Problem: Understanding how the brain codes 3D objects

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What is the neural code for 3D object geometry in CIPS?
Deep networks for 3D scene representation

Eslami et al., Science 2018

Fiebelkorn et al., Neuron 2018
A method for understanding deep networks

Object recognition area

Neuron’s response = \( \sum w_i \times \text{unit}_i \)

Yamins & DiCarlo, PNAS 2014
Bashivan & DiCarlo, bioRxiv 2018
CMS 273 Project: Use 3D scene representation networks to understand the brain

- Understand in explicit terms how high-level geometric variables (e.g., number of objects, surface geometry + location of each object) represented by neurons in networks trained to perform 3D scene representation (“in silico electrophysiology”)

- Evaluate different models for explaining responses of actual CIPS neurons

- Construct optimal stimuli for CIPS neurons assuming different models, and test on actual neurons

Banino et al., Nature 2018

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