

Representation of configural information in human visual cortex

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Brain & Cognition / KU Leuven (Belgium)

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■ klab.lt

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How do we see?



Vision is hard

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
PROJECT MAC

Artificial Intelligence Group
Vision Memo. No. 100.

July 7, 1966

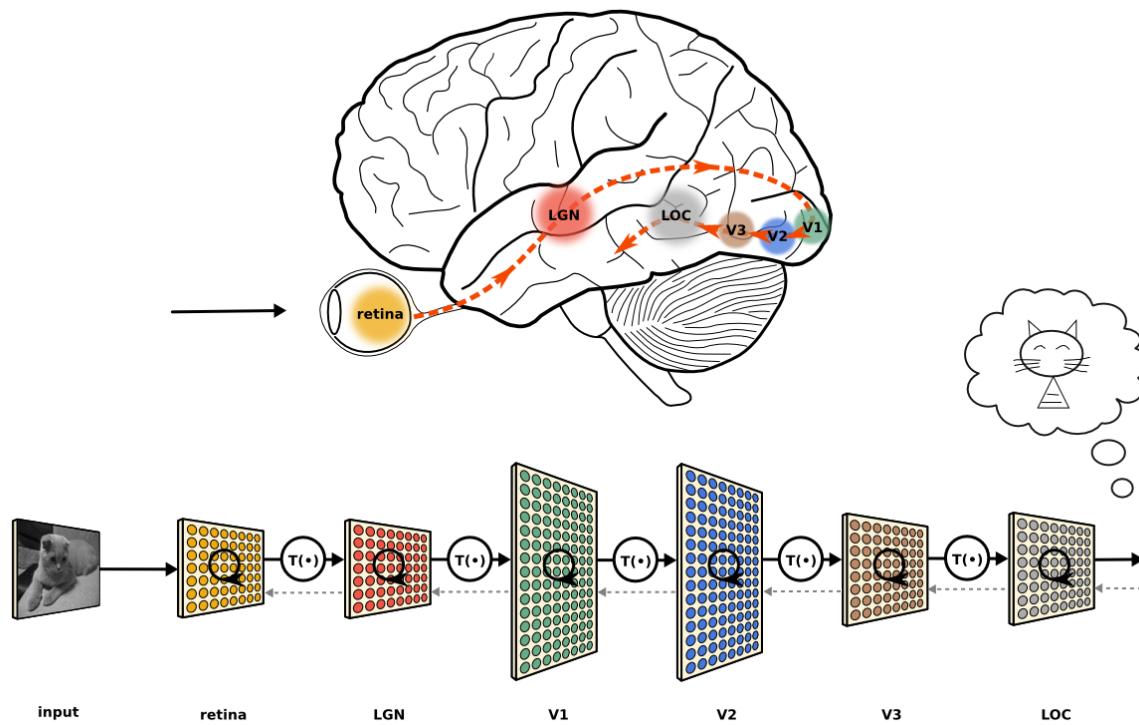
THE SUMMER VISION PROJECT

Seymour Papert

The summer vision project is an attempt to use our summer workers effectively in the construction of a significant part of a visual system.

The particular task was chosen partly because it can be segmented into sub-problems which will allow individuals to work independently and yet participate in the construction of a system complex enough to be a real landmark in the development of "pattern recognition".

