

Supervised learning

Gergő Orbán

Learning frameworks

How can we phrase the goal of learning?

Learning frameworks

How can we phrase the goal of learning?

- Supervised
- Reinforcement
- Unsupervised

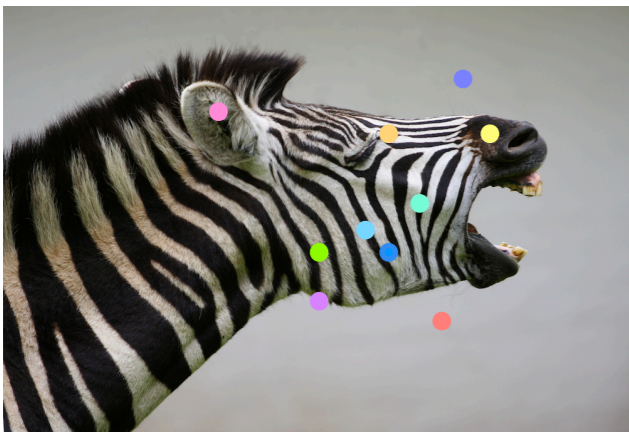
Perceptron

- .. from this point

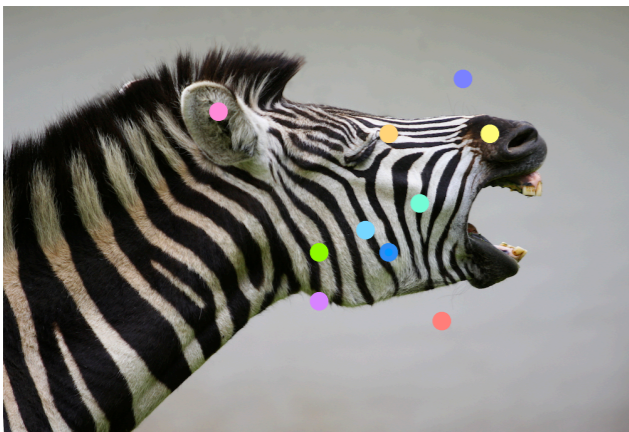
Deep Feed-Forward Networks



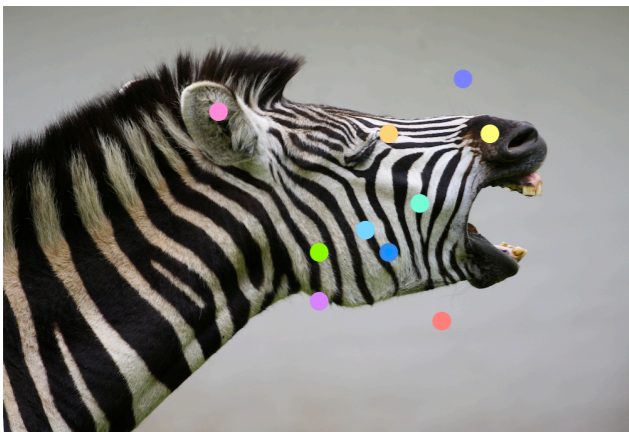
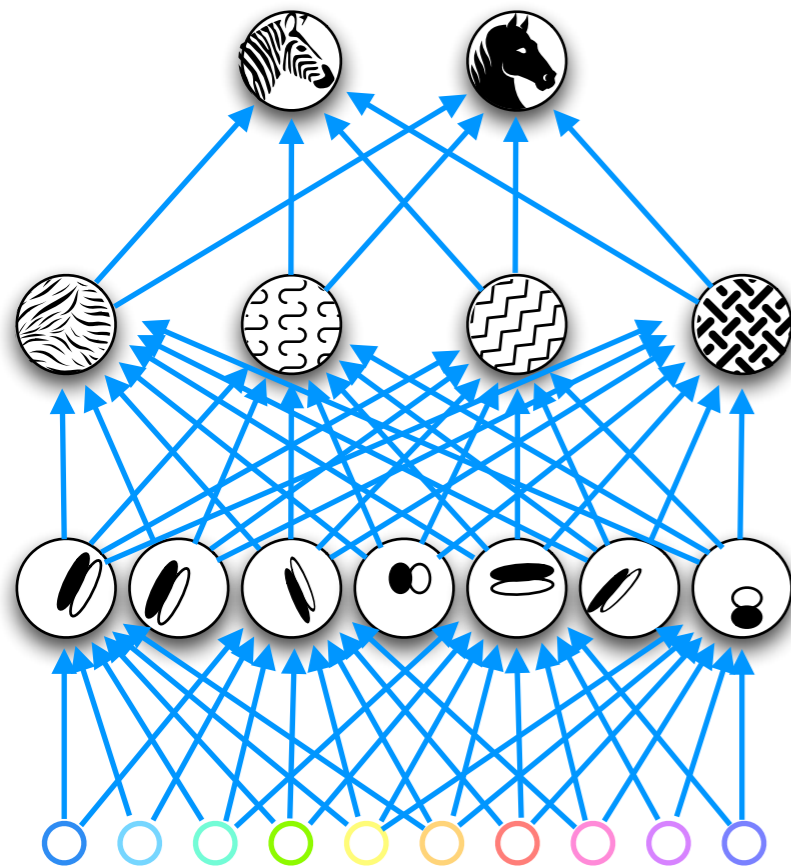
Deep Feed-Forward Networks



