

Group 1: Project 1

- 1) Implement Foldiak's (1991) learning rule and demonstrate how it learns a representation that is invariant to translation. Compare to the standard Hebbian learning rule.
- 2) What happens when the model is exposed to other kinds of transformations (e.g., rotations, changes in scale)?
- 3) Show (and interpret) what's going on inside the model over the course of learning: inputs, outputs, traces, synaptic weights.
- 4) Discuss how the model relates to existing empirical data. Some example references are: Wallis & Bulthoff (2001) and Li & DiCarlo (2008).

References:

Foldiak, P. (1991). Learning invariance from transformation sequences. *Neural Computation*, 3, 194-200.

Li, N., & DiCarlo, J.J. (2008). Unsupervised natural experience rapidly alters invariant object representation in visual cortex. *Science*, 321, 1502-1507.

Wallis, G., & Bulthoff, H. (2001). Effects of temporal association on recognition memory. *Proceedings of the National Academy of Sciences*, 98, 4800-4804.