Detecting and Predicting Seizure Onset

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Project length: 4 weeks
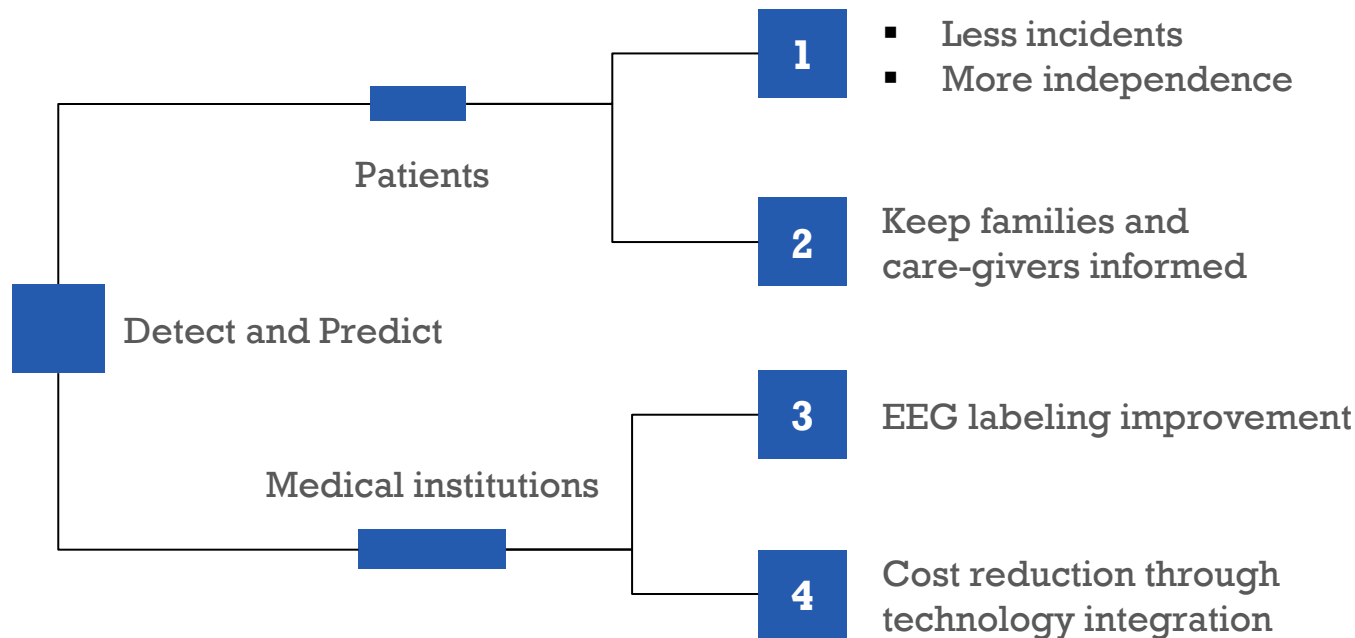
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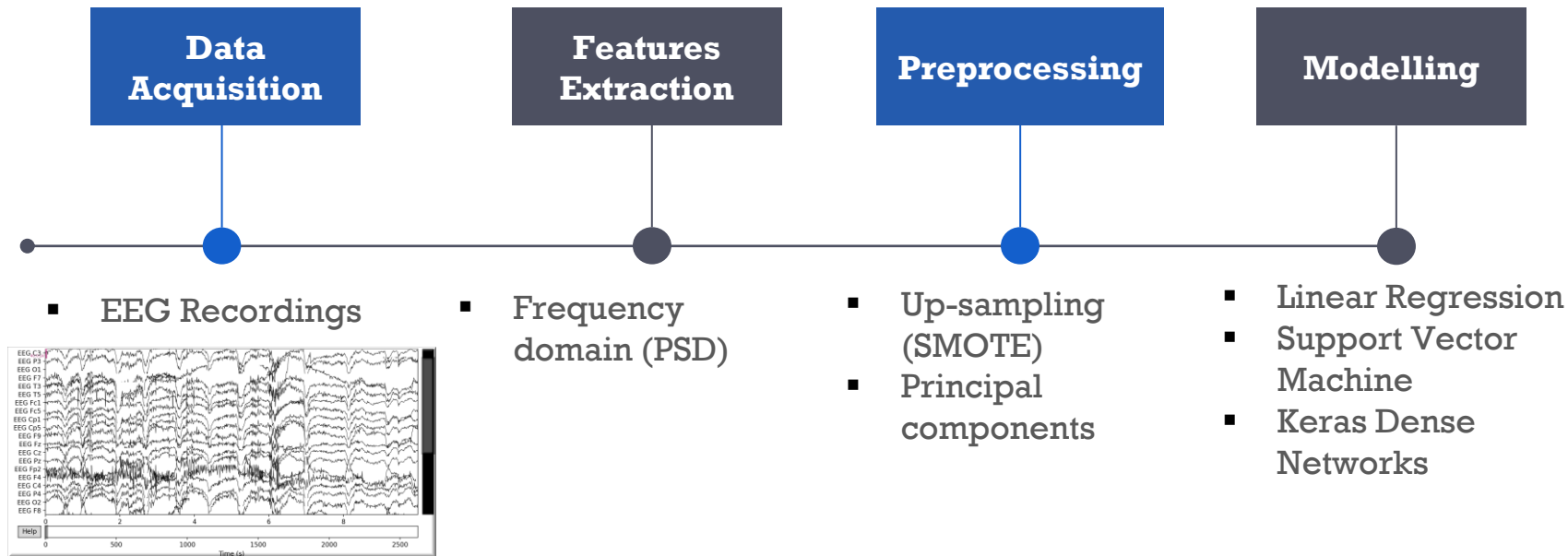
Why Detect and Predict Seizures?