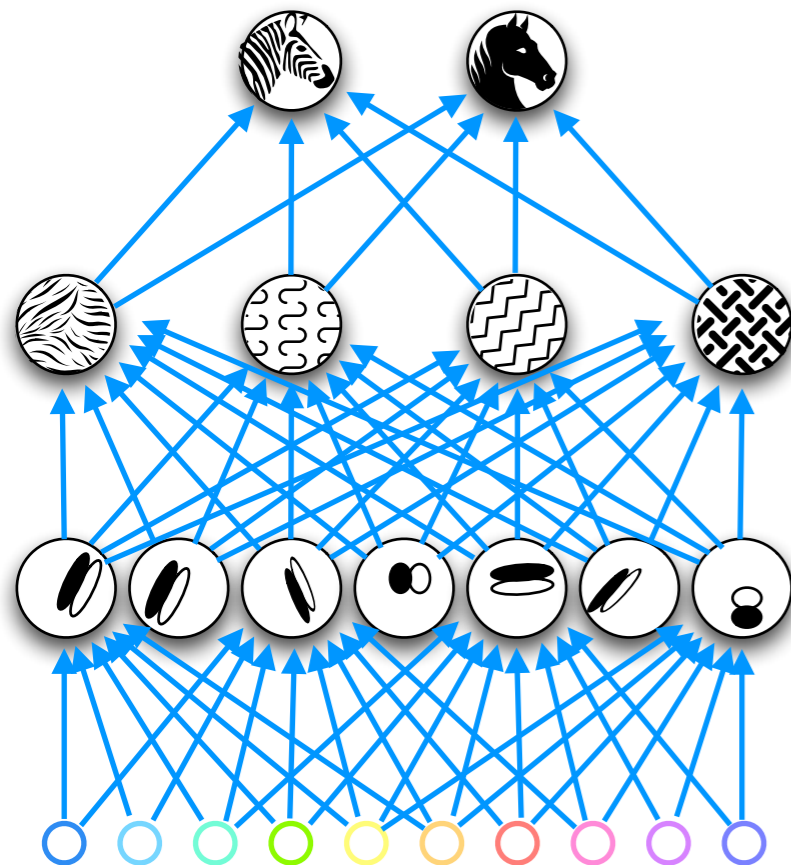
Deep Feed-Forward Networks



Deep Feed-Forward Networks



Deep Feed-Forward Networks



COMPUTATIONAL GOAL
classification

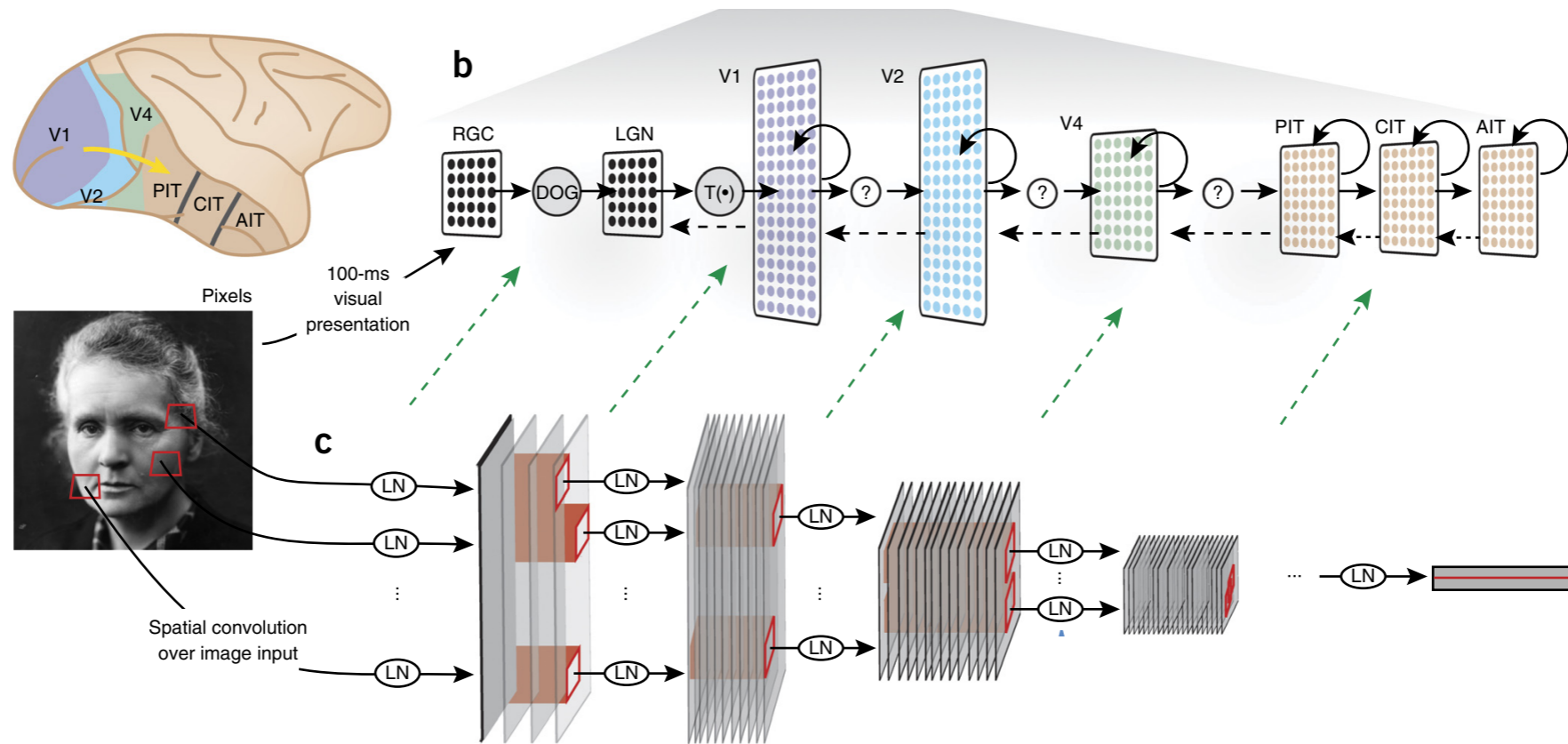
ARCHITECTURE
hierarchical feed-forward

LEARNING
supervised

REPRESENTATION OF UNCERTAINTY
no

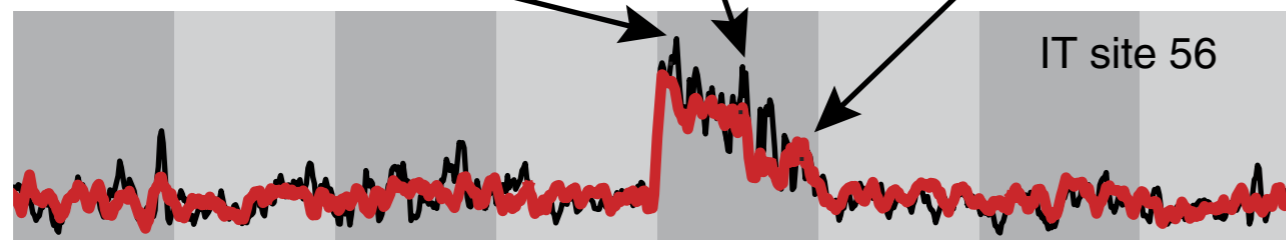
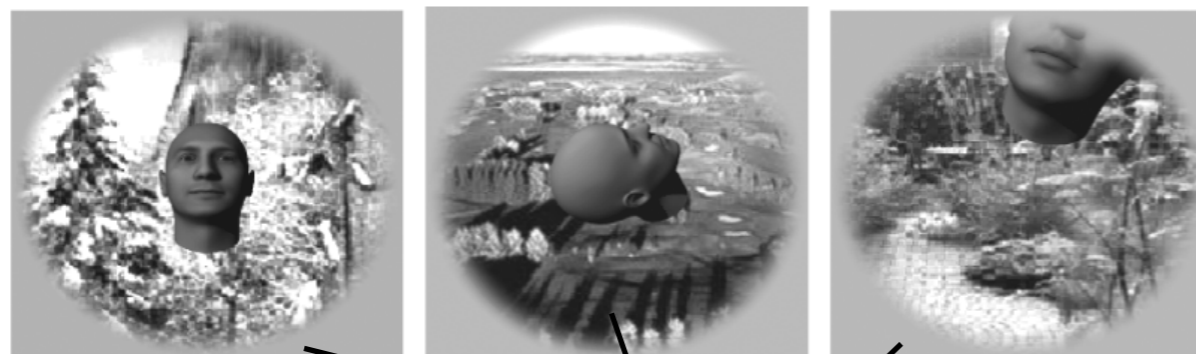
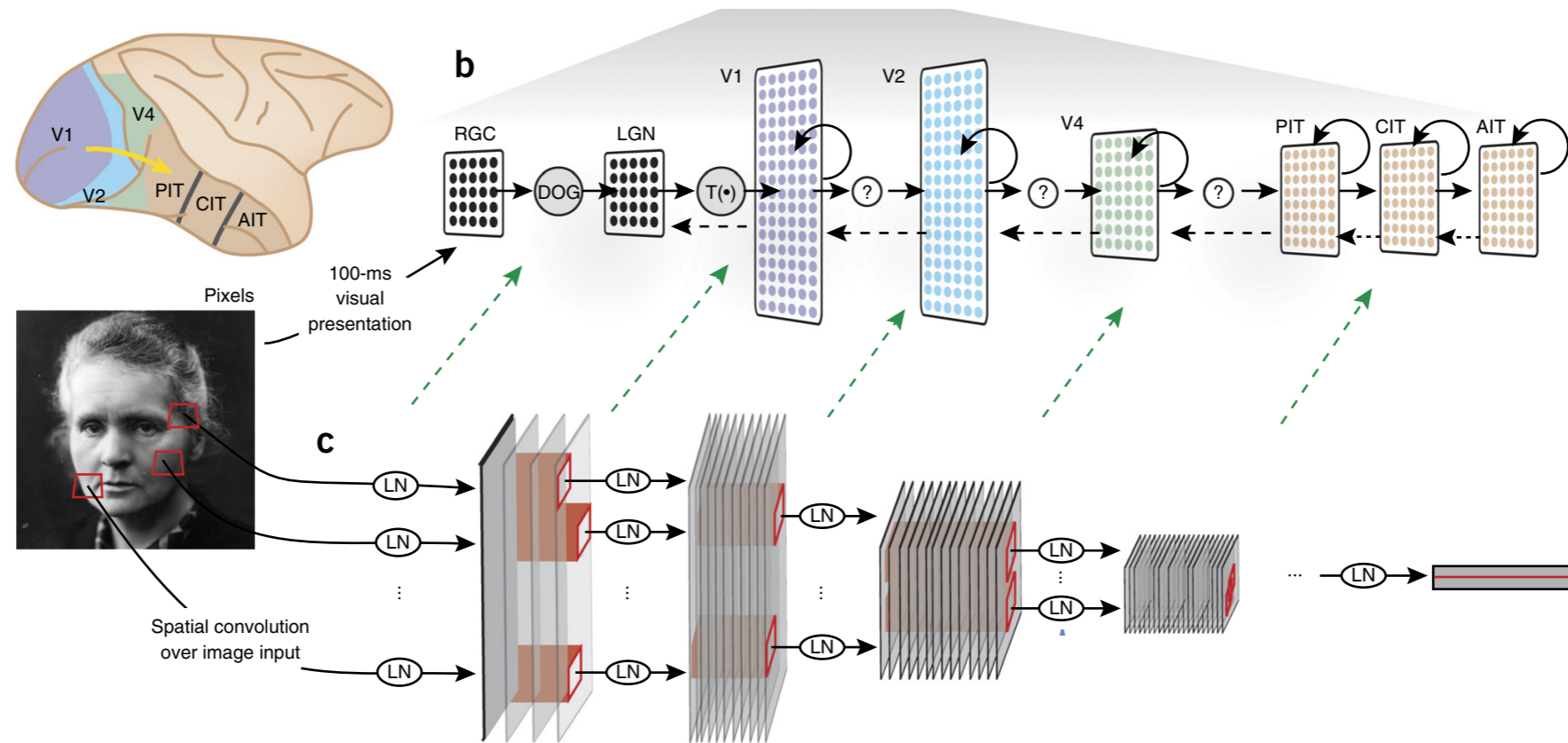
DATA HUNGER
immense

