

# Ion Channels

## Kaggle Challenge from University of Liverpool

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# Kaggle Competition

Predict the number of open ion channels based the electrophysiological signal data for each time value. A 'macro' F1 score is used for evaluation.

# WHAT ARE ION CHANNELS?

Pores in proteins, open ion channels produce an electrical current.

Electrical Response provides insight in biological processes.

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# Ion channel applications

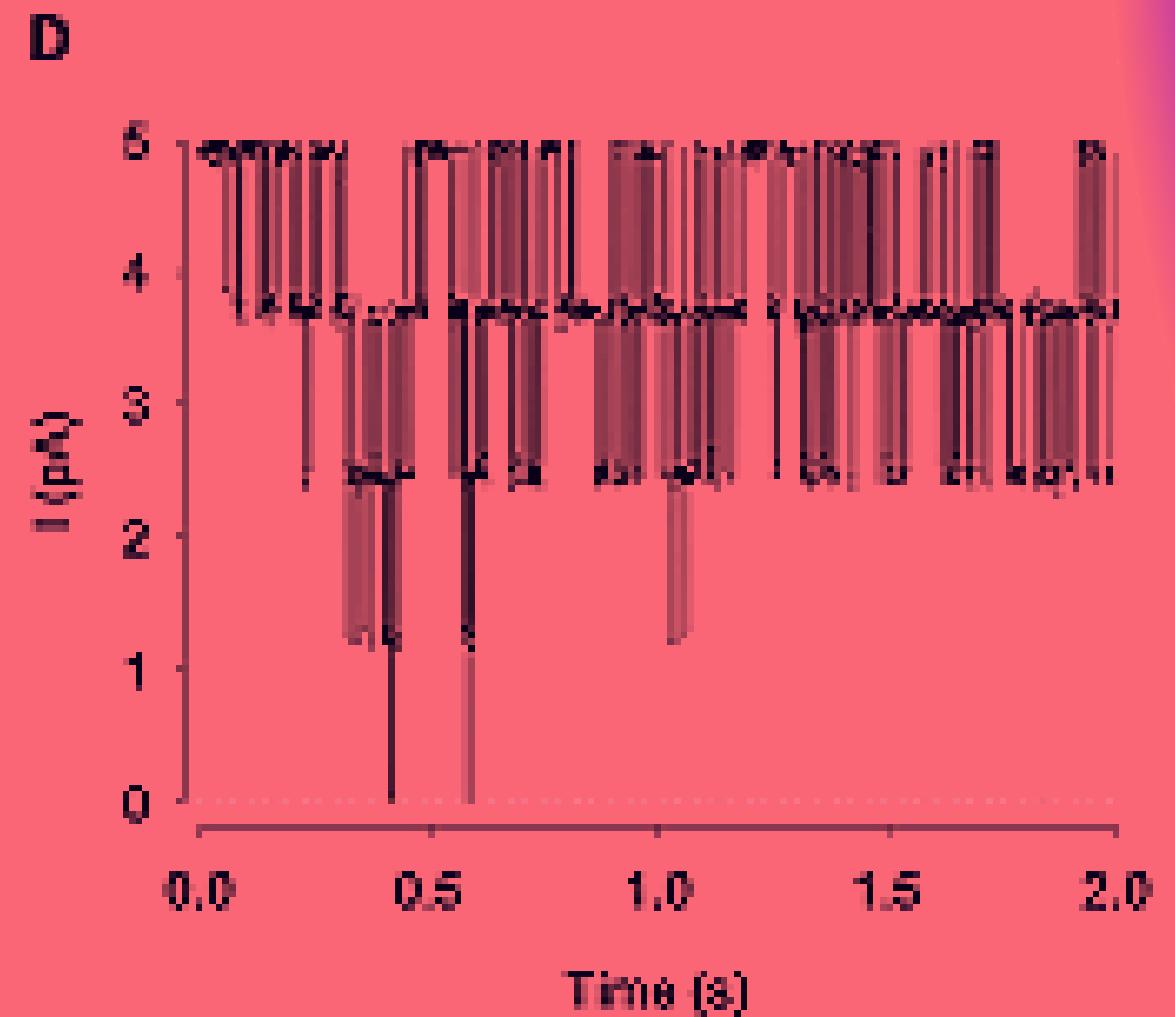
Neurology, Pharmacology, Cancer Research and other  
various biological applications



