What are they running from?

Making sense of the motor behaviour of mice in a non-motor task!

by **Mighty Mice**

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Overview

- Dataset & Experiment
- Hypothesis
- Modelling
- Results
- Conclusions & Future directions

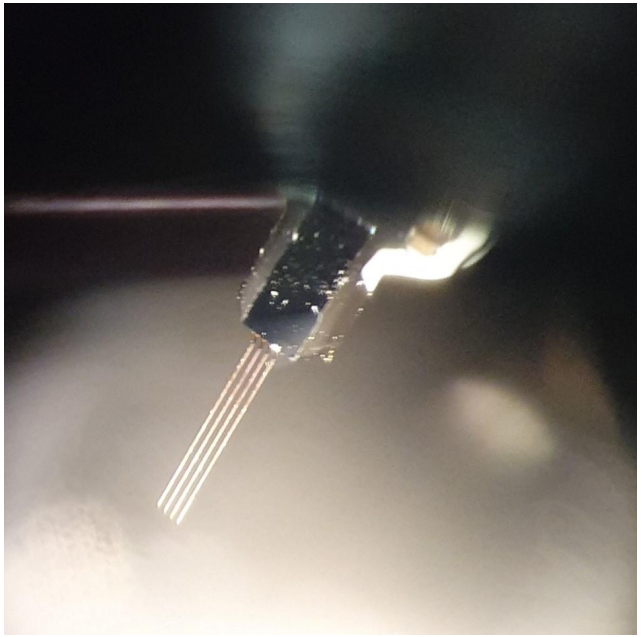
The Dataset :Neurons

Stringer

Information regarding the data set

- Population recordings from the mouse **visual cortex**

  during the **orientation decoding** task



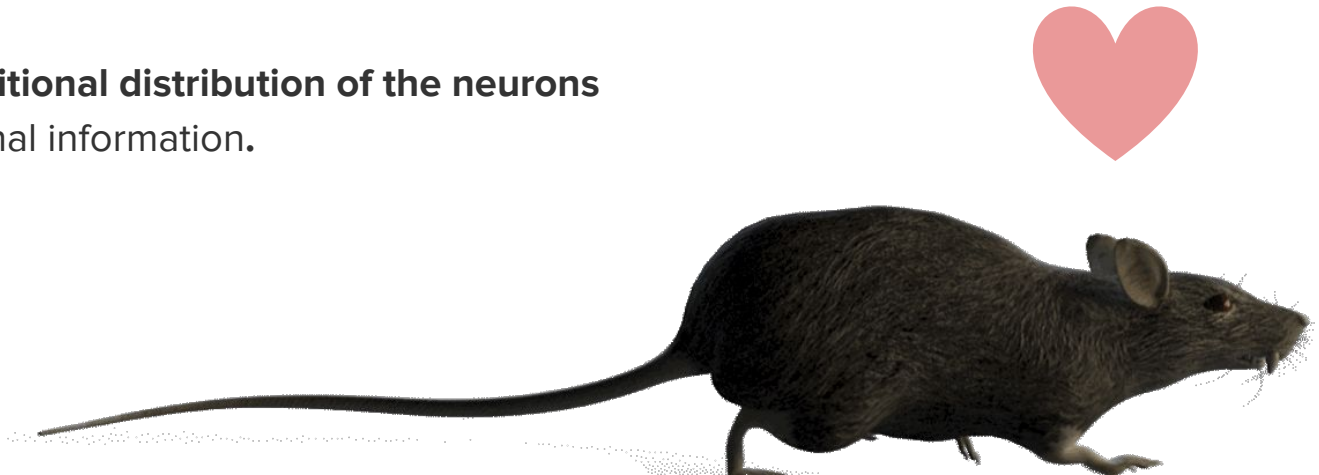
How the data is recorded

- Simultaneous introduction of 8 **neuropixels**

  Calcium channel activity imaging
  (a proxy of neuronal firing)

Hypothesis

- We aim to investigate if the **motor activity** is related to the **orientation of visual stimuli**.
- Investigate if **orientational preference** of the neurons is correlated to the **running speed.**
- Investigate if **the positional distribution of the neurons** provides any additional information**.**