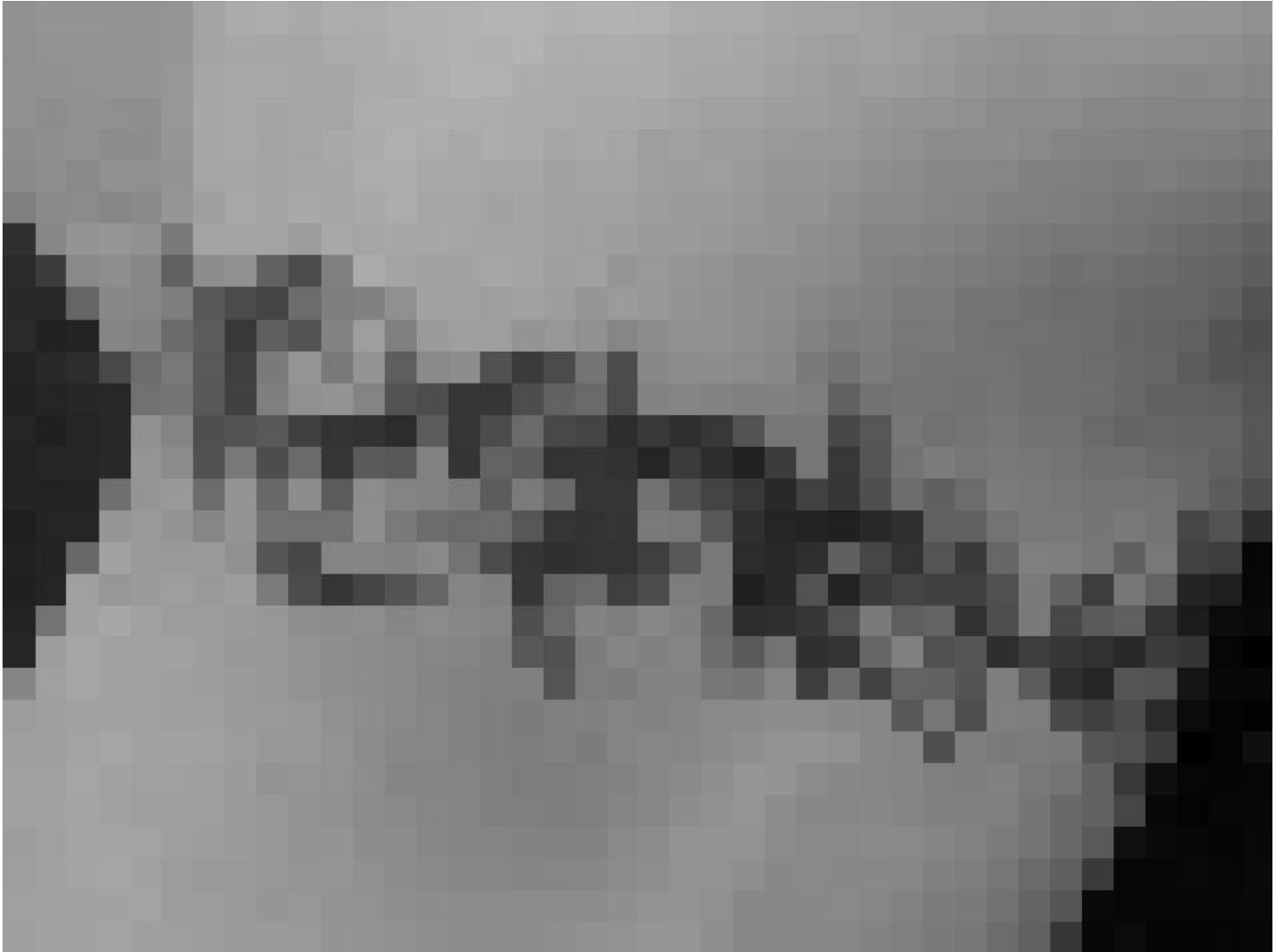
Human brain



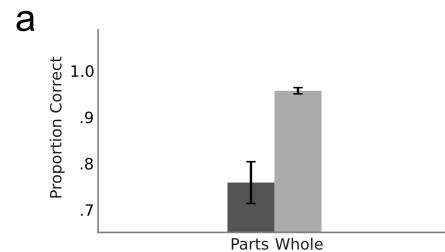
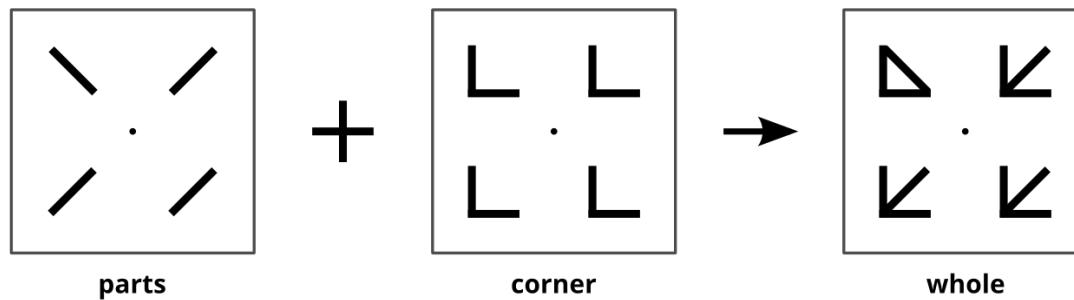
cc by 3.0 – Kubilius (figshare, 2013)

How to get from an image to the knowledge about its contents as perceived by a human observer?

