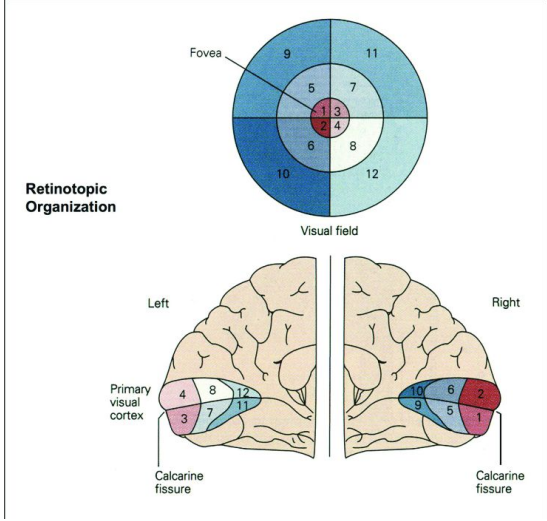
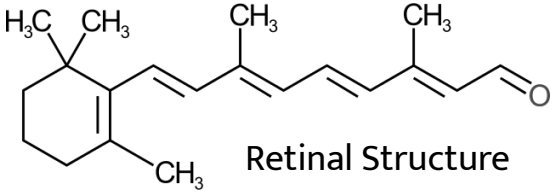
Stimulus Rotation Network In Visual Cortex

Retinotopy HCP

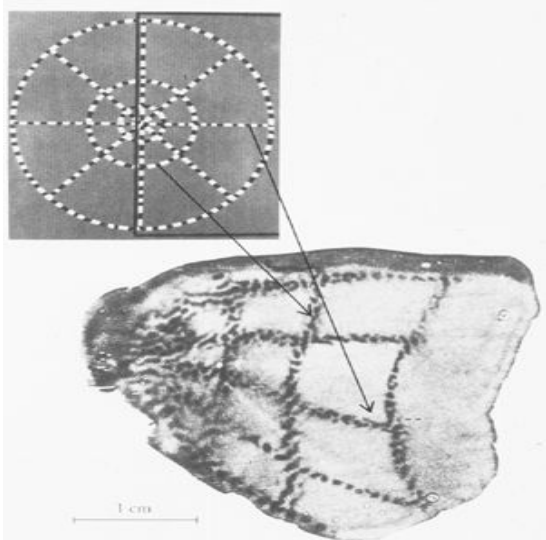


The Retinal SPAArkAnS

Literature Review: Aalina Bilal, Pushpraj Poonia, Sidney Shah
Data Analysis: Shikang Peng
BEST TA of 2023: Arkadeep



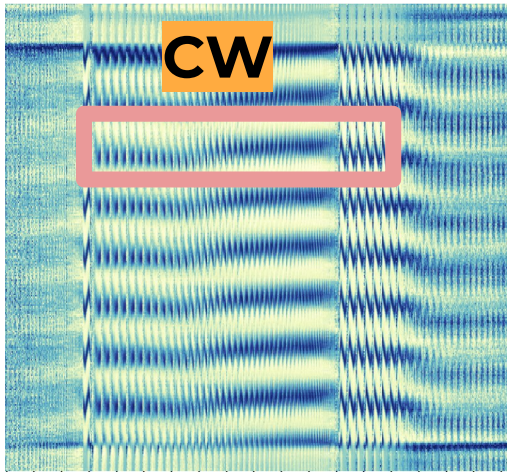
Retinal Structure

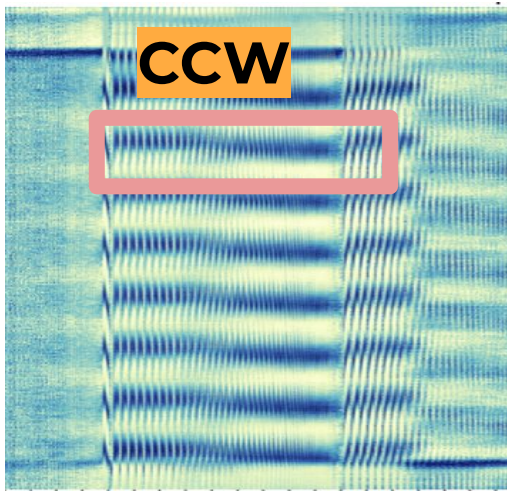


METHODS

- 1st - we computed the *heatmap* to help visualize the region activated in duration of the stimulus

- 2nd - we *narrowed down the regions* being activated to see if there's a difference in the activity of these regions across CW & CCW data