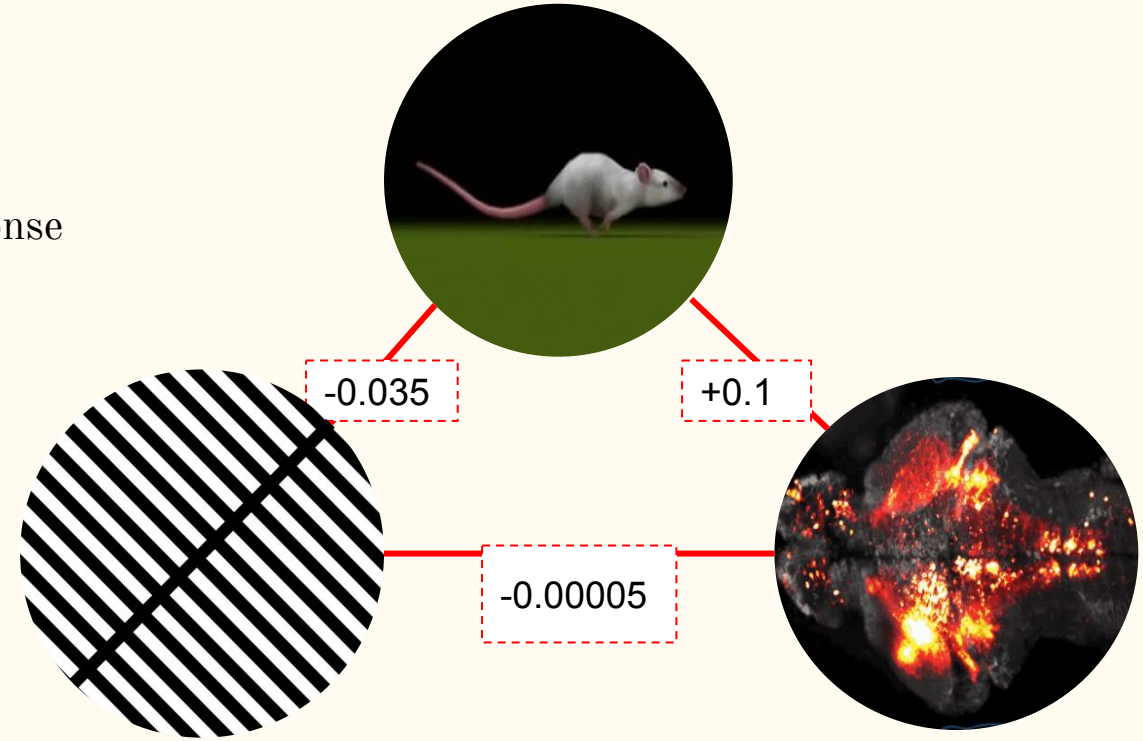


Preliminary Data Analysis

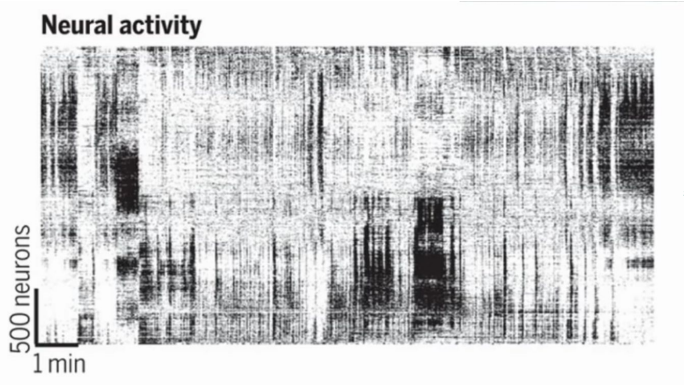
Correlations between:

- Orientation Stimuli
- Running Speed
- Individual neuronal Response (averaged across the population)

