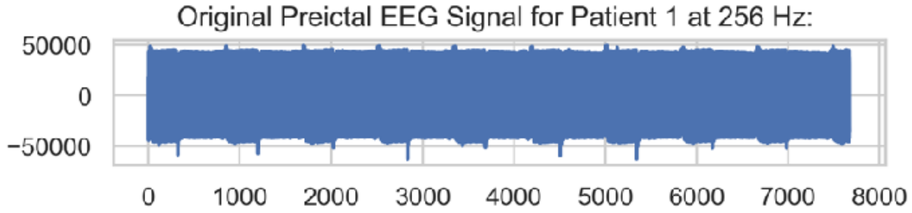


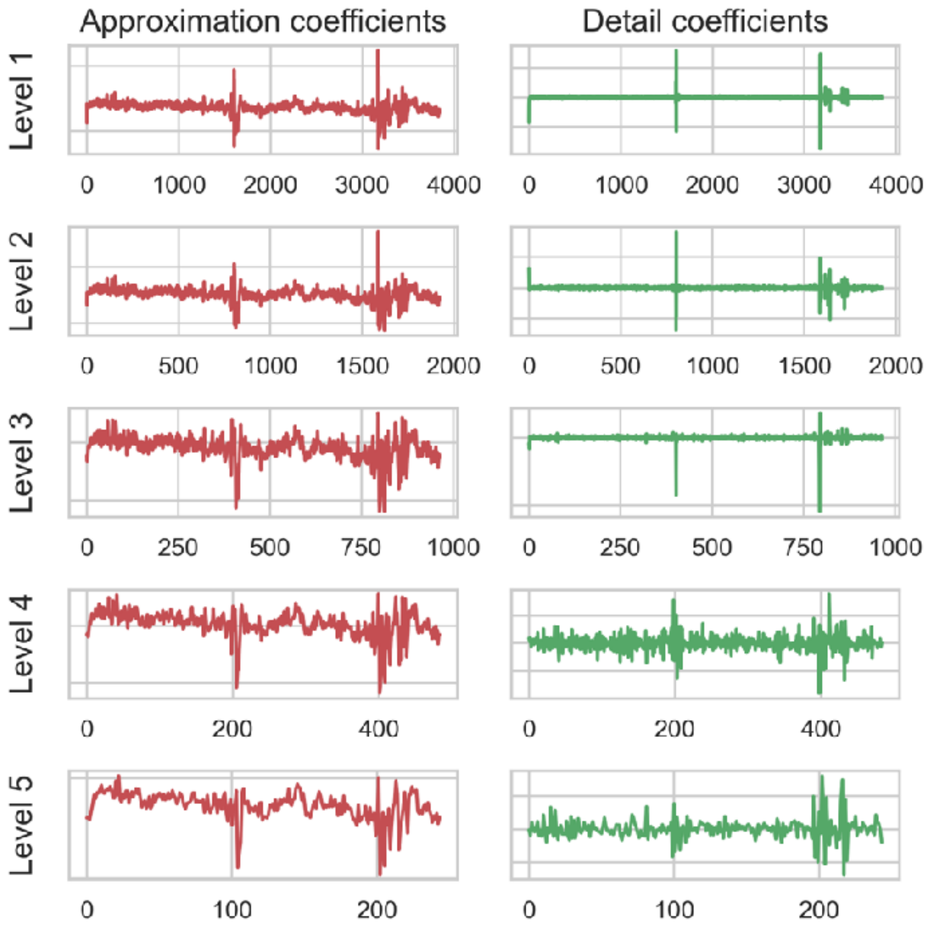
https://www.kaggle.com/c/seizure-prediction/overview