Visual cortex vs. Feed-forward deep neural network



Yamins et al (2016) Nat Neurosci

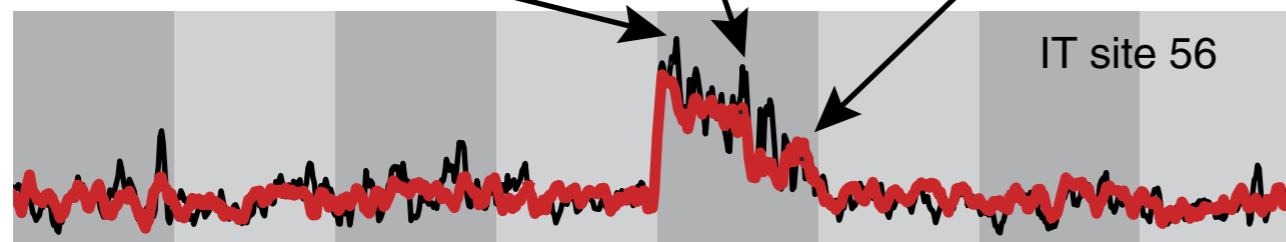
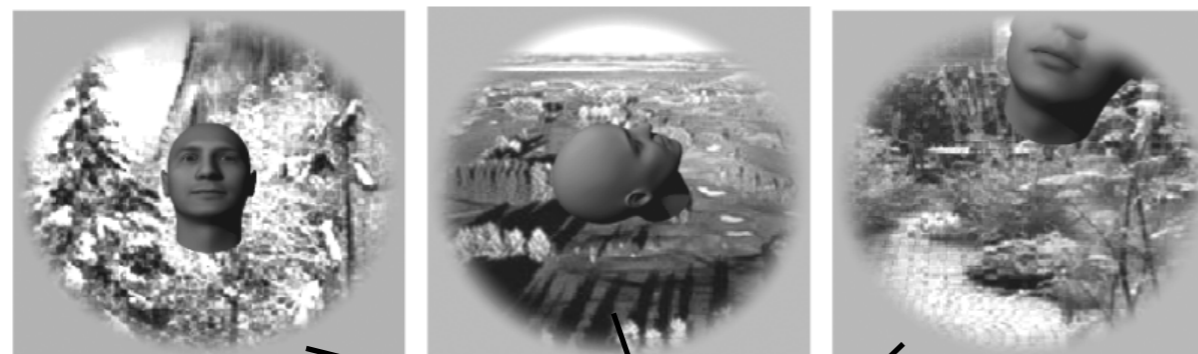
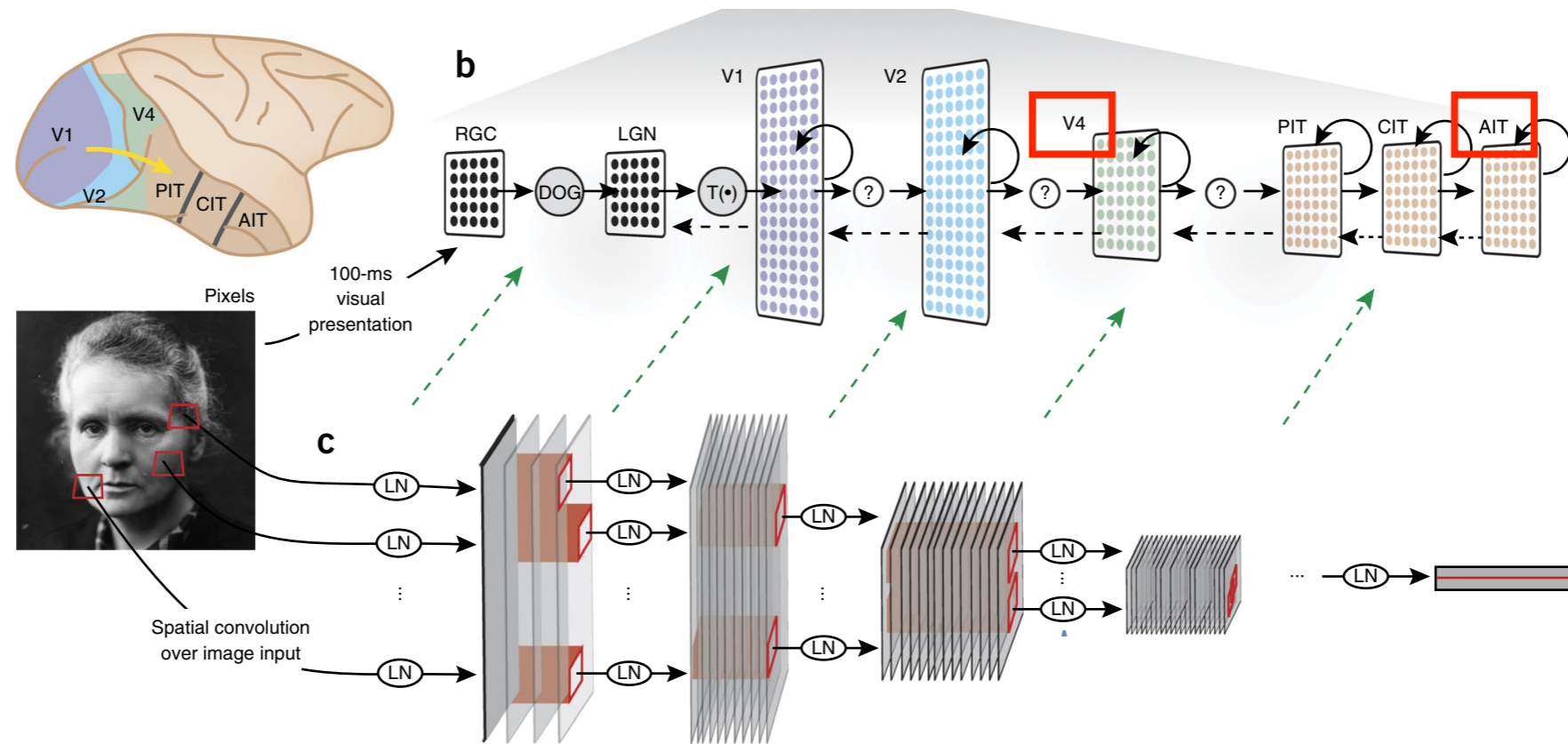
Visual cortex vs. Feed-forward deep neural network