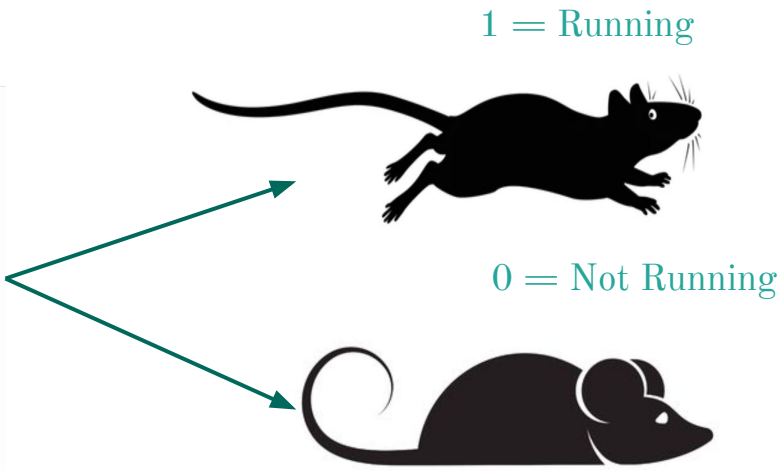
Pearson's Coefficient



Logistic Regression

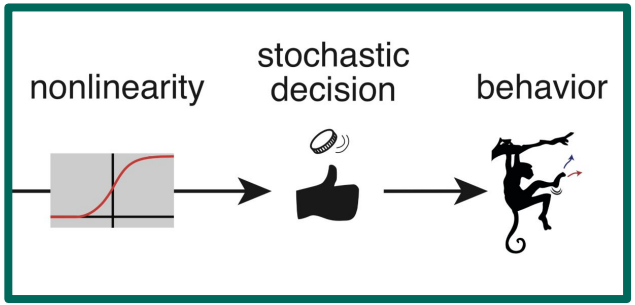


(Stringer 2019)



Variables

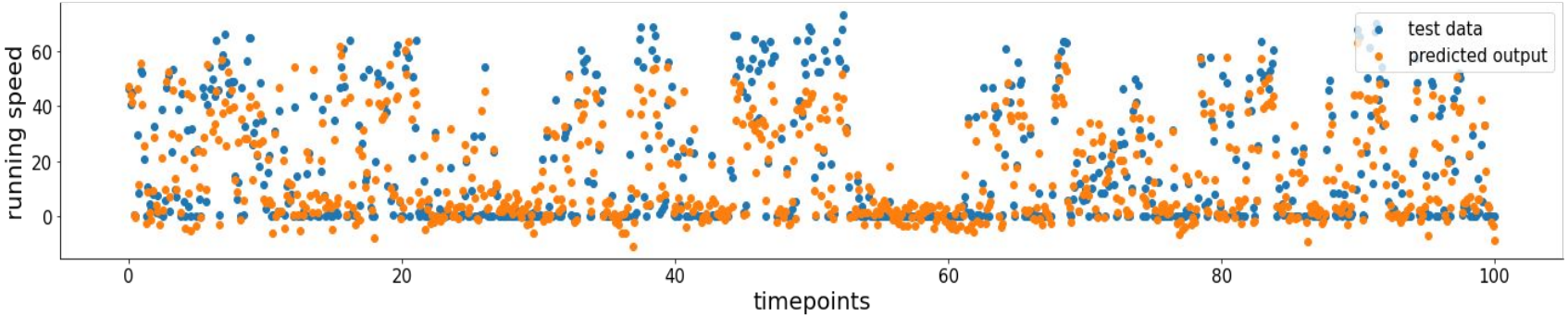
X-Neural response
Y-Running speed

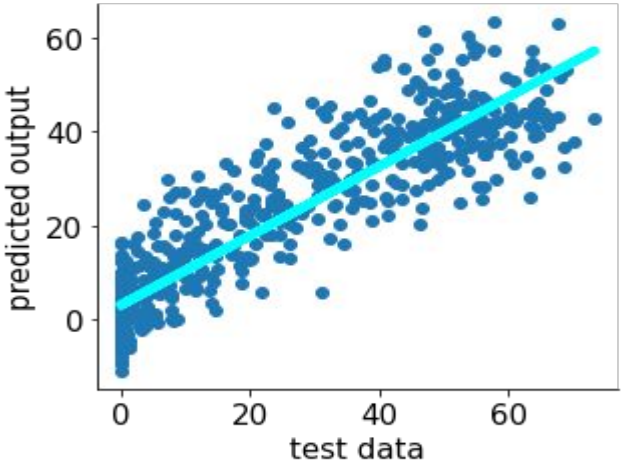


Total-4598
Training-3800 (82.64%)
Test -798(17.35%)

Accuracy of model = 87.69%

Generalized Linear Model



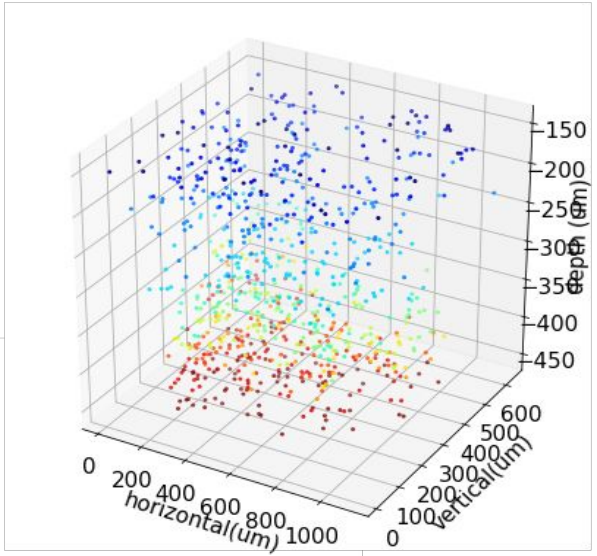


Total-4598
Training-3800 (82.64%)
Test -798 (17.35%)