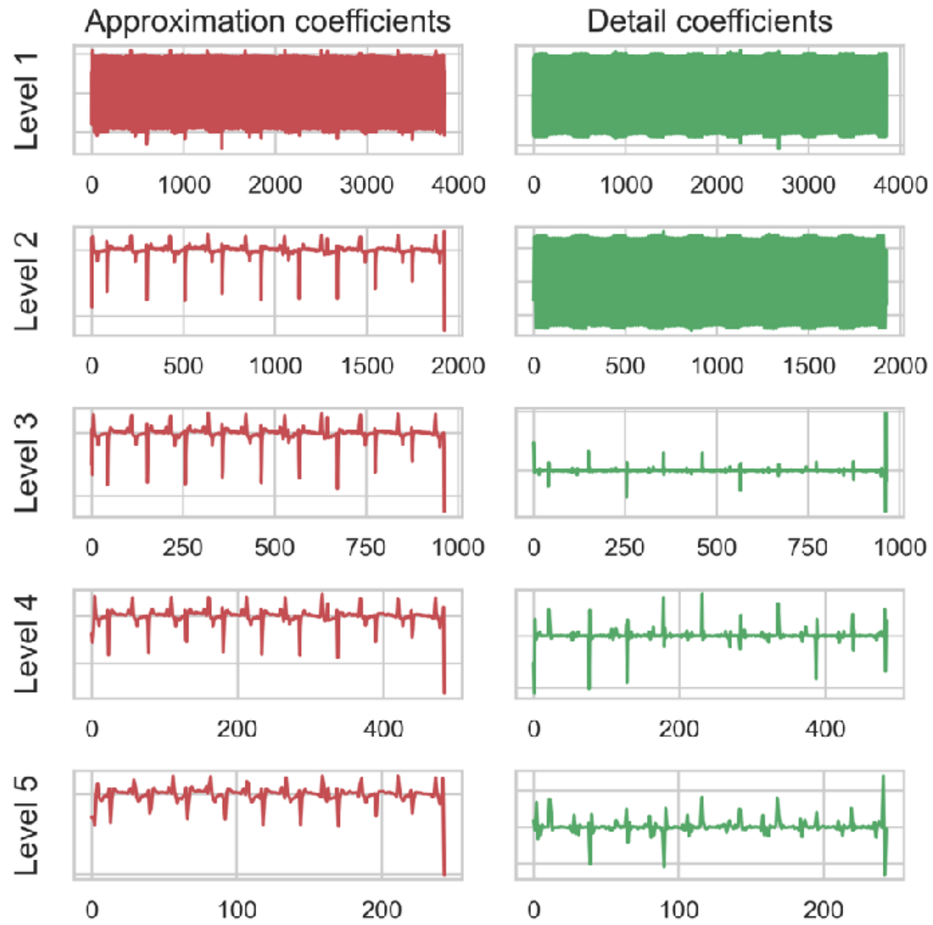
Data

Discrete Wavelet Transformation





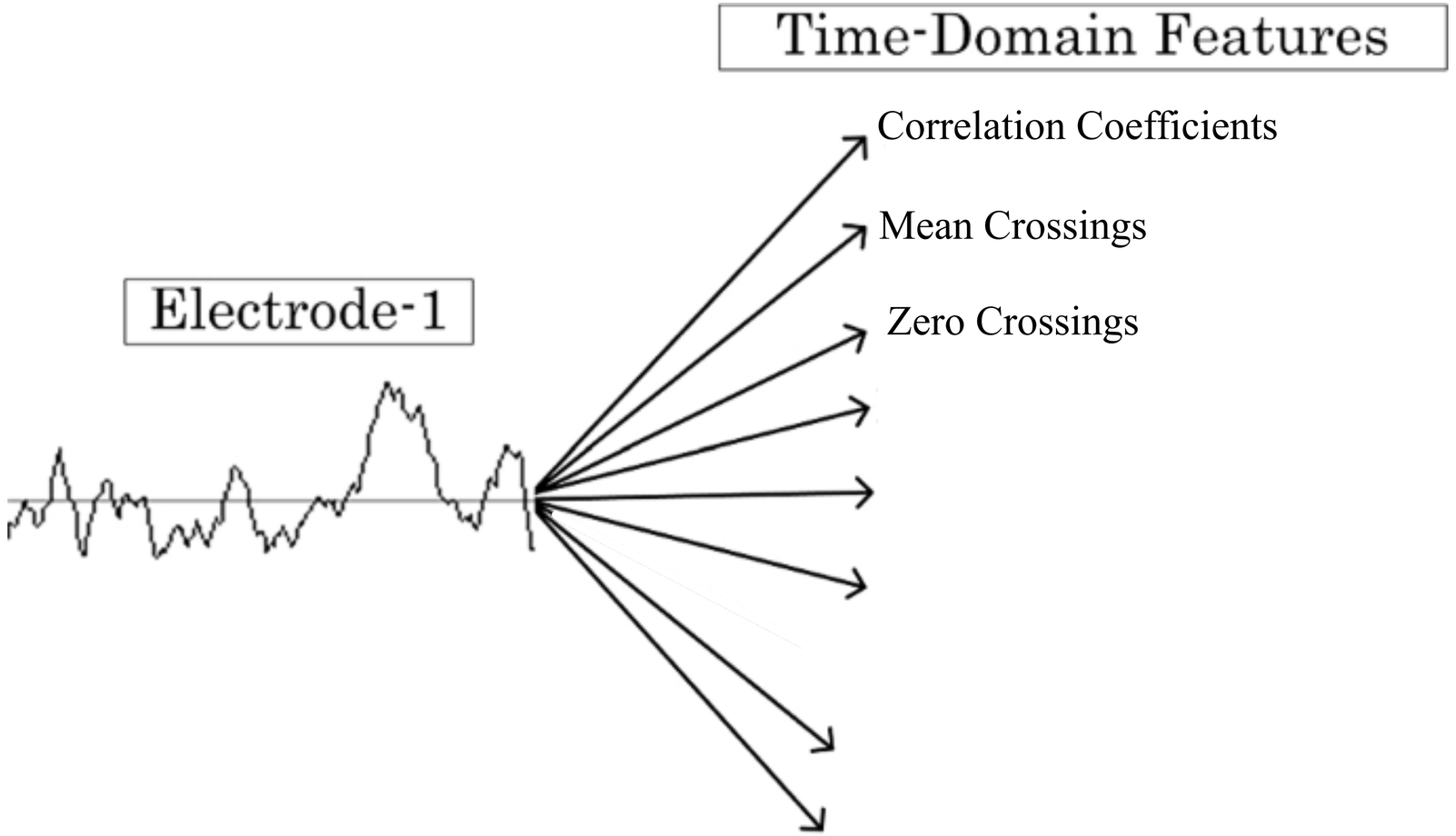




https://www.kaggle.com/c/seizure-prediction/overview

