

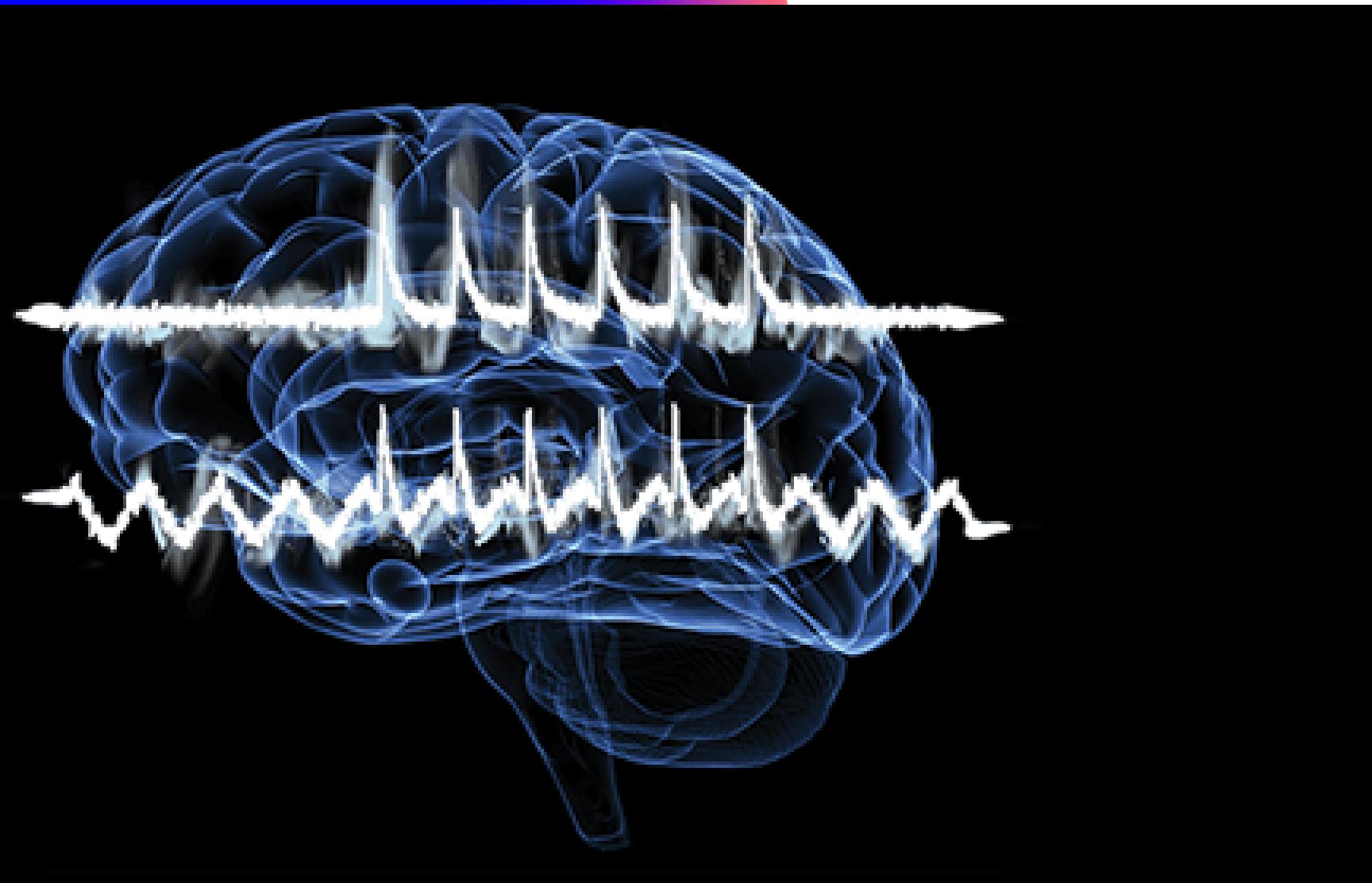
# **Ion Channels**

## **Kaggle Challenge from University of Liverpool**

**Lenaya Flowers**  
**May 2020**

# Predictions?

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.