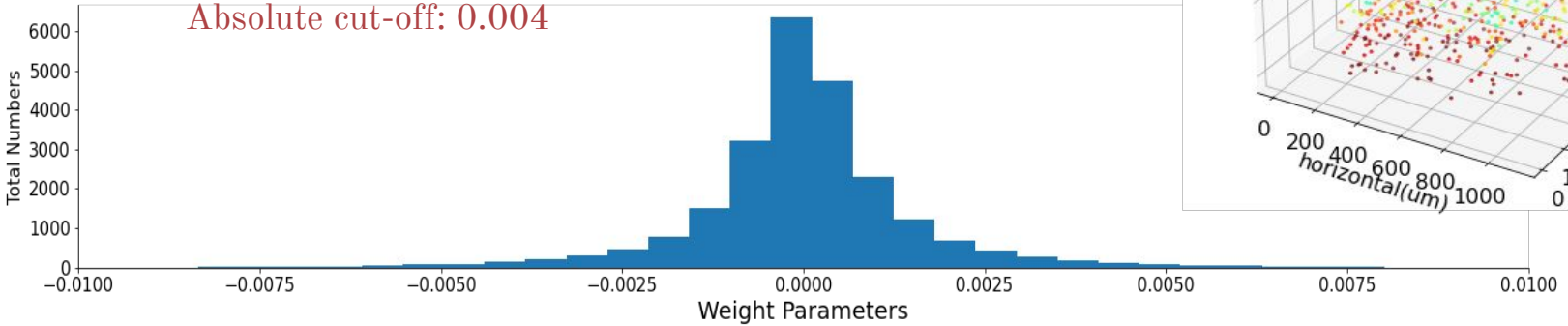
Pearson coefficient (between test and predicted speed) **= 0.918**

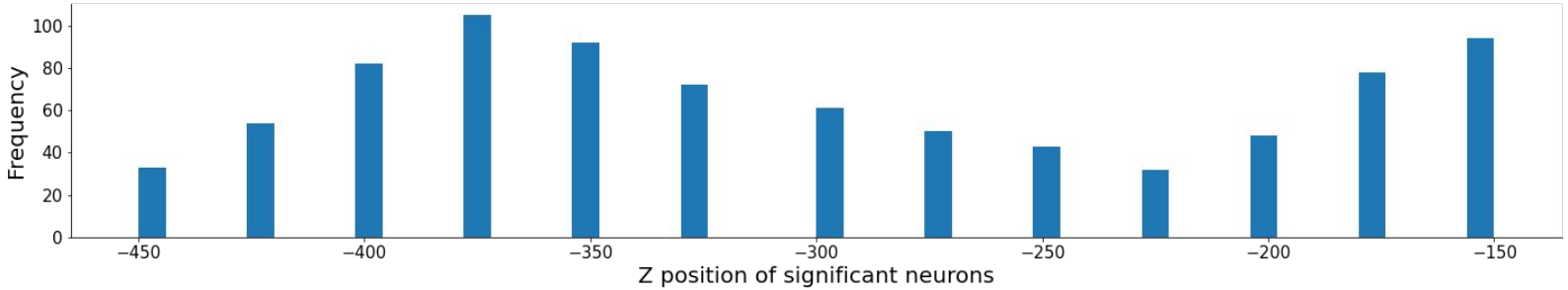
Further Analysis

(Logistic Regression)



Absolute cut-off: 0.004





Conclusion

- **We should not stop ourselves on the bases preliminary results.**

- The Logistic regression and Generalized Linear Model predicted the running status successfully and indicated that **visual representation encodes sufficient information to predict the running speed.**
- **Although the significant responders seem to be distributed all over the area, but their Z-directions show more activity near layer 2 and 6**

Future Plans

- To explore the role of **individual neuronal positions and tunings** (or absence of tunings) **in determining the running speed.**
- to explore other **non-linear models** for better prediction.


```
def Braaibroodjes ():

    School = Neuromatch

    Mentors = []
    Mentors.append(Luciano Censoni, Suranjana Pal)

    ProjectTA = Ritu Panda
    TA = Anindita Basu

    return Us!
```