# Patch Clamp Electrophysiology.

**Electrodes attached to the protein,  
gives information on open channel**

**Provides open channel information  
slowly and tediously**

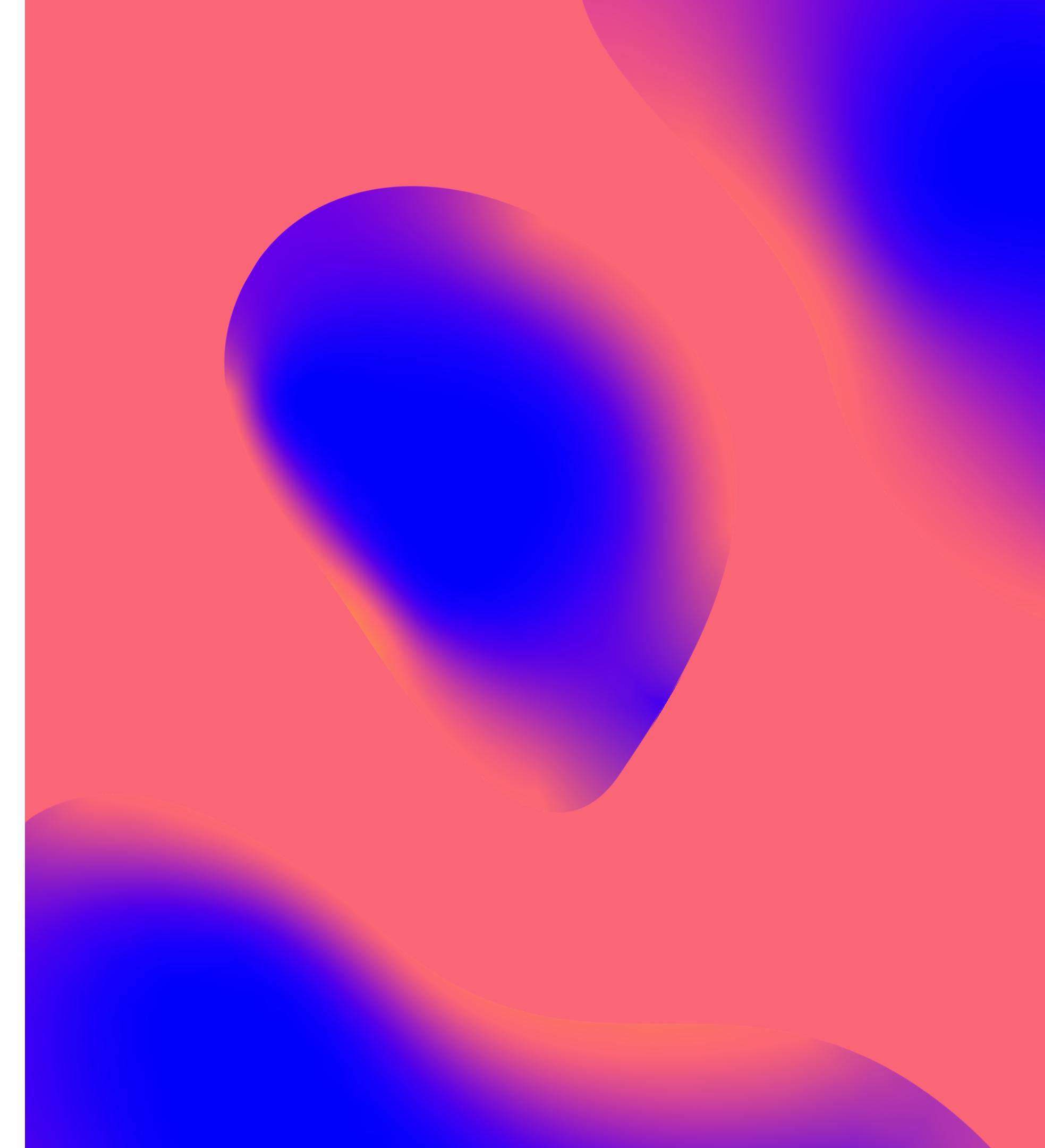