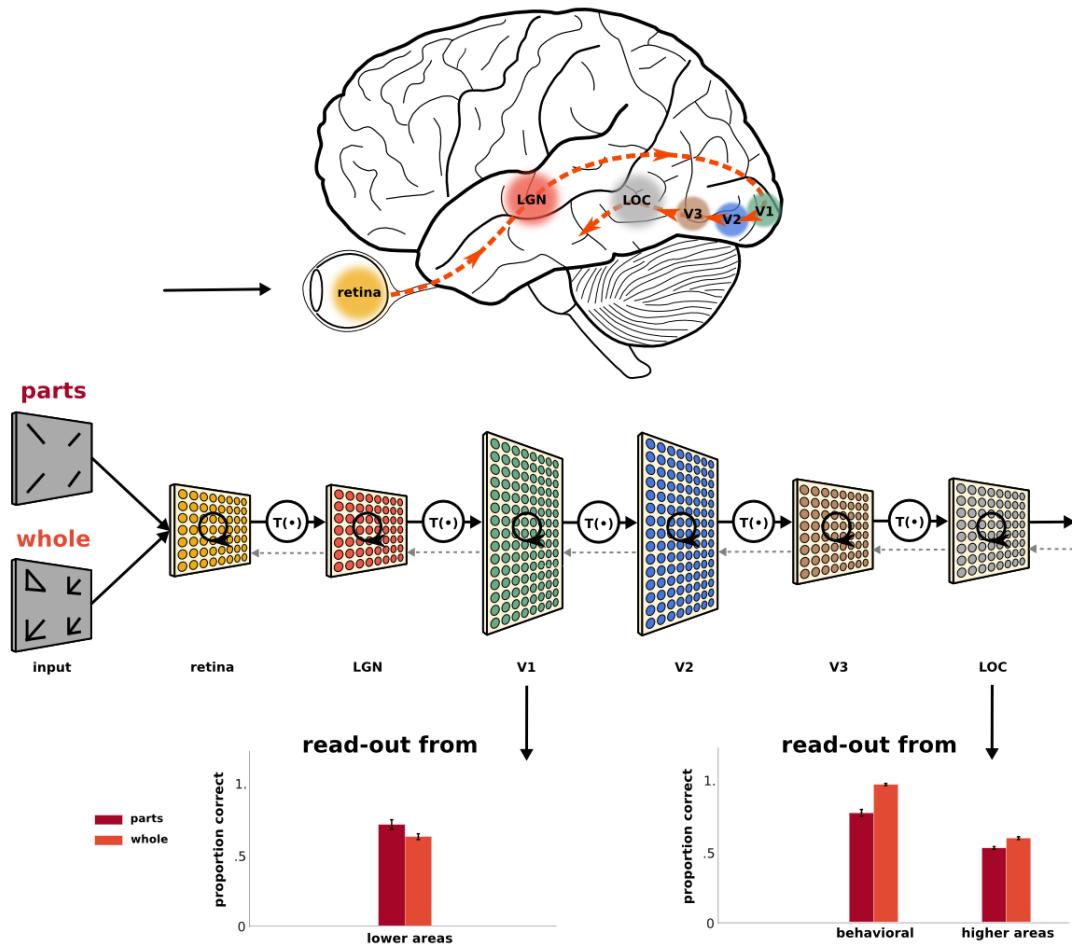
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Configural superiority effect