# 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**

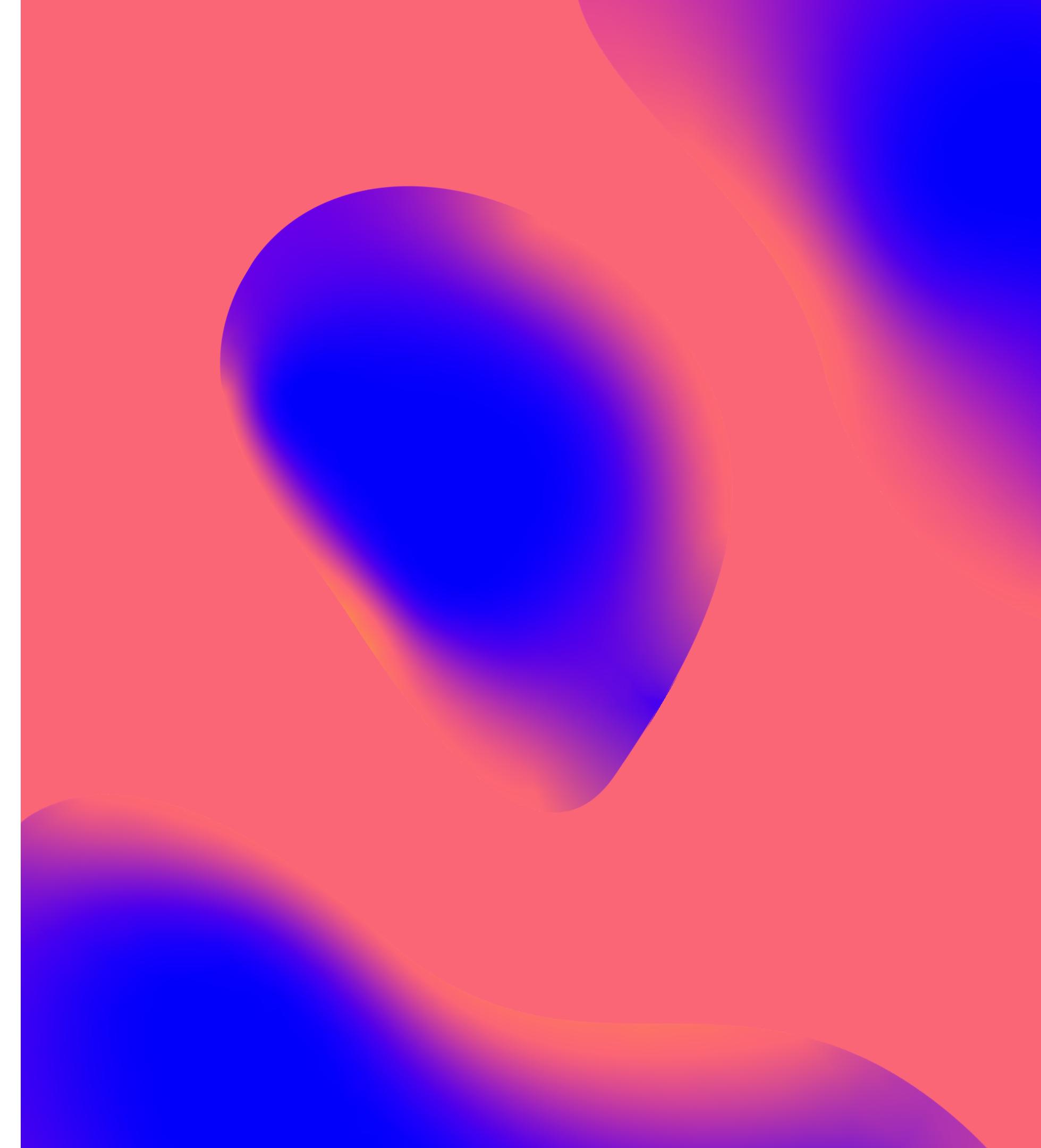
**Provides open channel information  
slowly and tediously**