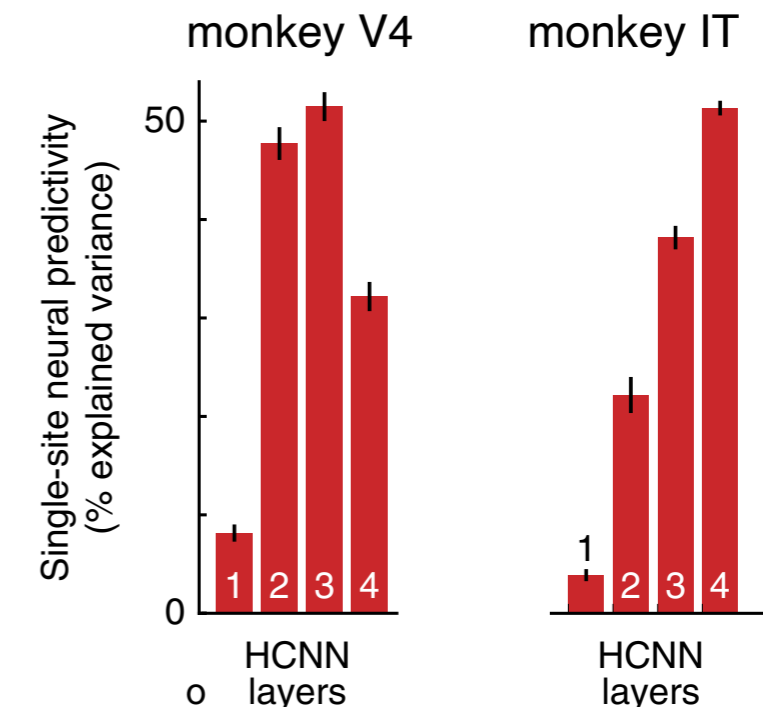
1600 unseen test image (sorted by category)

Yamins et al (2016) Nat Neurosci

Visual cortex vs. Feed-forward deep neural network



1600 unseen test image (sorted by category)



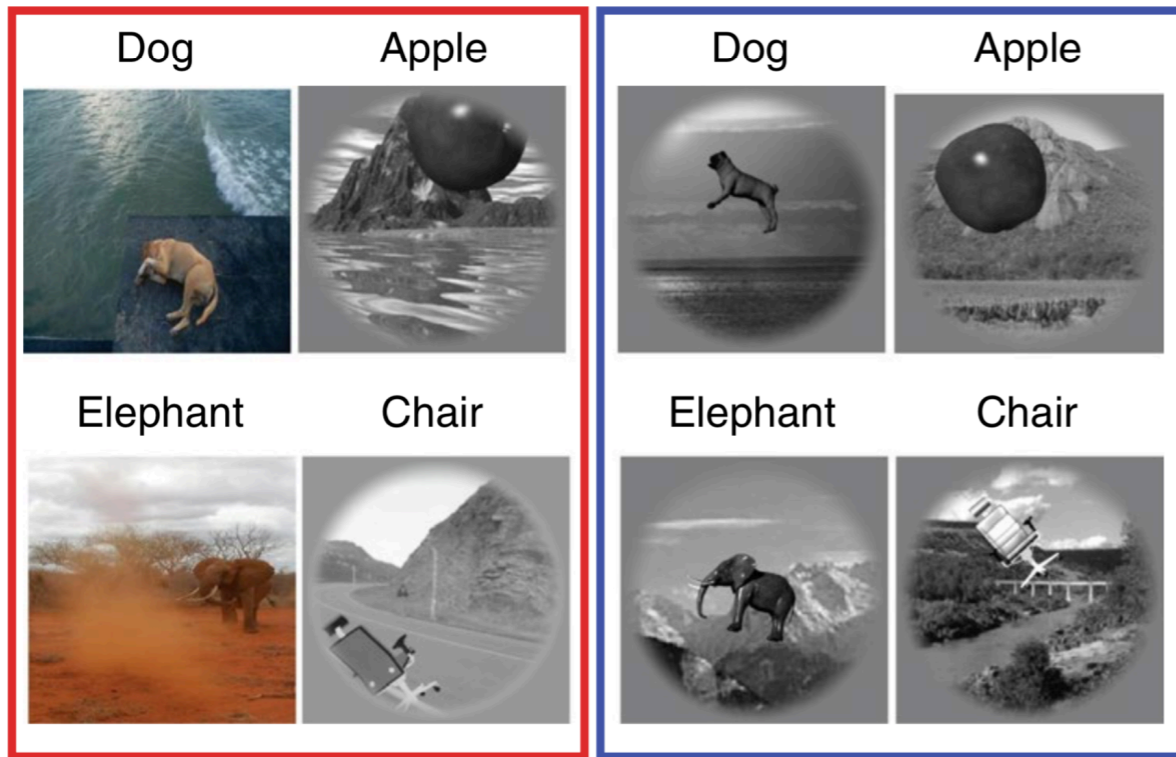
Yamins et al (2016) Nat Neurosci

Visual cortex vs. Feed-forward deep neural network

Image examples

Challenge images

Control images

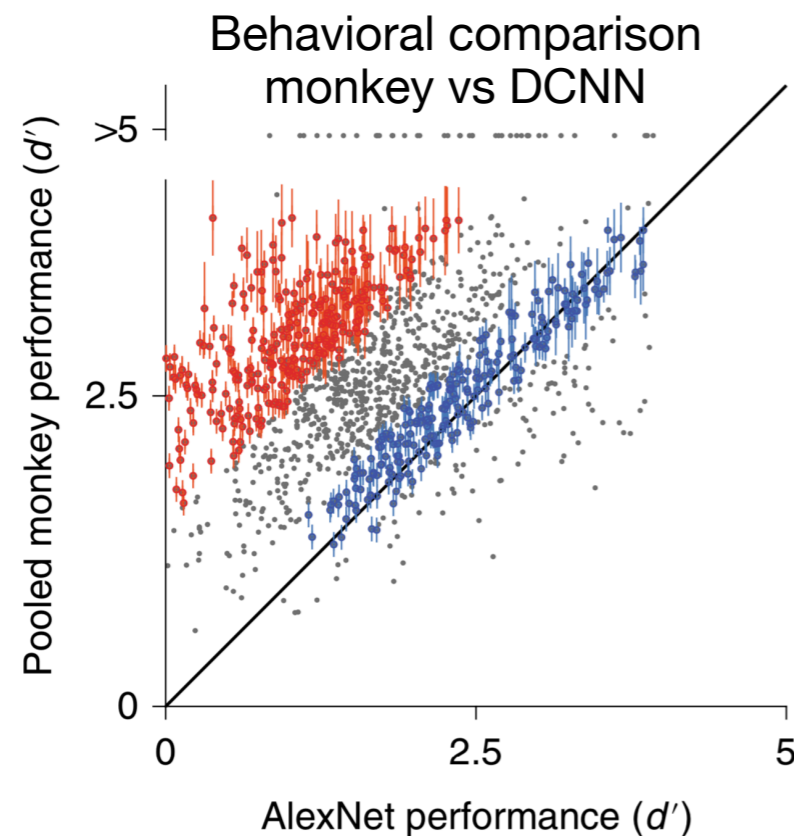
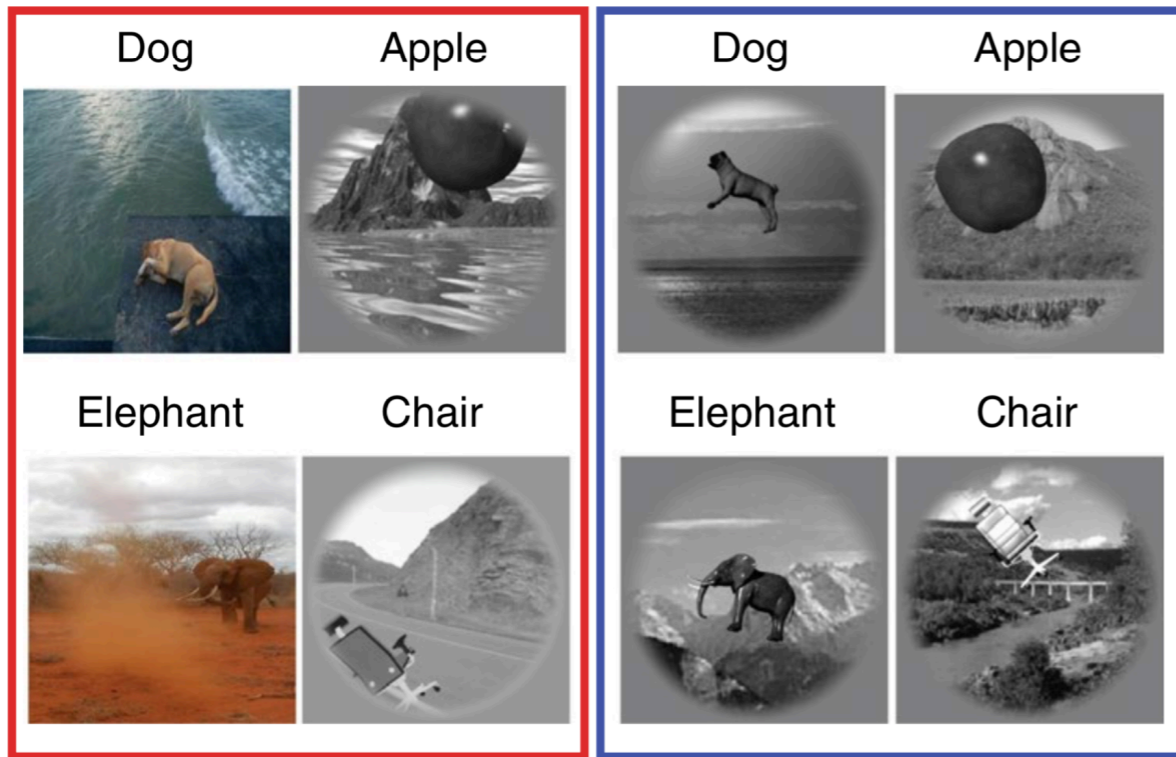