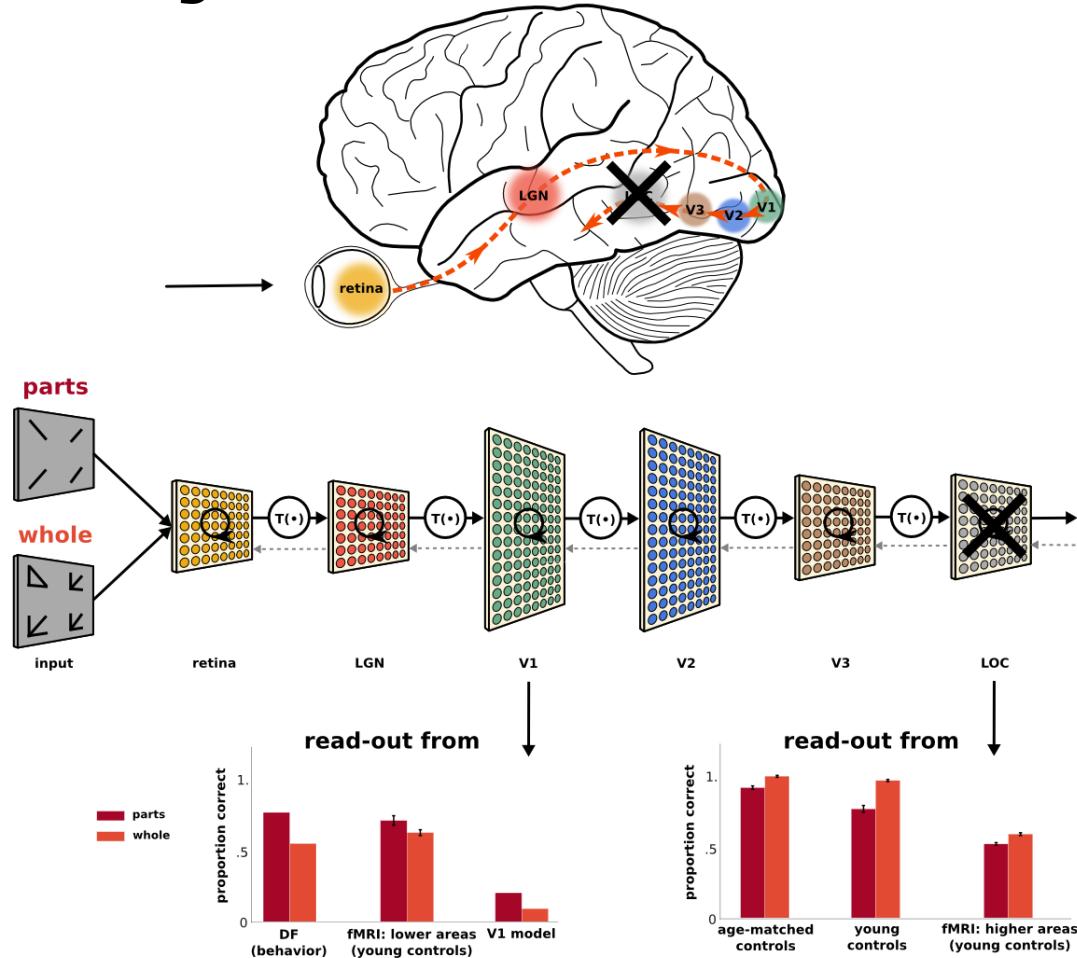


Results



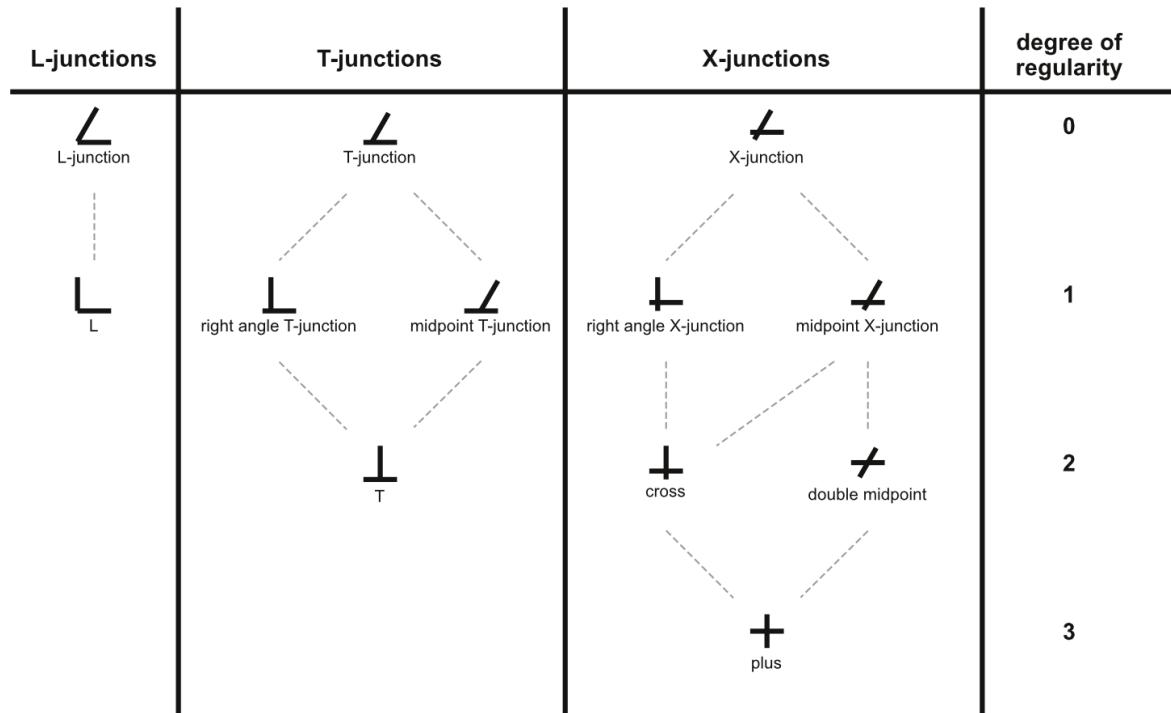
Kubilius et al. (Psychological