

Group 3: Project 3

1) Implement the deep Boltzmann machine model of Reichert et al. (2013), train it on the simple shapes dataset, and show that it produces hallucinations when visual input is ablated.

2) Show how acetylcholine (modeled as changing the balance of feedforward vs. feedback pathways) alters hallucinations.

3) What happens if you lesion the top-down feedback?

4) Discuss the model in light of experimental evidence on acetylcholine and hallucinations (Perry & Perry, 1995).

References:

Perry, E.K. & Perry, R.H. (1995) Acetylcholine and hallucinations: disease-related compared to drug-induced alterations in human consciousness. *Brain and Cognition*, 28, 240–258.

Reichert, D., Seriès, P., & Storkey, A. (2013). Charles Bonnet syndrome: evidence for a generative model in the cortex? *PLOS Computational Biology*, 9, e1003134.