Invariant Recognition drives neural representations of action sequences

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Presentation Abstract Summary Recognizing the actions of others from visual stimuli is a crucial aspect of visual perception. Humans are able to identify similar behaviors and discriminate between distinct actions despite transformations, like changes in viewpoint or actor, that substantially alter the visual appearance of a scene. This ability to generalize across complex transformations is a hallmark of human visual intelligence. Advances in understanding motion perception at the neural level have not always translated in precise accounts of the computational principles underlying what representation of action sequences our visual cortex evolved or learned to compute. Here we test our hypothesis that invariant action discrimination might fill this gap. We show that spatiotemporal CNNs appropriately categorize video stimuli into actions, and that deliberate model modifications that improve performance on an invariant action recognition task lead to data representations that better match human neural recordings. Our results suggest that performance on invariant discrimination dictates the neural representations of action sequences computed by visual cortex. Moreover, these results broaden the scope of the invariant recognition framework understand human visual intelligence to the study of perception of action sequences.

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