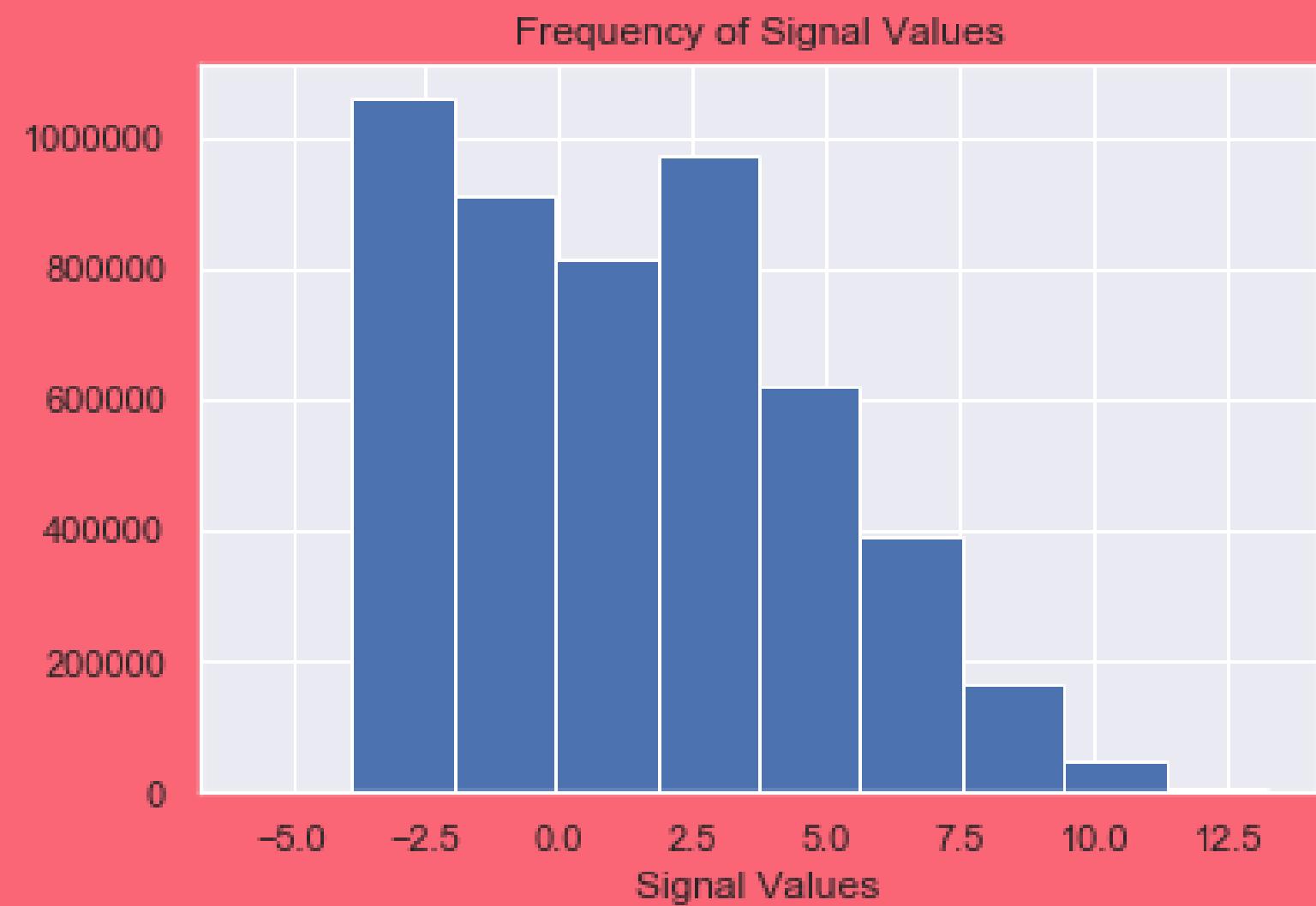
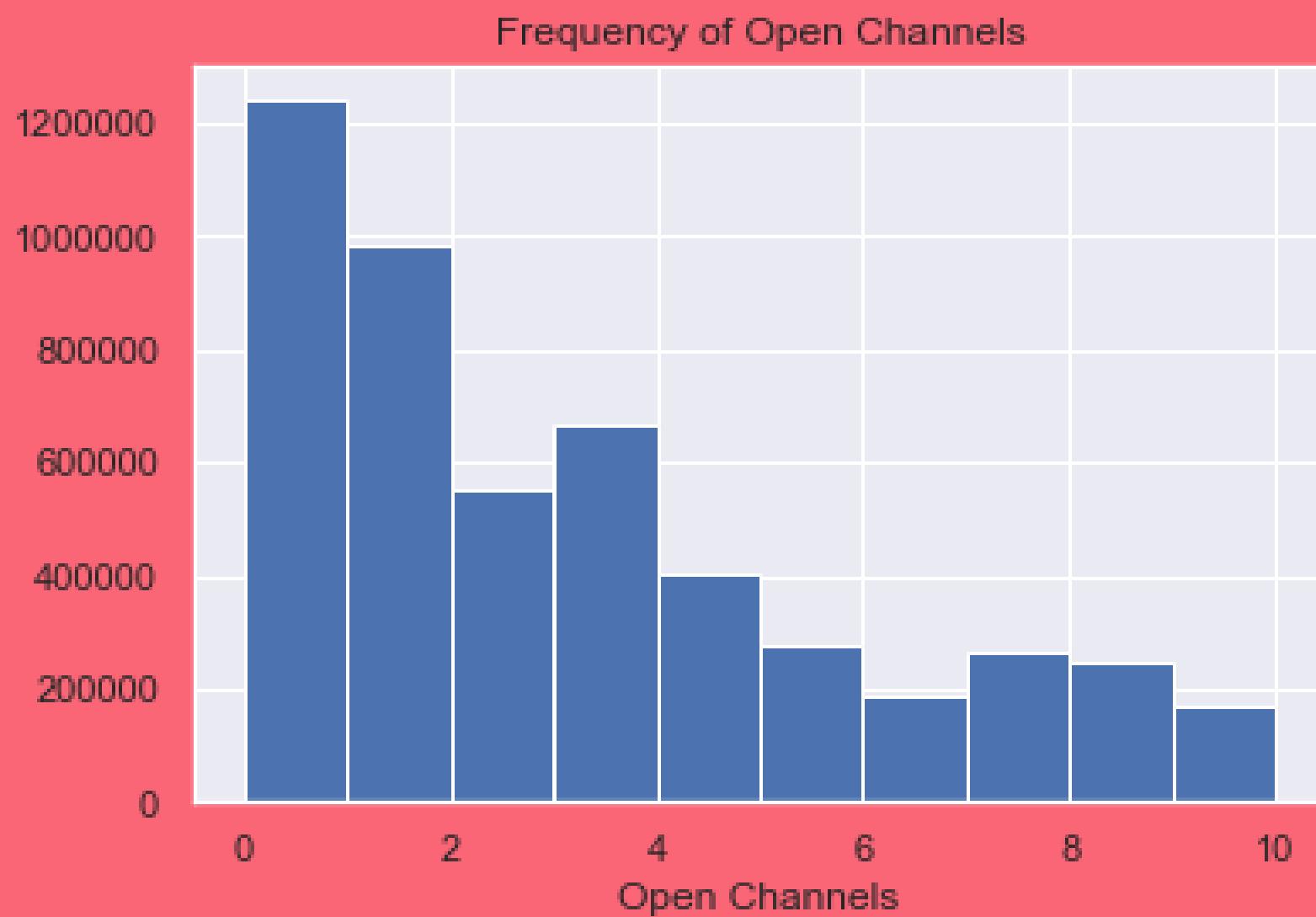
ENTER  
MACHINE  
LEARNING