Visual cortex vs. Feed-forward deep neural network

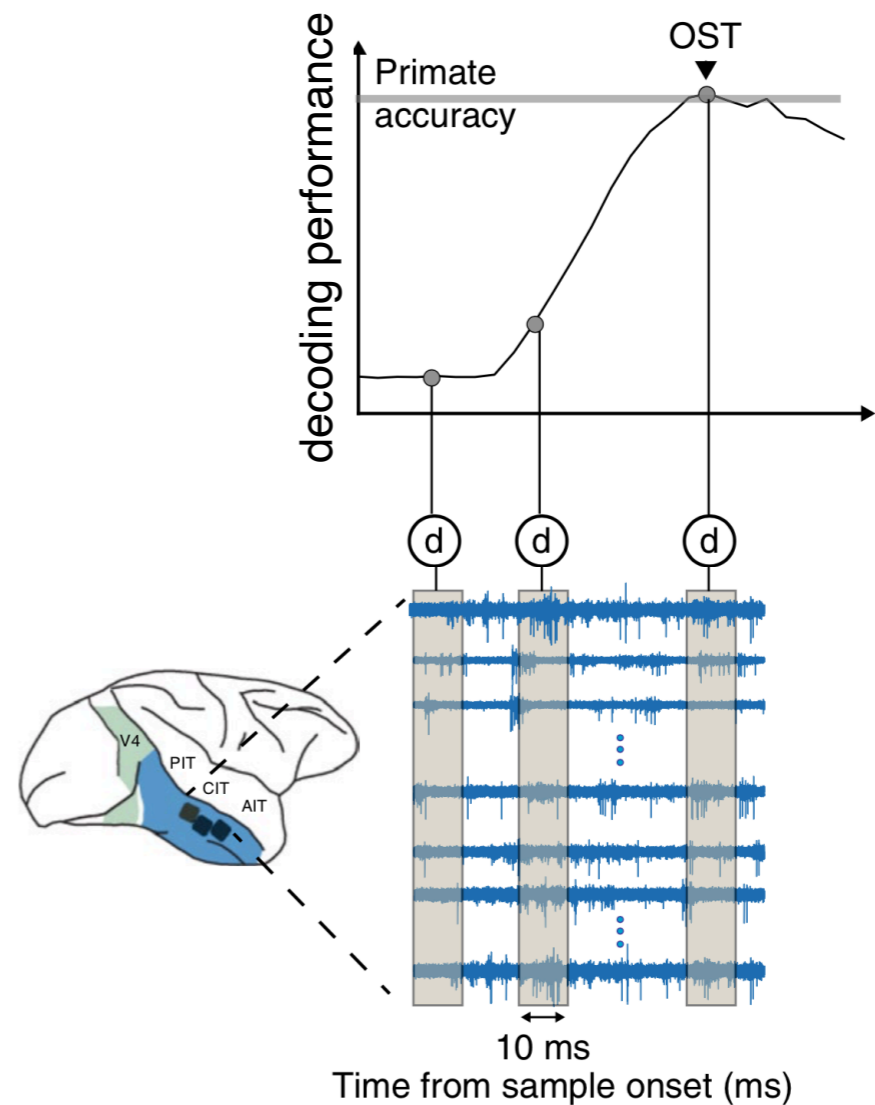
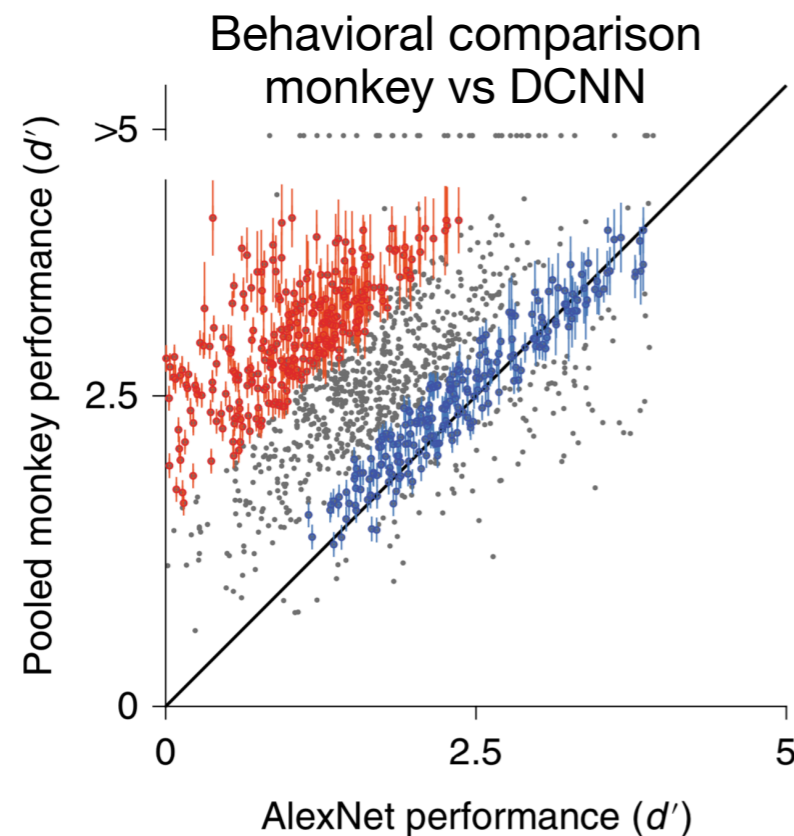
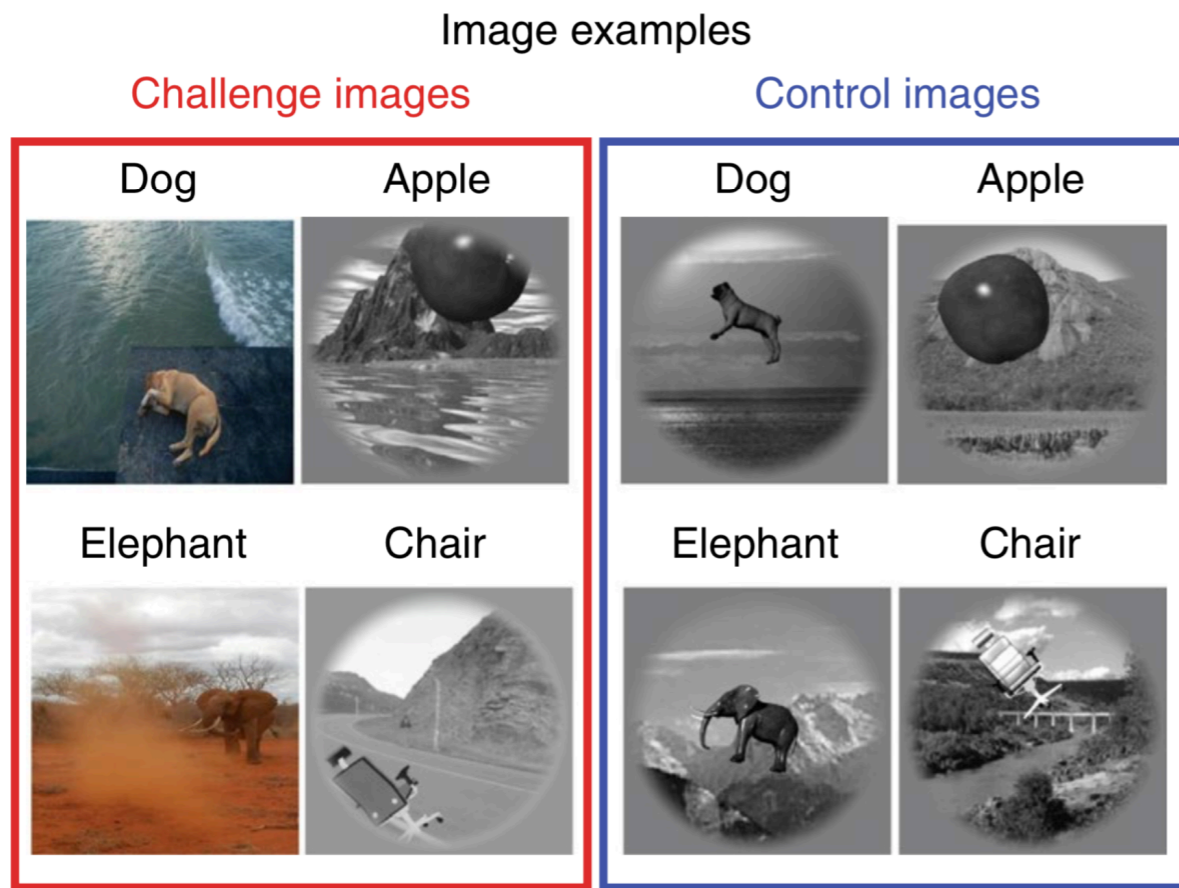