Science, 2011)

Causality



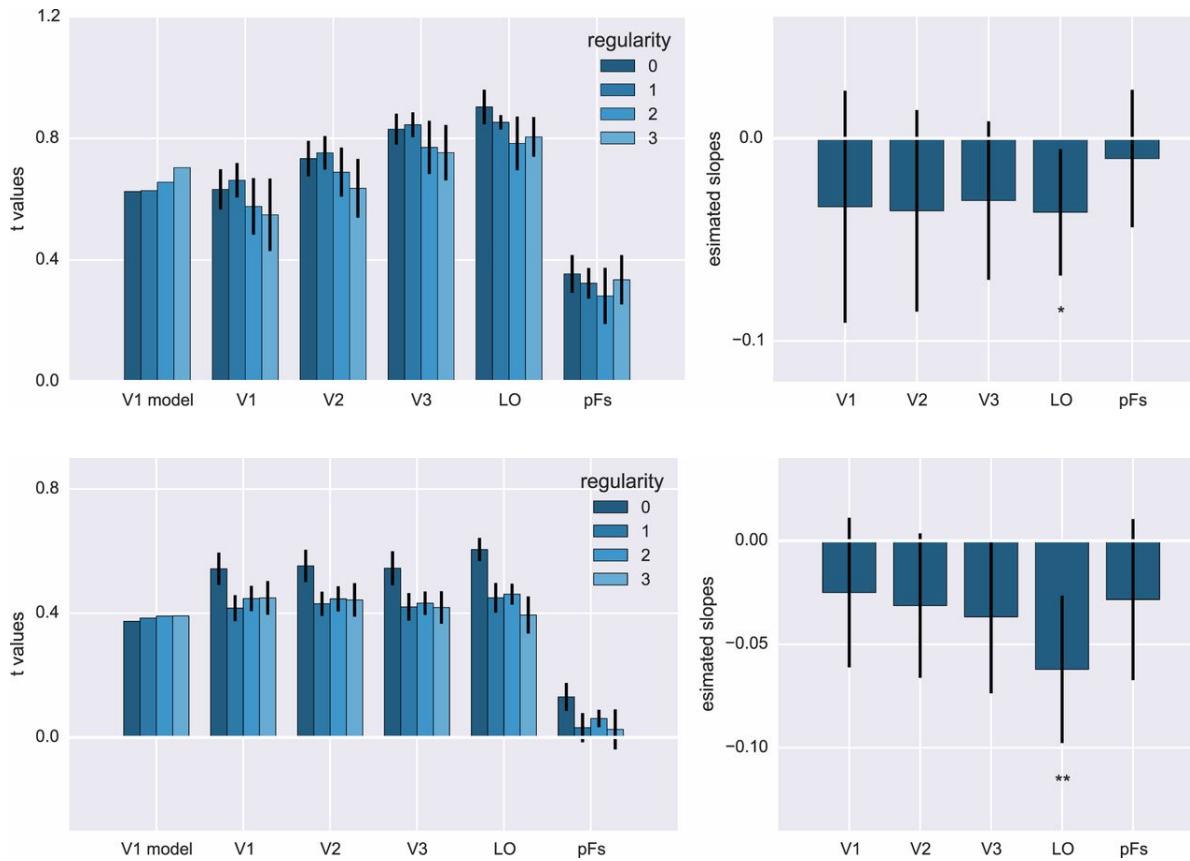
de-Wit, Kubilius et al. (*i-Perception*, 2013)

