

# How did they miss?

Decoding hit-miss behaviour in a visual discrimination task from large-scale neural recordings.



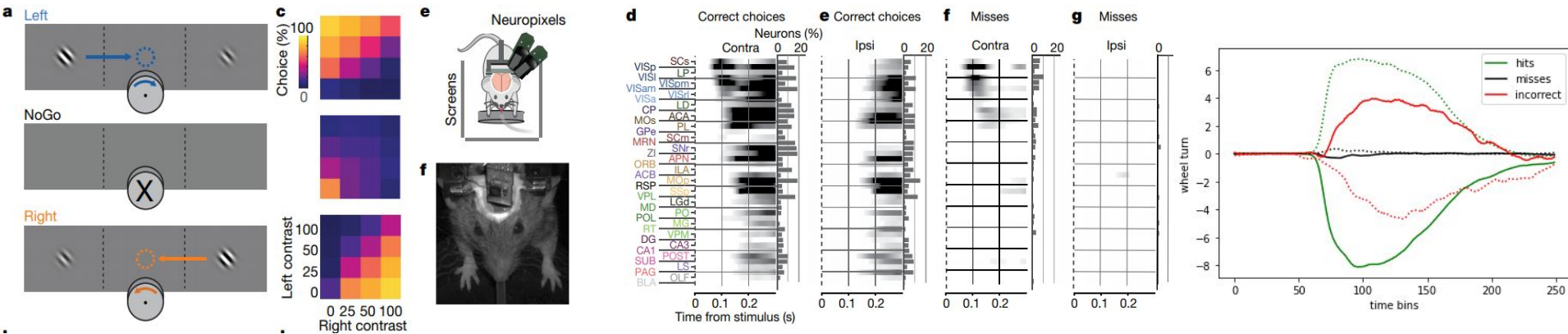
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Pod-019 Evasive Seals; Hybrid/Chimeric Seals



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@twitterless\_Q\_Q



# Introduction



Steinmetz et al., *Nature* 2019

**Question:** How does the brain represent hit and miss behaviour during a visual discrimination task?

**Hypothesis:** Task performance is represented in a distributed code in the mouse brain.

**Prediction:** Neural activity from distributed brain regions will result in better decoding accuracy than any single region.

# Methods

Data

Subsets

Visual

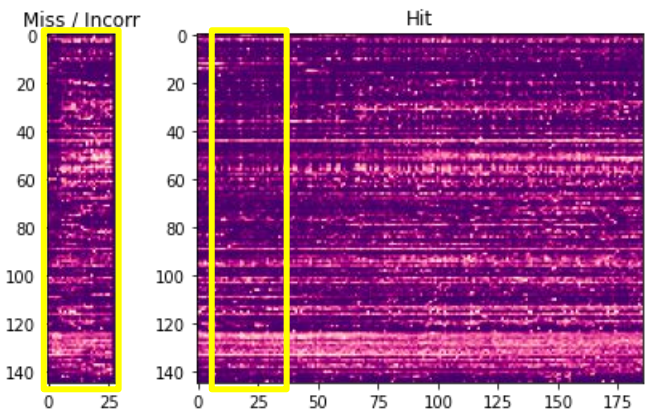
Hippocampus

Thalamus

All

Features

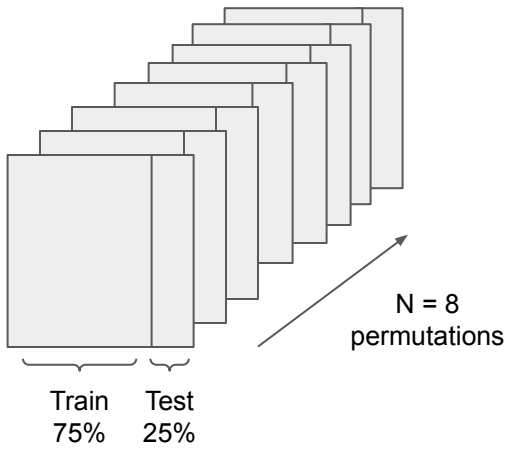
Labels



	Performance	Stim Side	Difficulty
0	2.0	0.0	0.00
1	2.0	0.0	0.00
2	2.0	0.0	0.00
3	1.0	0.0	0.50
4	1.0	1.0	0.25
...	...	...	...
335	0.0	1.0	1.00
336	0.0	1.0	1.00
337	0.0	1.0	1.00
338	0.0	1.0	1.00
339	0.0	1.0	1.00

340 rows x 3 columns

Analysis Pipeline



GLM

- Logistic Regression
- Regularizer = L2
- C = 1
- Solver = "saga"

Dimensionality Reduction

Gridsearch (Hyperparameter Optimization)

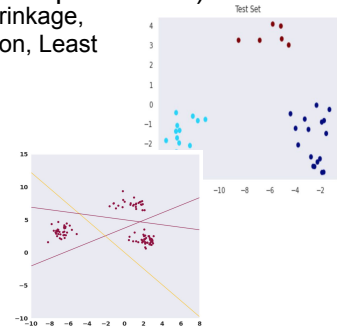
Regularization (L1/L2), Shrinkage, Solver (Eigen decomposition, Least Squares)

Dimensionality Reduction

Unsupervised: PCA, MDS  
Supervised: LDA

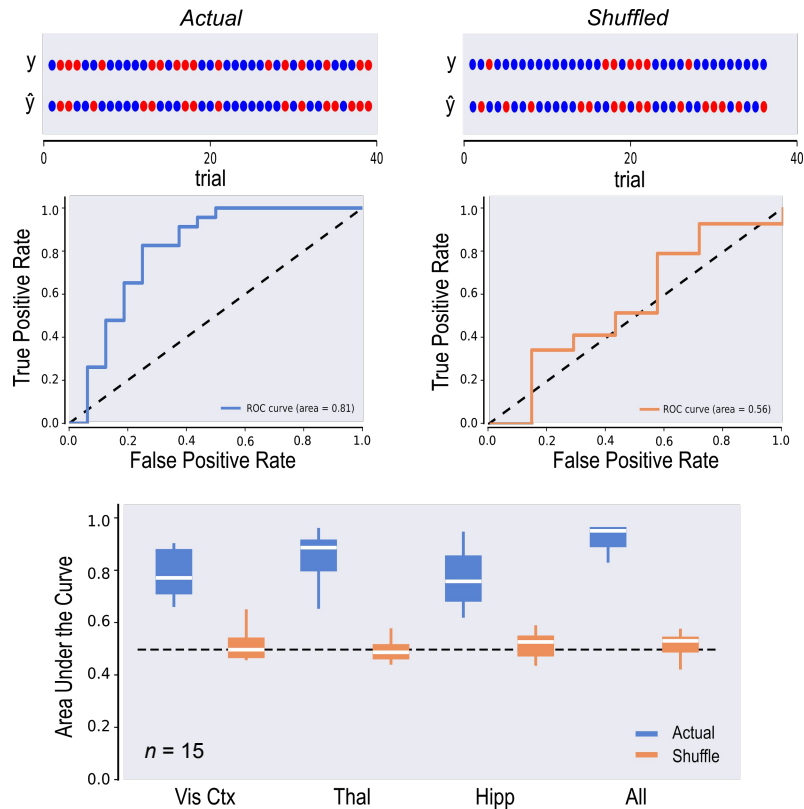
Classifier

Supervised: Linear SVC



# Results and Conclusions

## GLM results



## Dimensionality Reduction