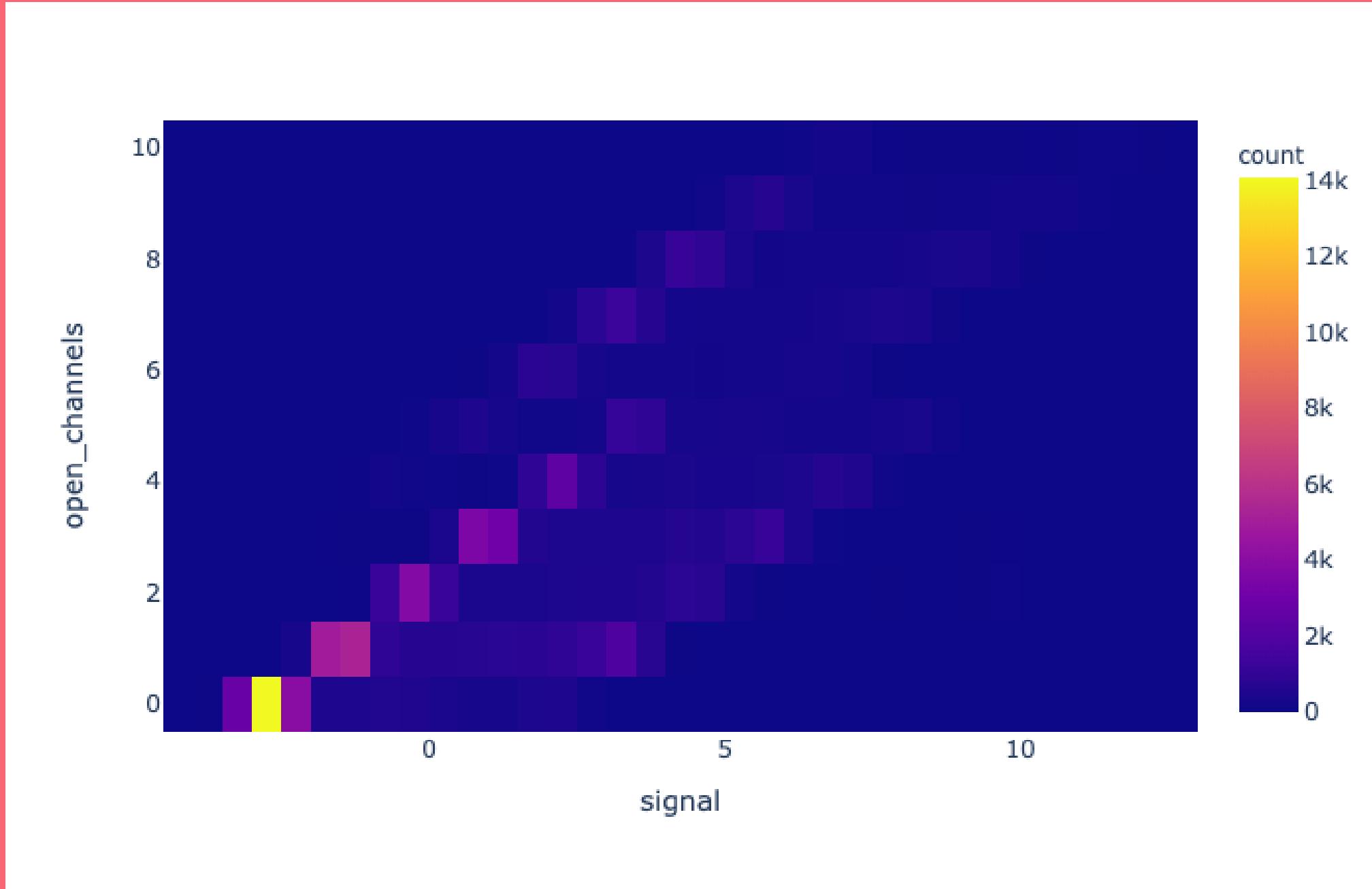
ENTER  
MACHINE  
LEARNING

# MACHINE LEARNING TOOLS

Deep Learning, Convolutional  
Neural Networks, and  
Recurrent Neural Networks



# RESULTS OF PROJECT



Baseline Model Score:  
61.4%

Refined Model Score: 64%

# Future Work

**Using additional time series analysis  
will, hopefully, improve the score.  
Deploying increasingly complex  
models for a higher score.**

# Questions?

## Contact Information

- [linkedin.com/in/lenaya-flowers-b73758103/](https://linkedin.com/in/lenaya-flowers-b73758103/)
- [github.com/Pugzworth](https://github.com/Pugzworth)
- [lenaya.flowers@gmail.com](mailto:lenaya.flowers@gmail.com)

# 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>