Data

Statistical Analysis

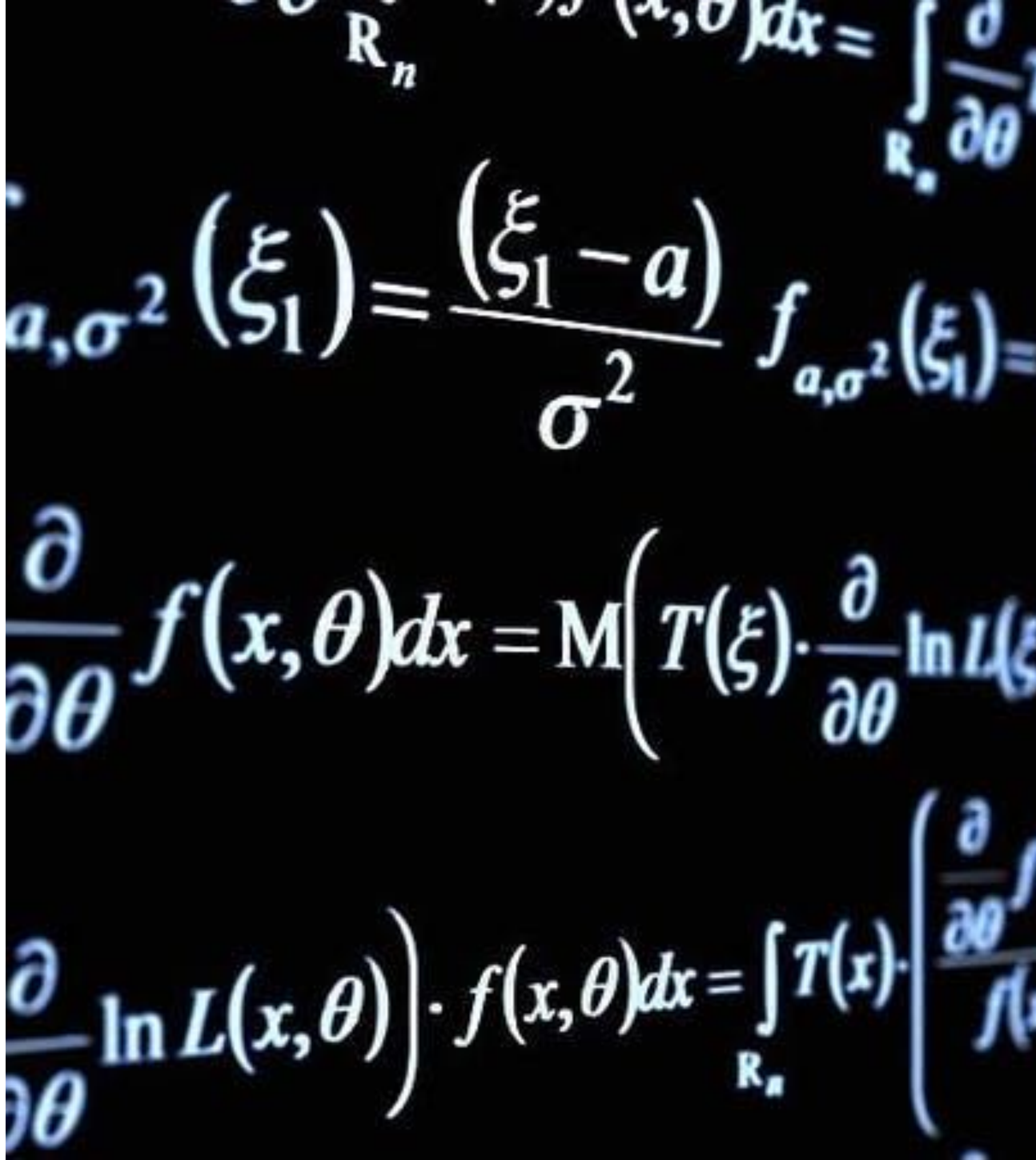


https://www.kaggle.com/c/seizure-prediction/overview

Model

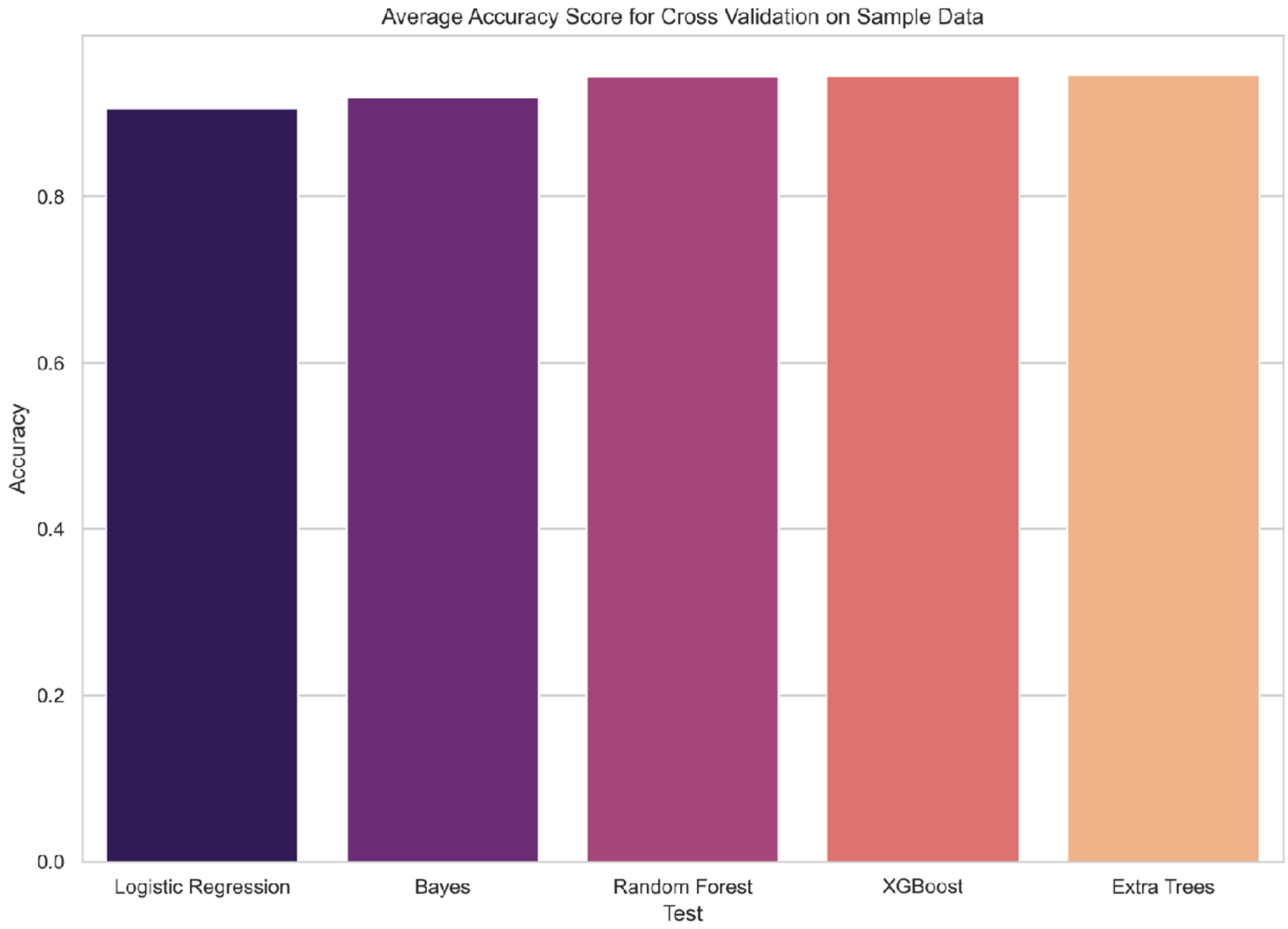
Feature Engineering

- 10 minute recording
  - 15 single electrode readings
    - 5 levels of decomposition
      - 7 statistical features
        - 15 correlation coefficients
  - 855 Features



