A COMPUTATIONAL MODEL OF SHARED FINE-SCALE STRUCTURE IN HIGH-DIMENSIONAL CORTICAL INFORMATION SPACES

A TALK BY JAMES HAXBY

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Multivariate pattern analysis reconceptualizes cortical functional architecture as high-dimensional information spaces. This architecture is contained in fine-grained topographies of response tuning and functional connectivity patterns. We have developed a high-dimensional computational model of the structure in these response and connectivity topographies that is shared across brains. We derive this model with new algorithms called response hyperalignment and connectivity hyperalignment. Our model captures shared information as basis functions for response tuning and functional connectivity that are common across brains. These response and connectivity basis functions are instantiated in individual brains as multiplexed topographic basis functions that are specific to each individual brain. We developed this model using fMRI data collected while subjects watched meaning, dynamic naturalistic stimuli, namely movies, and during the resting state. We are now investigating how to leverage this model for more sensitive analyses of individual differences in cortical functional architecture.

James Haxby, is professor in Psychological and Brain Sciences at Dartmouth College in the United States. He is the Director of the Dartmouth Center for Cognitive Neuroscience. He is a computational cognitive neuroscientist who investigates visual cognition, the representation of semantic knowledge, and person perception with functional brain imaging.

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