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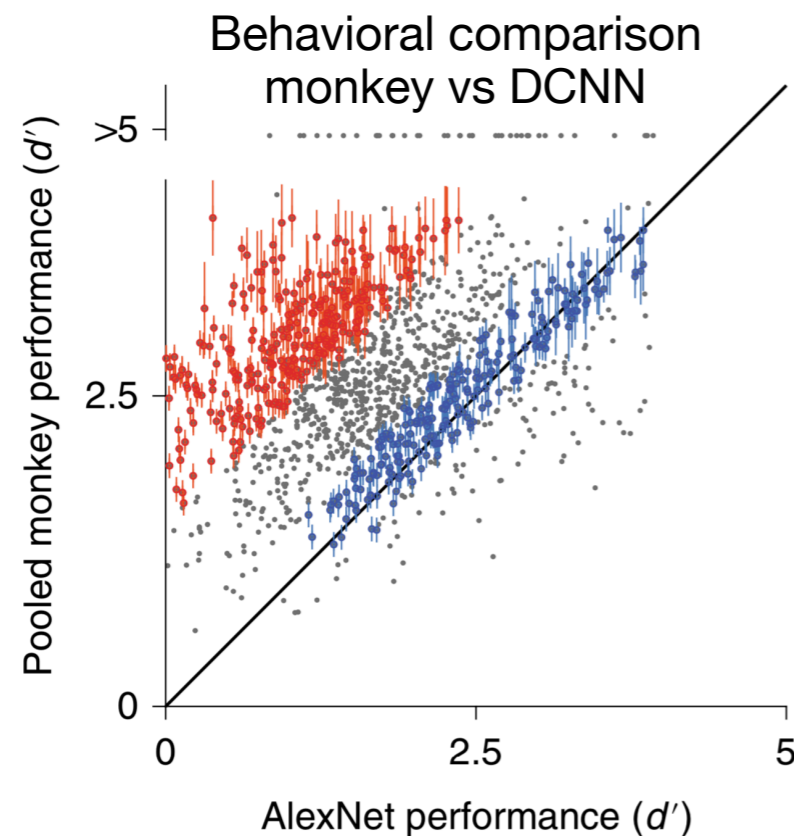
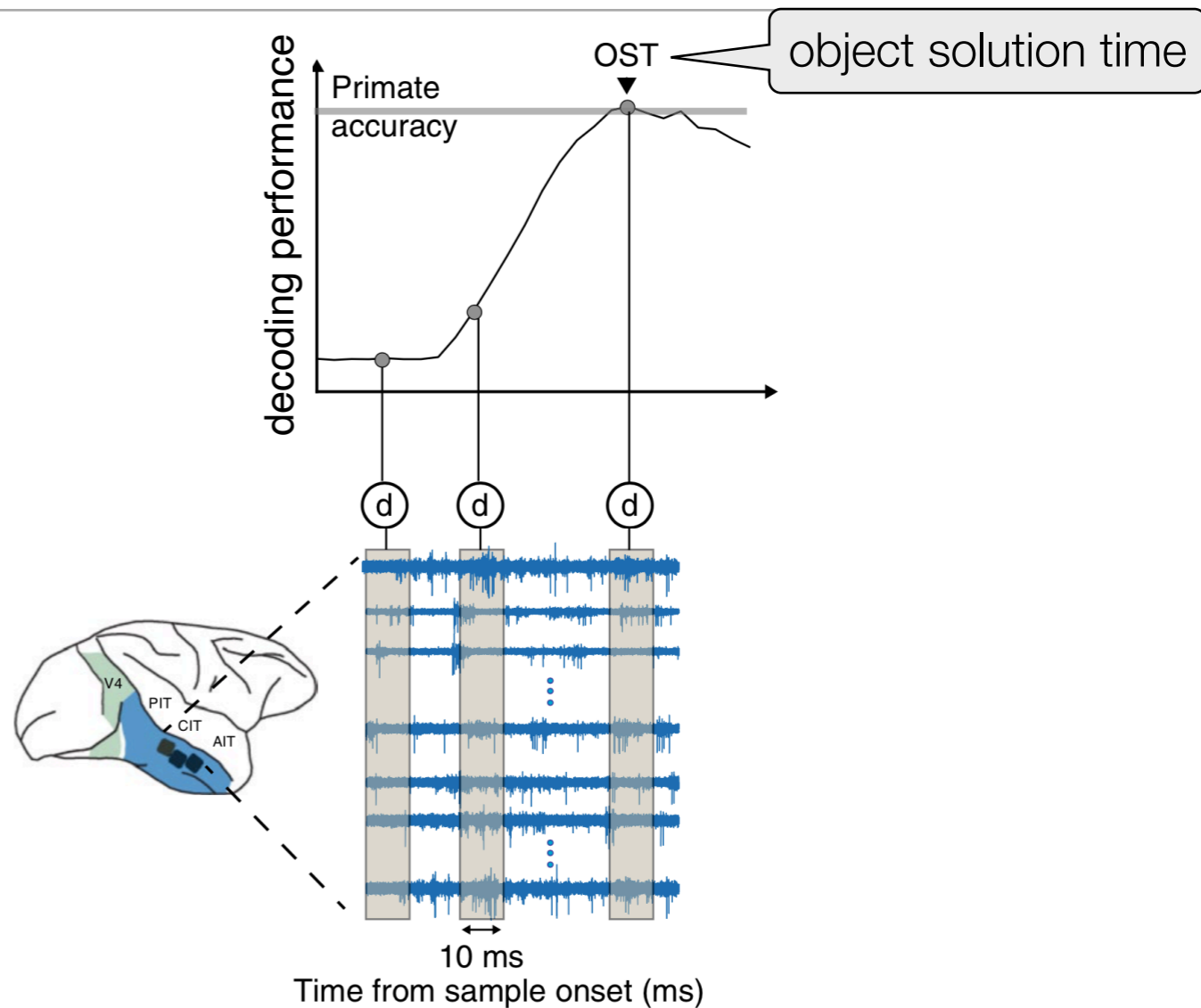
