

Variability in the Internal Dynamics of Our Brain's Compass Benjamin Hartwick, B.A. & Sc. Cognitive Science | Supervised by Gilberto Rojas-Vite, Adrien Peyrache





Discussion

Neuron speed reported in the HD system matches approximate speeds of head-turning behavior during wake. This finding confirms previous work showing the head direction system of ADn can inform the brain of changes in

A key finding is that head direction cells seemed to work similarly when awake and dreaming but acted differently during deep sleep. This offers information regarding the brain's relative functions during different states of consciousness, from everyday activities to dreaming.

Another point of interest is the emergence of animal B0710 as an outlier in wake and REM speed analysis. Further investigation is required to determine

Although neurons were selected based on their gaussian fit, future work should select based on a more precise metric such as head direction information.

Further Directions

• Filter data to include only cells with precise head direction information.

• Compare wake periods before and after sleep to investigate effects of sleep periods on cell properties during wake.

• Analyze data from additional brain areas to explore the prevalence of the found effects throughout the head direction system.

• Analyze data from animals over extended periods of time (weeks) to investigate the effect of long-term learning and age on dynamics of the

• Review literature to provide additional context and further understanding of current and future findings.

Acknowledgements & References

I would like to acknowledge Gilberto Rojas-Vite for his invaluable support and guidance as well as Professor Adrien Peyrache for offering key insights

This study was completed with funding from the McGill Arts Undergraduate

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²Peyrache, A., Lacroix, M., Petersen, P. et al. Internally organized mechanisms of the head direction sense. Nat Neurosci 18, 569–575 (2015).