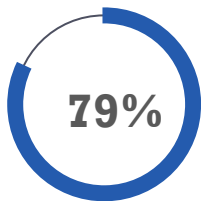**Detect and Predict**

Patients

1 ▪ Less incidents
▪ More independence

2 Keep families and care-givers informed

Medical institutions

3 EEG labeling improvement

4 Cost reduction through technology integration

EEG: *Electroencephalogram, AKA brain activity recordings*

Solution Process

Data Acquisition

Features Extraction

Preprocessing

Modelling

- EEG Recordings

- Frequency domain (PSD)

- Up-sampling (SMOTE)
- Principal components

- Linear Regression
- Support Vector Machine
- Keras Dense Networks

Results – Neural Networks

Detection Classifier

79% **Recall**

94% **Accuracy**

FPR 13%

FNR 13%
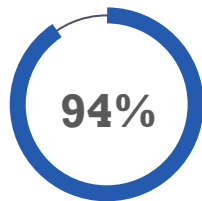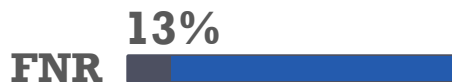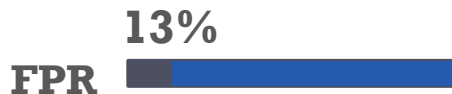
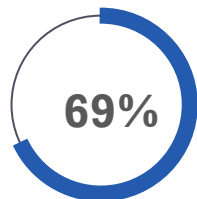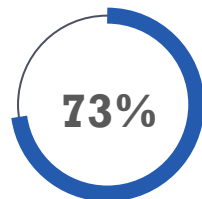**Optimization**

- Relu activation
- Adam optimizer
- 20 epochs

Prediction Classifier

69% **Recall**
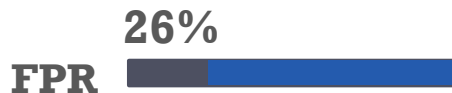
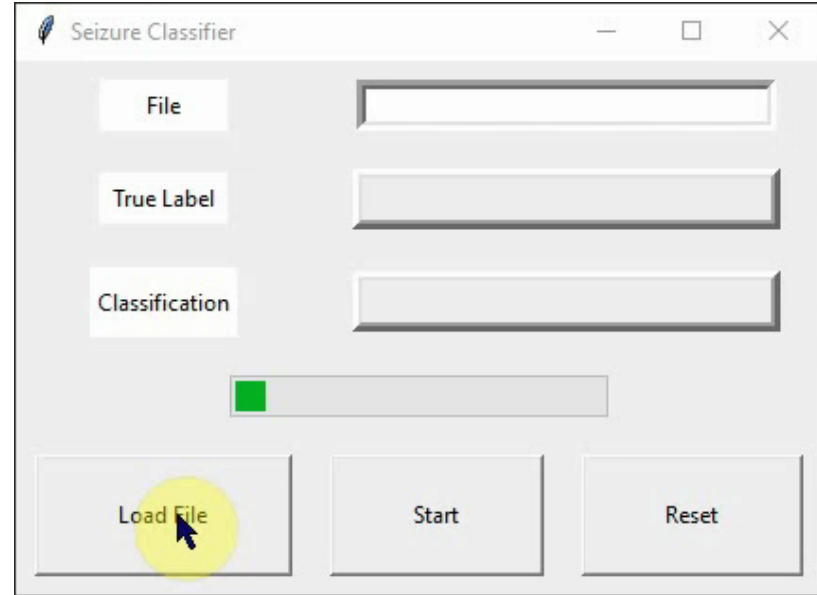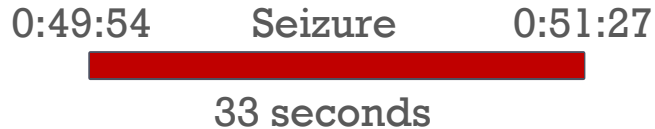73% **Accuracy**

FPR 26%

FNR 31%
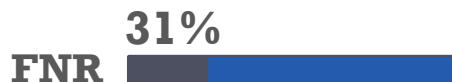
- Relu activation
- Adamax optimizer
- 50 epochs

* **FPR:** False Positive Rate
* **FNR:** False Negative Rate

Results in Action

- 4X playback speed demo
- 1 min classification recording
- Displays the model performance
- Classifies **every three seconds**

0:49:54   Seizure   0:51:27

33 seconds

Way Forward

Prediction

Software

Improve Prediction models by adding a layer to account for real-time data chronological order

- Improve software GUI and functionality – *In Progress* **(Python Tkinter)**
- Develop a mobile app for patients' use

Thank You!

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