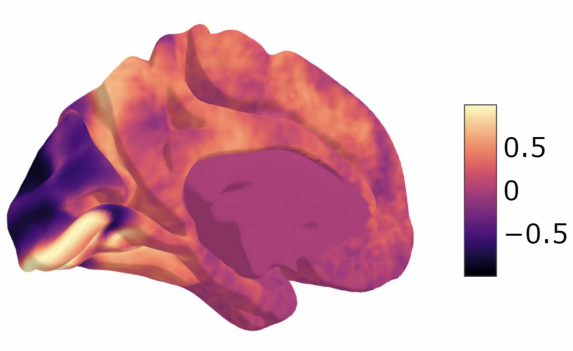


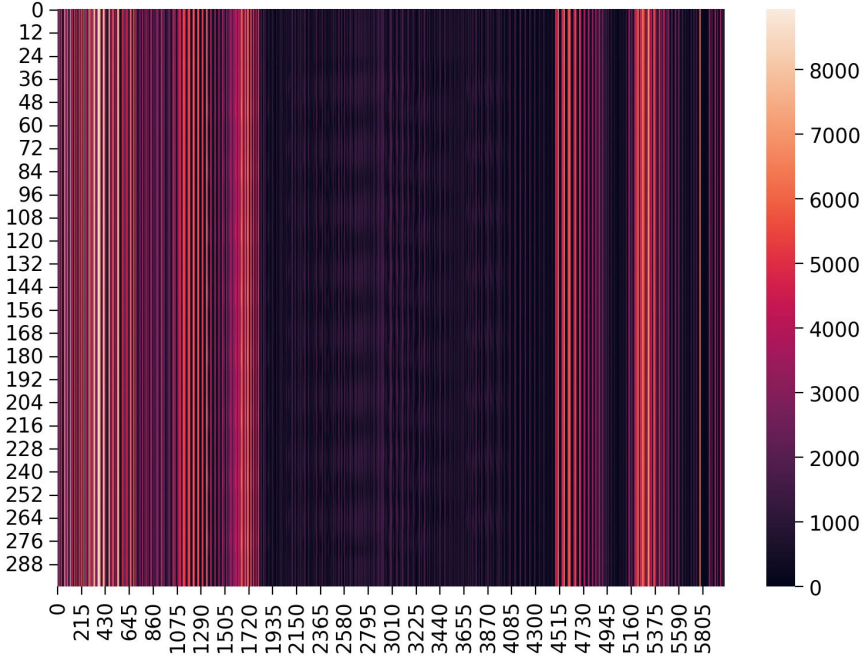


METHODS

- The difference between CW & CCW in a heatmap within visual cortex

- Threshold: 2 SD
  - Similar regions [approx.]
    - [1808, 4080]
  - Different regions [approx.]
    - [0-1808, 4080-6000]

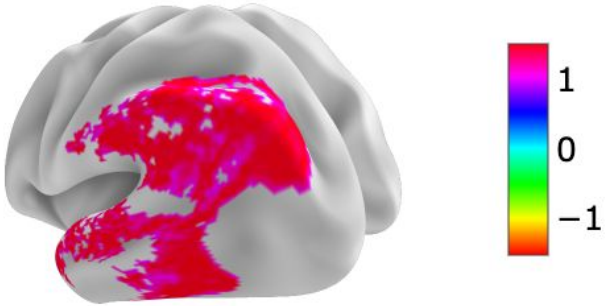




METHODS

- 3rd - we used *atlas to parcellate* the regions of the brain, and do the *correlation analysis* for functional connectivity of the parcellated regions

- 4th - we did an Independent Component Analysis *(ICA)* to find the functional networks that is accounting for the rotation processing



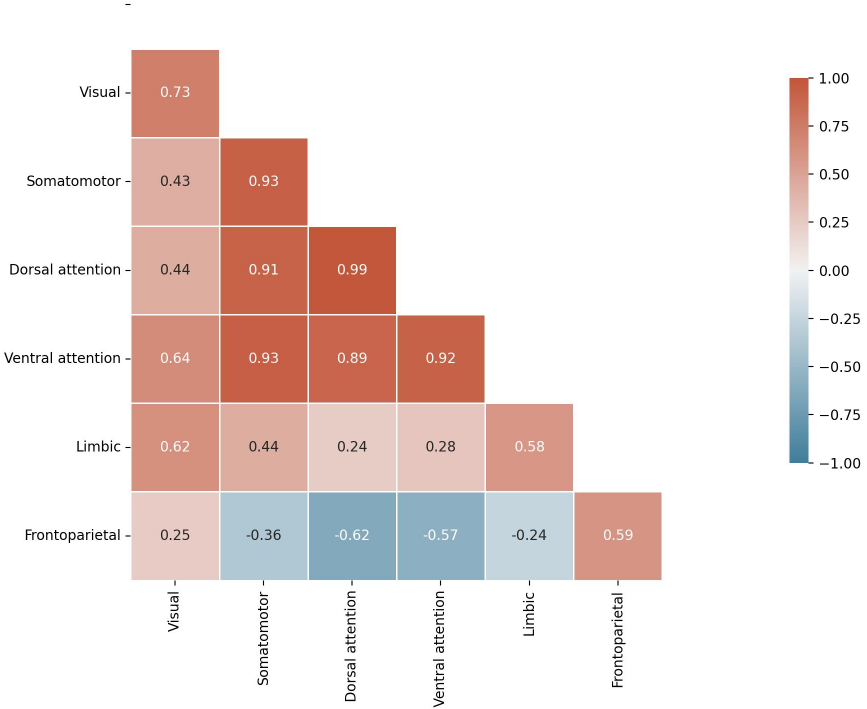
	region	id	data
0	Dorsal Attention	3	3.190903
1	Frontoparietal	6	1.452162
2	Ventral Attention	4	1.006000
3	Visual	1	0.955981
4	Default	7	0.720821
5	Limbic	5	0.448979
6	Somatomotor	2	-0.364635

RESULTS

- Pearson correlation across 7 parcellated regions indicates that visual cortex is not highly correlated between CW & CCW rotation
  - **Sub-regions in visual cortex is activated differently**

- Paired sample t-test after ICA shows that the 4th independent component is significantly different between CW & CCW
  - **A small functional network accounting for stimulus rotation**

Correlation matrix CW vs. CCW



[t, p] = (−0.37, 0.71)
[t, p] = (1.2, 0.24)
[t, p] = (−0.6, 0.56)
[t, p] = (−2.58, 0.02)*
[t, p] = (1.16, 0.26)
[t, p] = (2.01, 0.06)
[t, p] = (−0.44, 0.67)