Deep Multi-View Representation Learning of Brain Responses to Natural Stimuli

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Submitter Leila Wehbe

Affiliation UC Berkeley

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Presentation Abstract Summary One of the central goals of cognitive neuroscience is to understand how information is represented in the brain. Most neuroimaging studies focus on only a single cognitive domain such as vision and language, and use relatively simple, highly controlled stimuli. Here we construct a statistical model that learns a common latent "cognitive" space that accounts for results obtained in many different naturalistic neuroimaging experiments. Using data from experiments in which subjects listened to spoken stories and watched natural movies, we show that this model can accurately reconstruct: (1) any one subject's brain activity from any stimulus feature view; (2) any stimulus feature view from any subject's brain activity; and (3) any subject's brain activity from any other subject's brain activity. Our one model provides a common representation of cognitive events across experiments, subjects and feature spaces.

Co-author Information

* Presenting Author

First Name	Last Name	Affiliation	E-mail
Leila *	Wehbe *	UC Berkeley	lwehbe@berkeley.edu
Anwar	Nunez-Elizalde	UC Berkeley	anwarnunez@gmail.com
Alexander	Huth	UC Berkeley	alex.huth@berkeley.edu
Fatma	Deniz	UC Berkeley	fatma@berkeley.edu
Natalia	Bilenko	UC Berkeley	nbilenko@berkeley.edu
Jack	Gallant	UC Berkeley	gallant@berkeley.edu

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