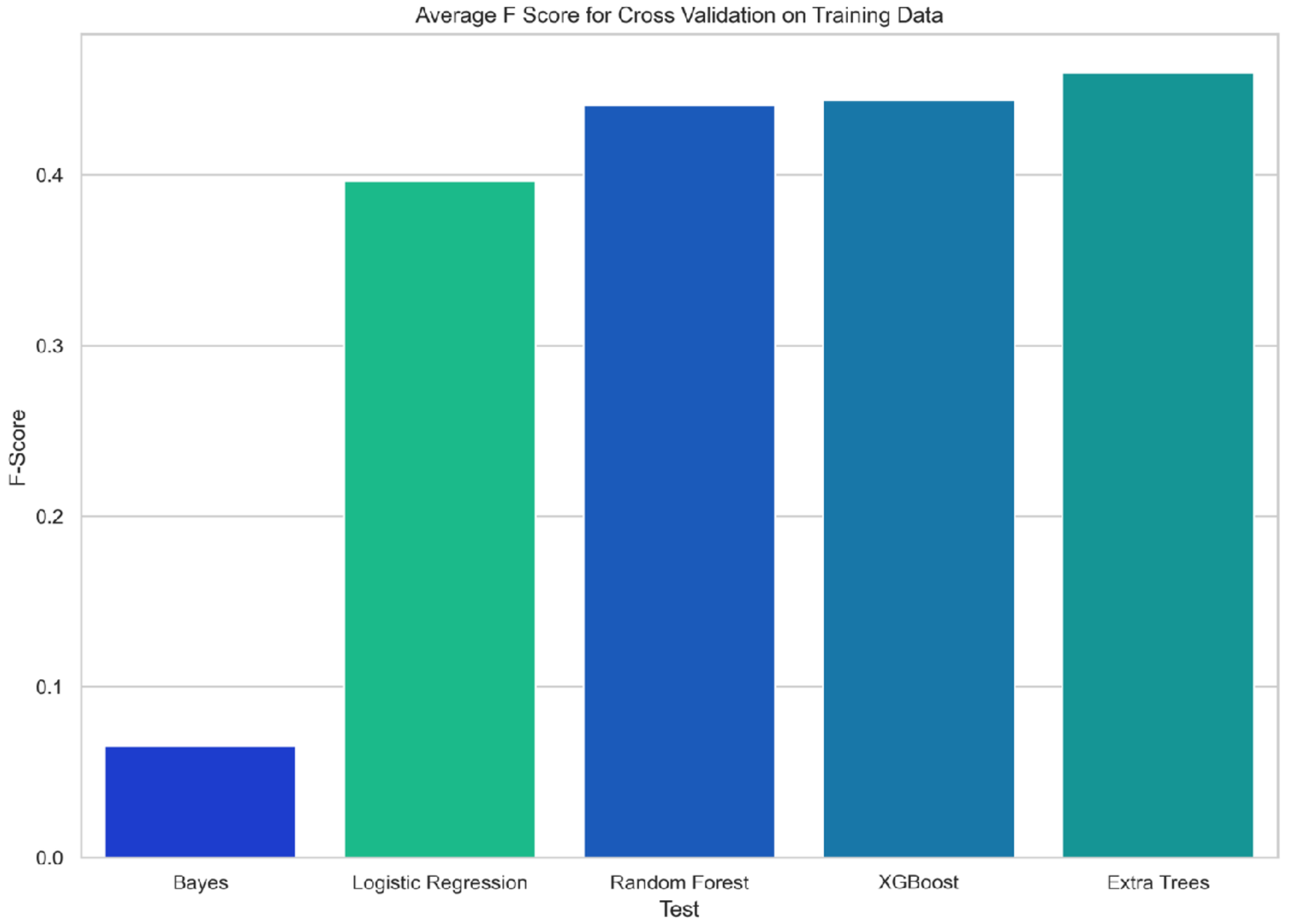
Accuracy Score

Same Metric used in Kaggle Competition



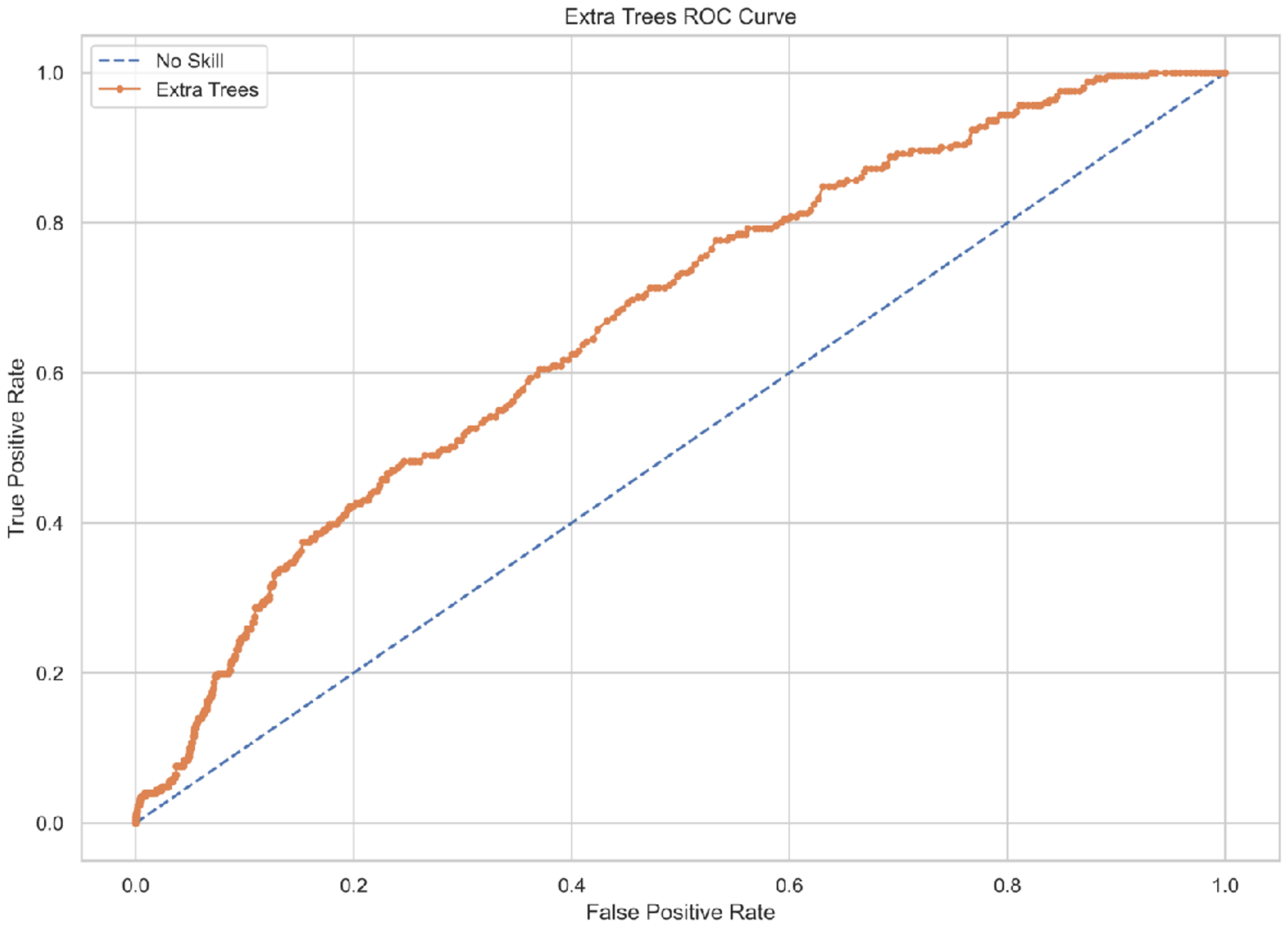
F- Score