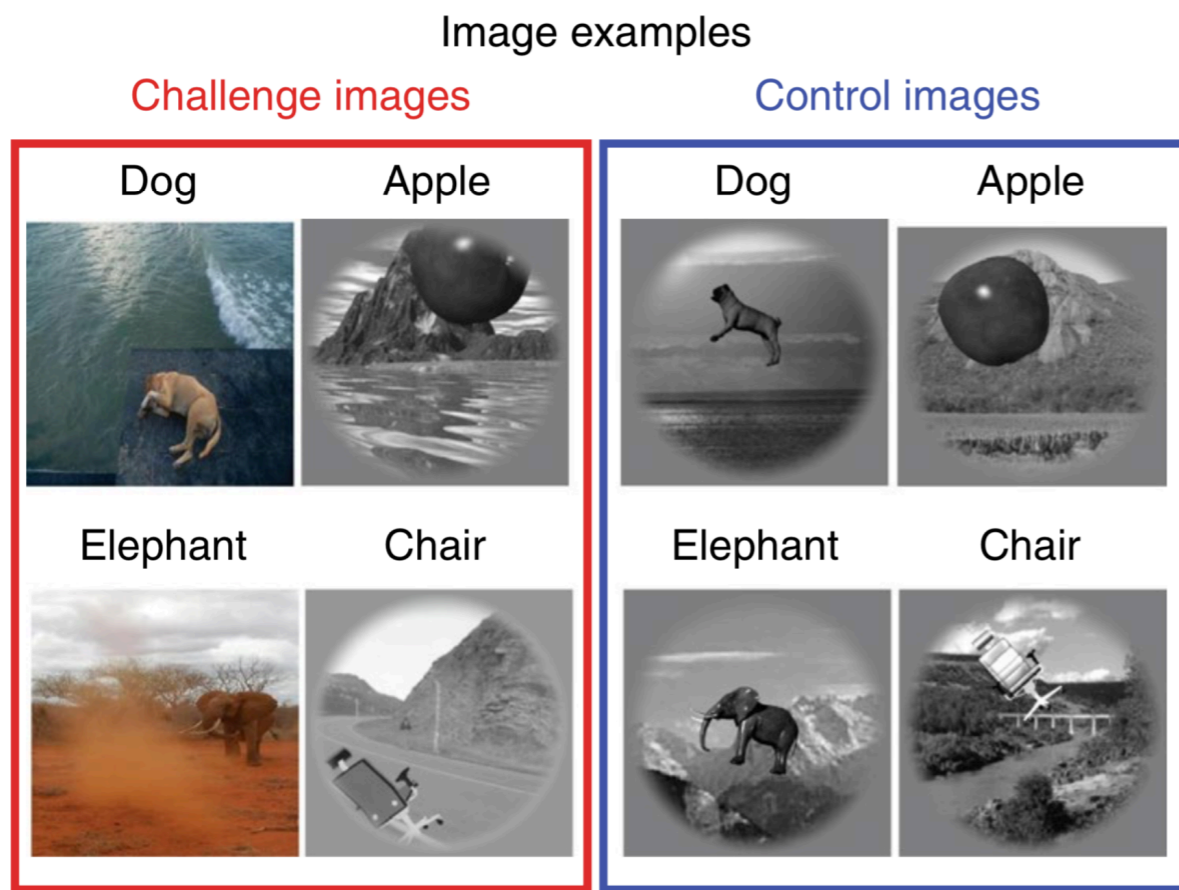
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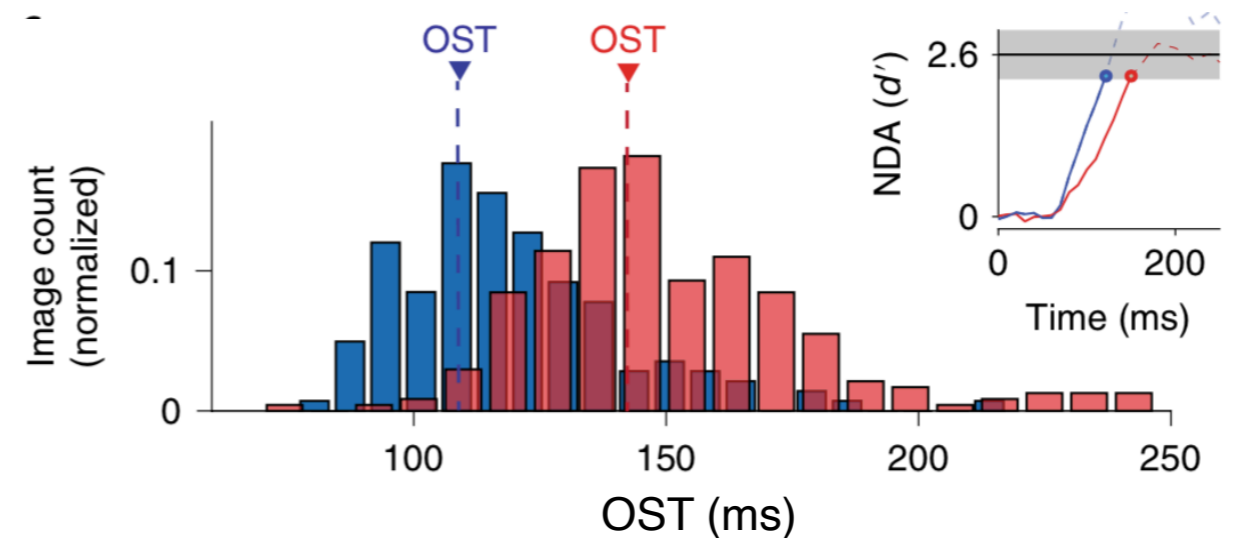
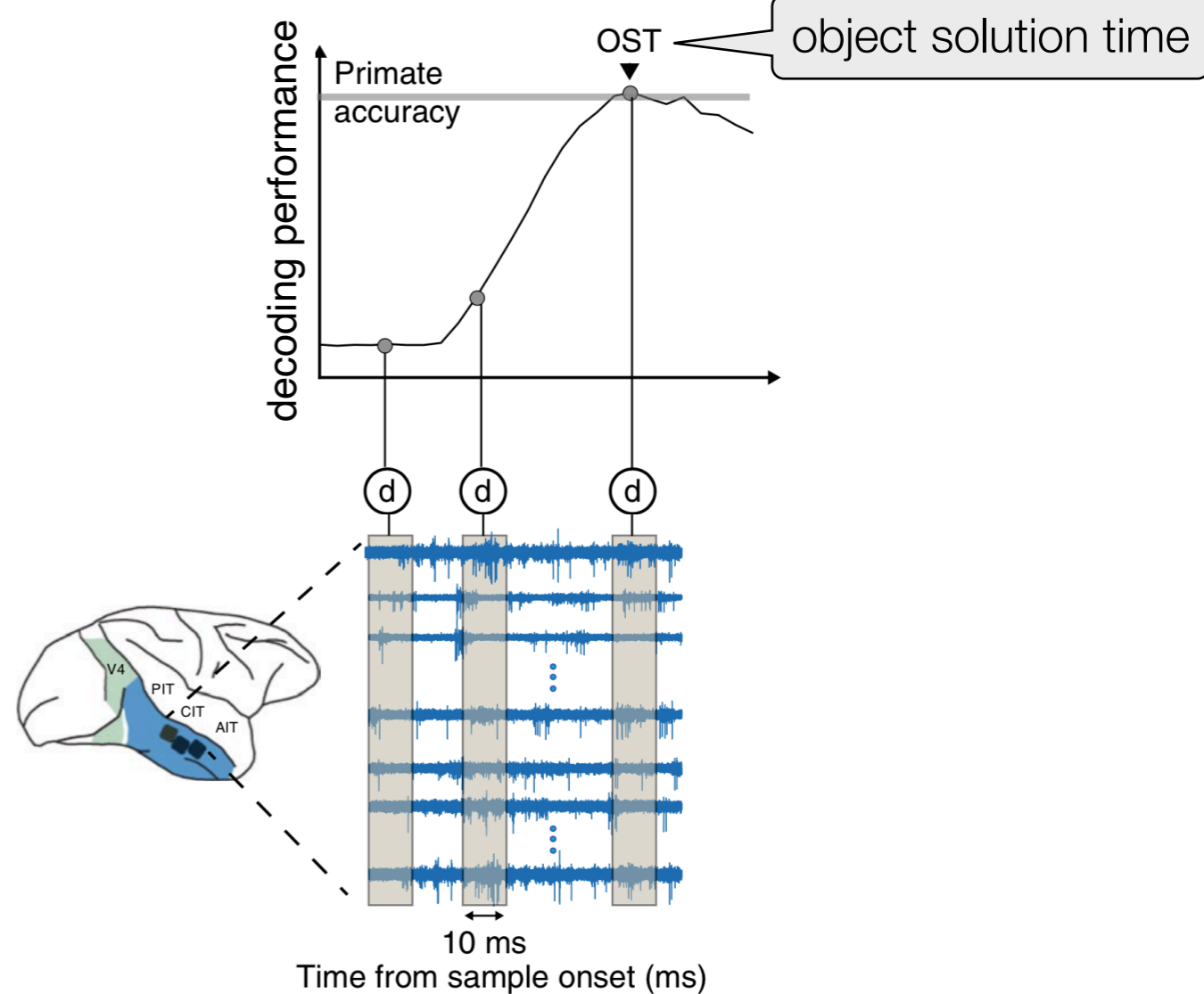