# MACHINE LEARNING TOOLS

Deep Learning, Convolutional Neural Networks, and Recurrent Neural Networks



# CURRENT STATUS OF PROJECT



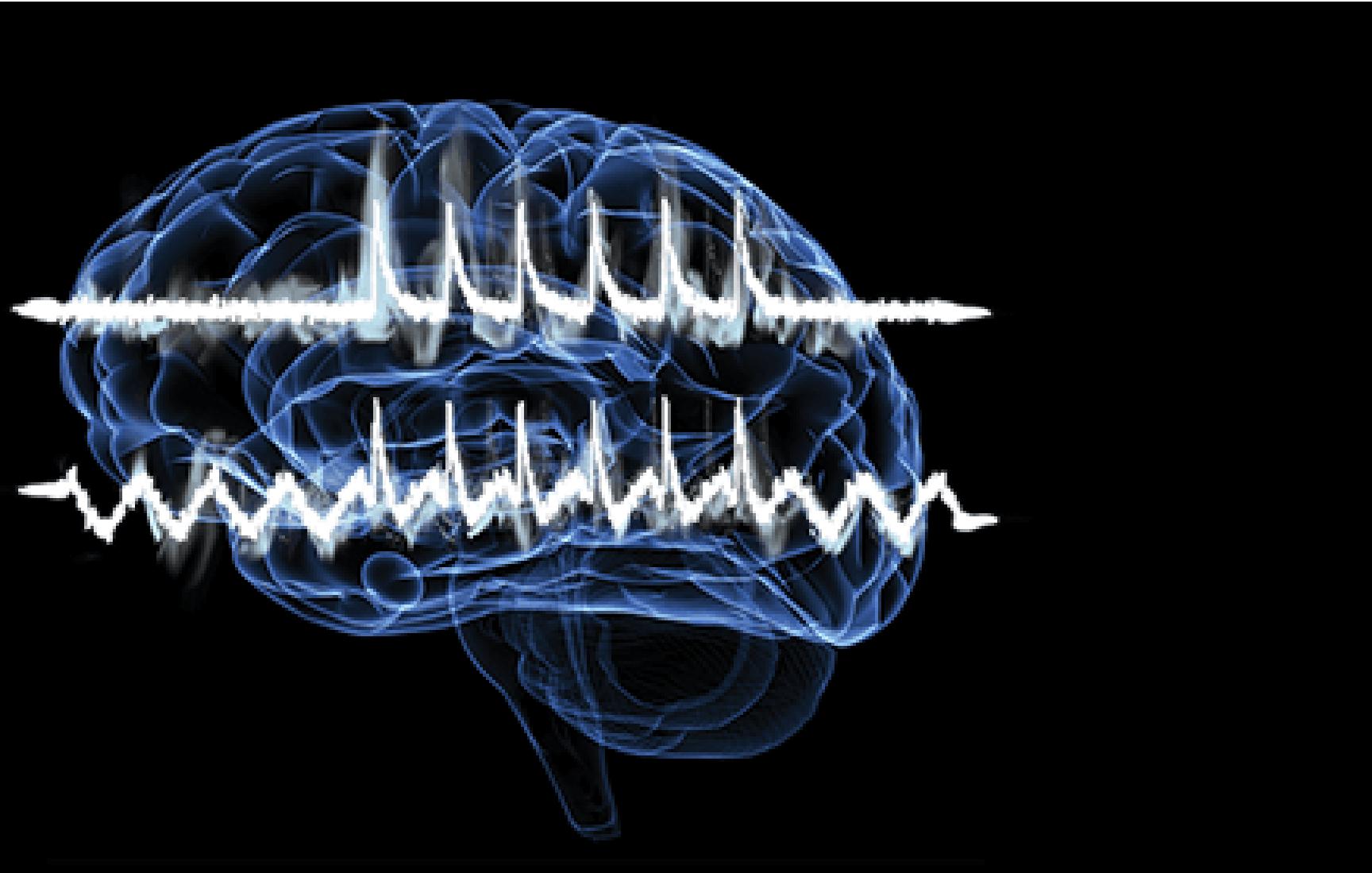


**Used Gradient Boosted Tree Model as  
Baseline, with 68% F1 Score**

**Using additional time series analysis,  
hopefully, score will improve. Need  
additional time to create an  
increasingly accurate model for  
submission.**

# References

1. <https://www.nature.com/articles/s42003-019-0729-3.pdf>
2. <https://www.moleculardevices.com/applications/patch-clamp-electrophysiology#gref>
3. <https://www.kaggle.com/c/liverpool-ion-switching/data>



# Questions?