Important for identifying interictal EEG signals



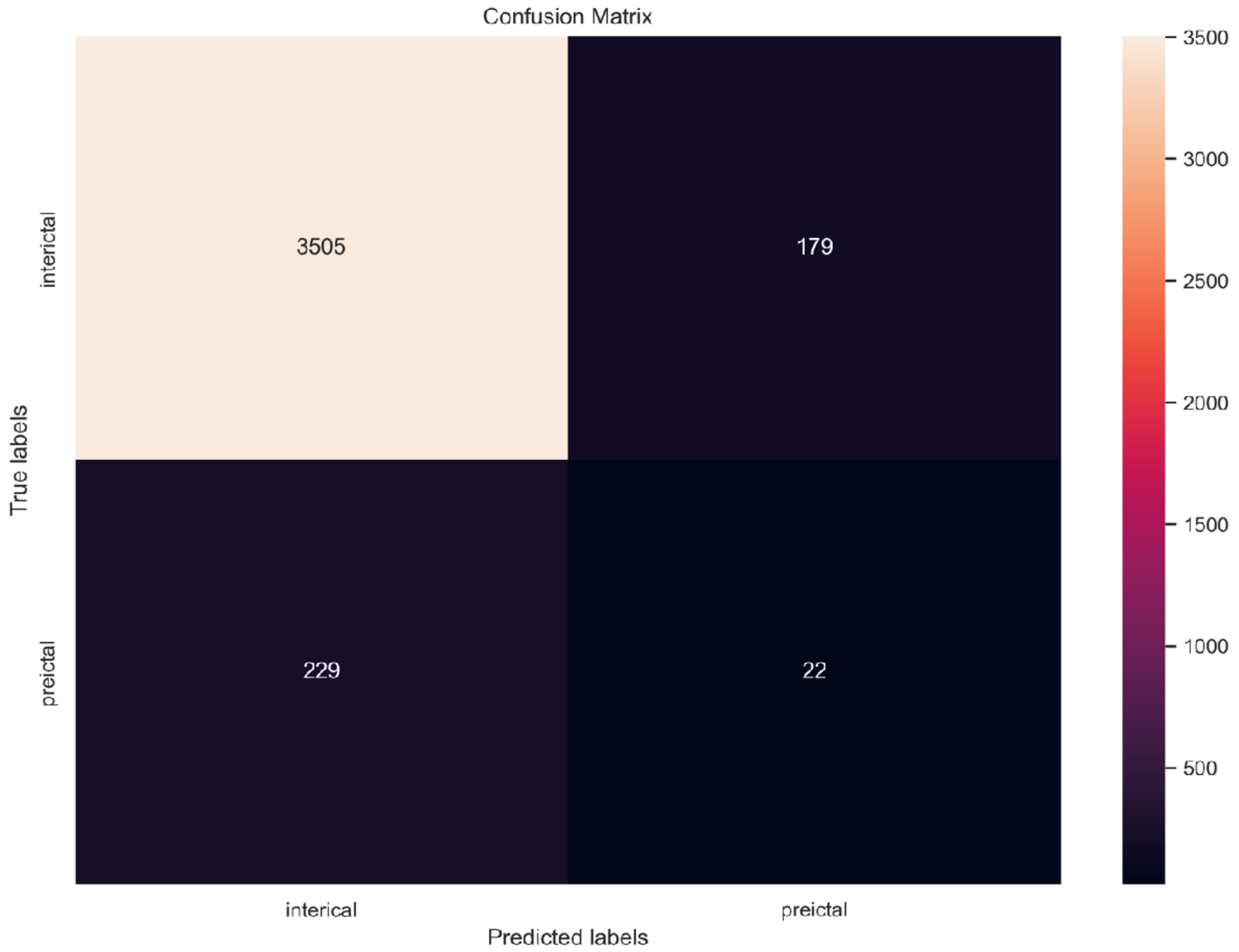
Competition Test

Accuracy Score: 89.6%
F Score: 9.7%