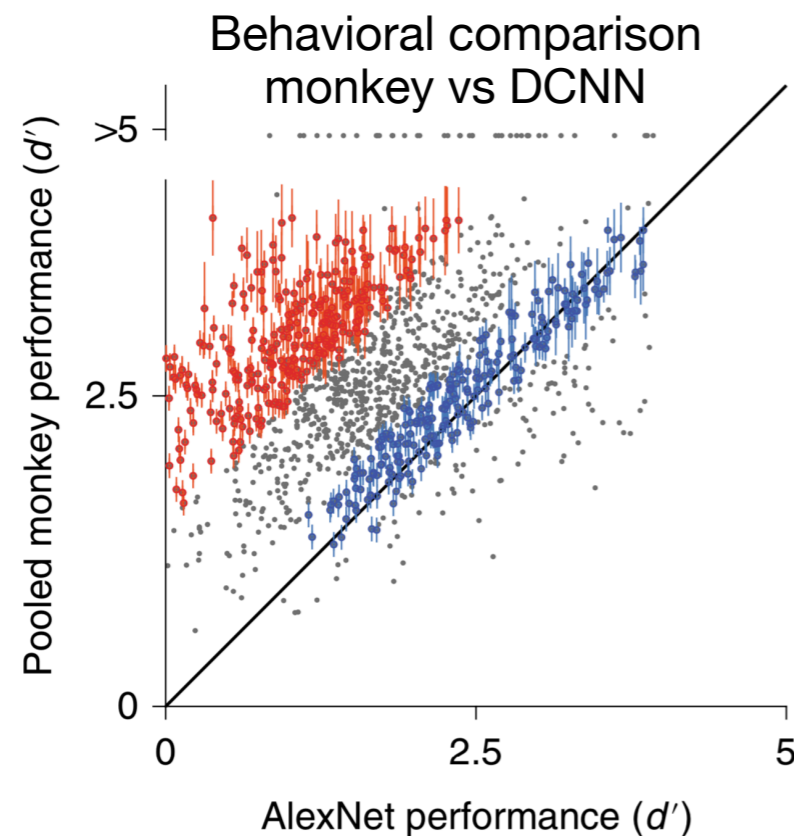
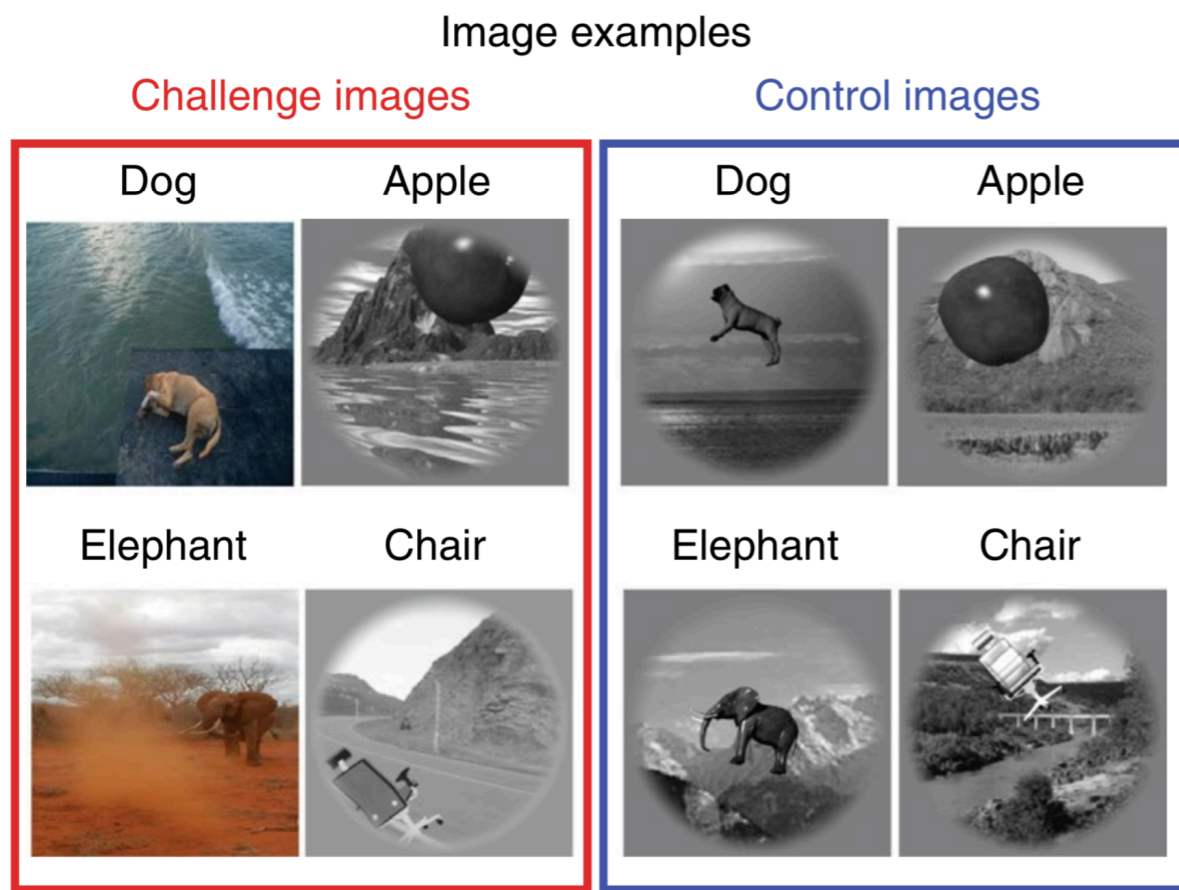
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Kar et al (2019) Nat Neurosci