Representational Dynamics: The Temporal Evolution of Neural Population Coding in Nonhuman Primate Inferior Temporal Cortex

Submission ID   3000091

Submission Type Poster

Topic   Neuroscience

Status   Submitted

Submitter   Marieke Mur

Affiliation   MRC Cognition and Brain Sciences Unit

SUBMISSION DETAILS

Presentation Type Oral Presentation

Presentation Abstract Summary The primate visual system can be understood as a hierarchical feedforward system that transforms visual input into meaning via a range of linear and nonlinear transformations. The feedforward framework is very successful; however, it ignores temporal dynamics. Temporal dynamics might be highly relevant for object recognition. Here, we analyze single-unit recordings from monkey high-level visual cortex, i.e. inferior temporal cortex, to examine the temporal dynamics of neural population coding of object images. We show that both within- and between category distinctions arise early (80 ms after stimulus onset). Within-category distinctions can be explained by low-level features computed from the input image, while between-category distinctions cannot, especially at later time points after stimulus onset (> 125 ms). These results suggest that the IT code reflects both visual similarity and category distinctions and that the latter might require some recurrent processing to emerge.

Paper Upload (PDF) CNN2017.pdf

Co-author Information

* Presenting Author

First Name	Last Name	Affiliation	E-mail
Marieke *	Mur *	MRC Cognition and Brain Sciences Unit	marieke.mur@mrc-cbu.cam.ac.uk

Andrew	Bell	MRC Cognition and Brain Sciences Unit; Department of Experimental Psychology, University of Oxford; Laboratory of Brain and Cognition, NIMH	andrew.bell@psy.ox.ac.uk
Nicholas	Malecek	Laboratory of Brain and Cognition, NIMH	nmalecek@gmail.com
Elyse	Morin	Laboratory of Brain and Cognition, NIMH	elyselouisemorin@gmail.com
John	Duncan	MRC Cognition and Brain Sciences Unit; Department of Experimental Psychology, University of Oxford	john.duncan@mrc-cbu.cam.ac.uk
Nikolaus	Kriegeskorte	MRC Cognition and Brain Sciences Unit	nikolaus.kriegeskorte@mrc-cbu.cam.ac.uk

Keywords

Keywords
object recognition
inferior temporal cortex
macaque
temporal dynamics
population coding
Convolutional Neural Nets