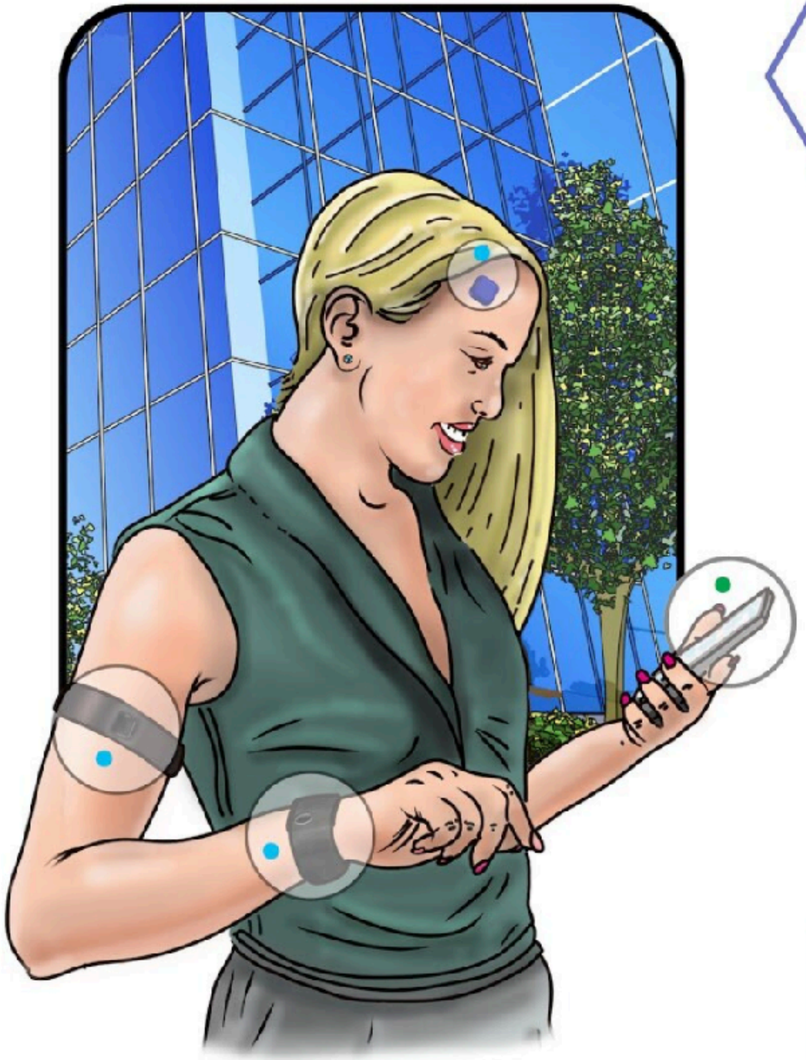
Competition Data

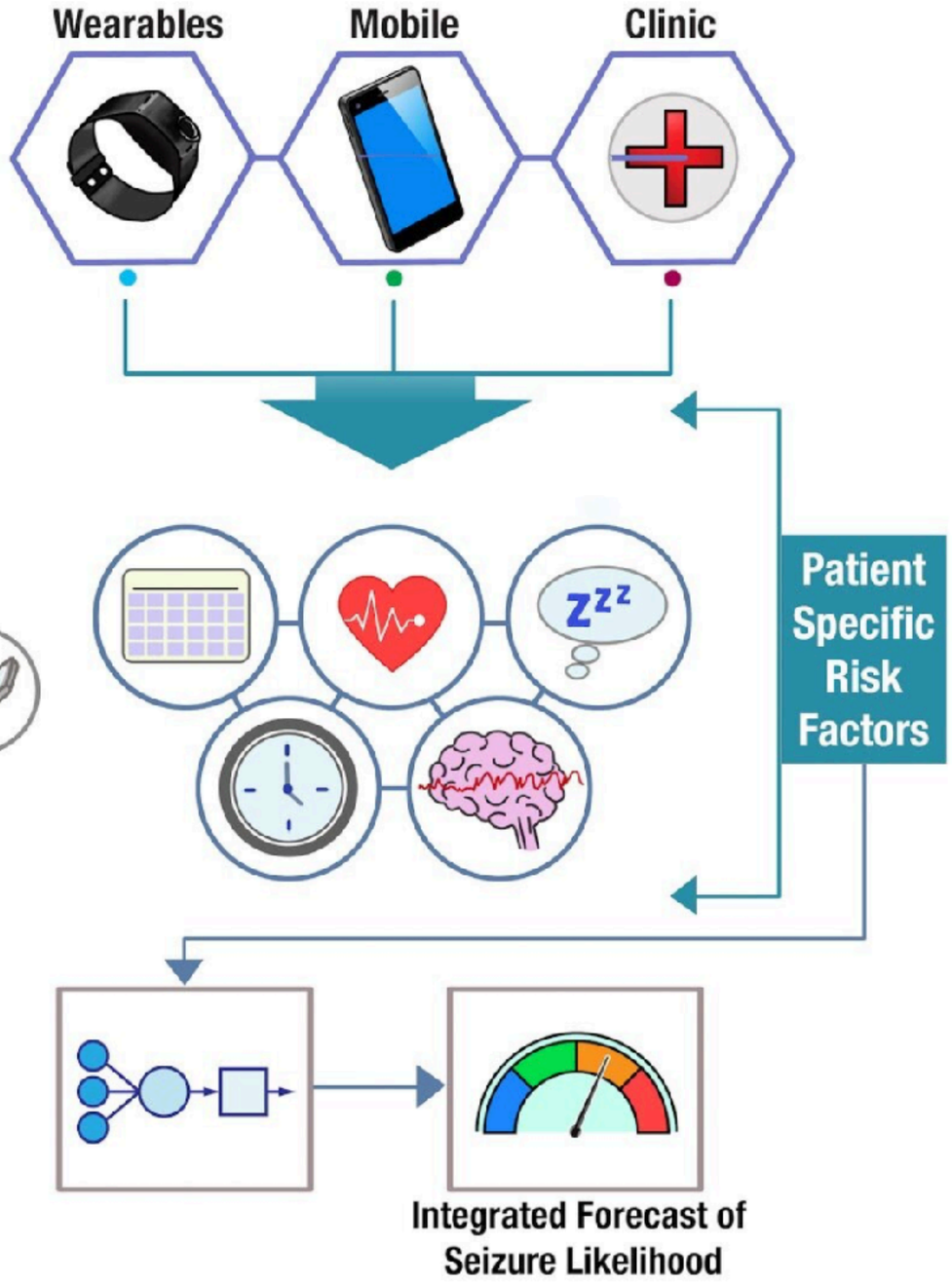
Baseline Prediction: 95.14%
Pre-Seizure Prediction: 8.7%



Next Steps

- Address Class Imbalance
- Refine features
- Focus Patient Specific Algorithms






EEG Classification
Any Questions?