More configurations



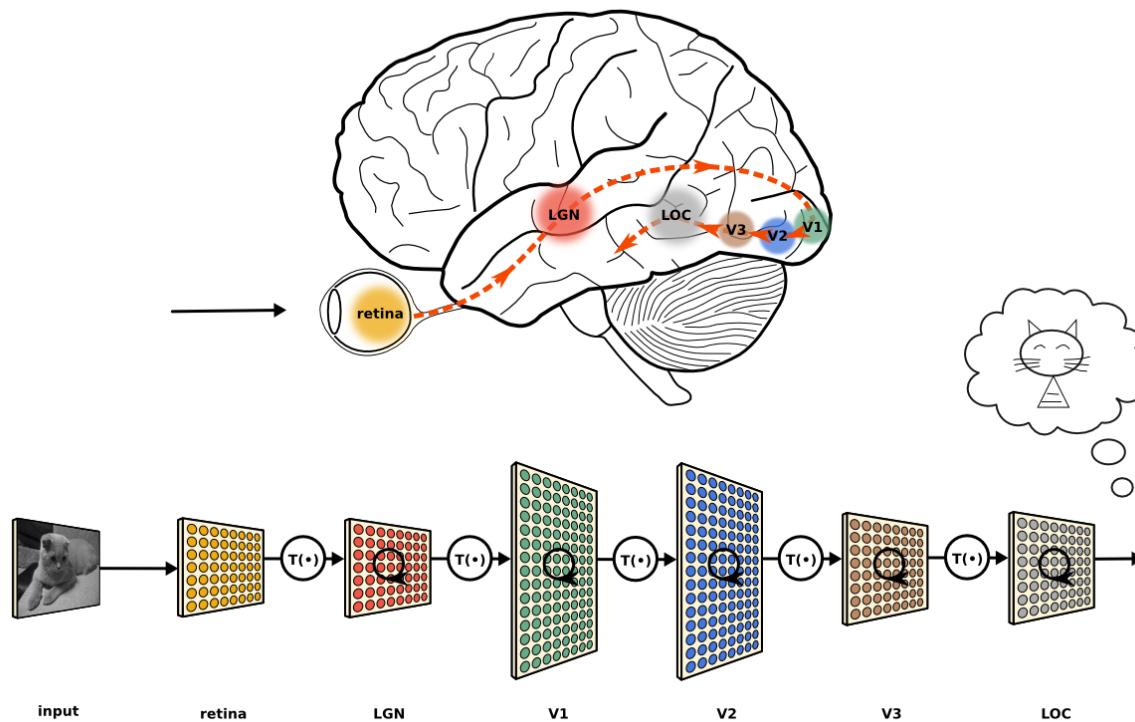
Kubilius et al. (Journal of Vision, 2014)

Results



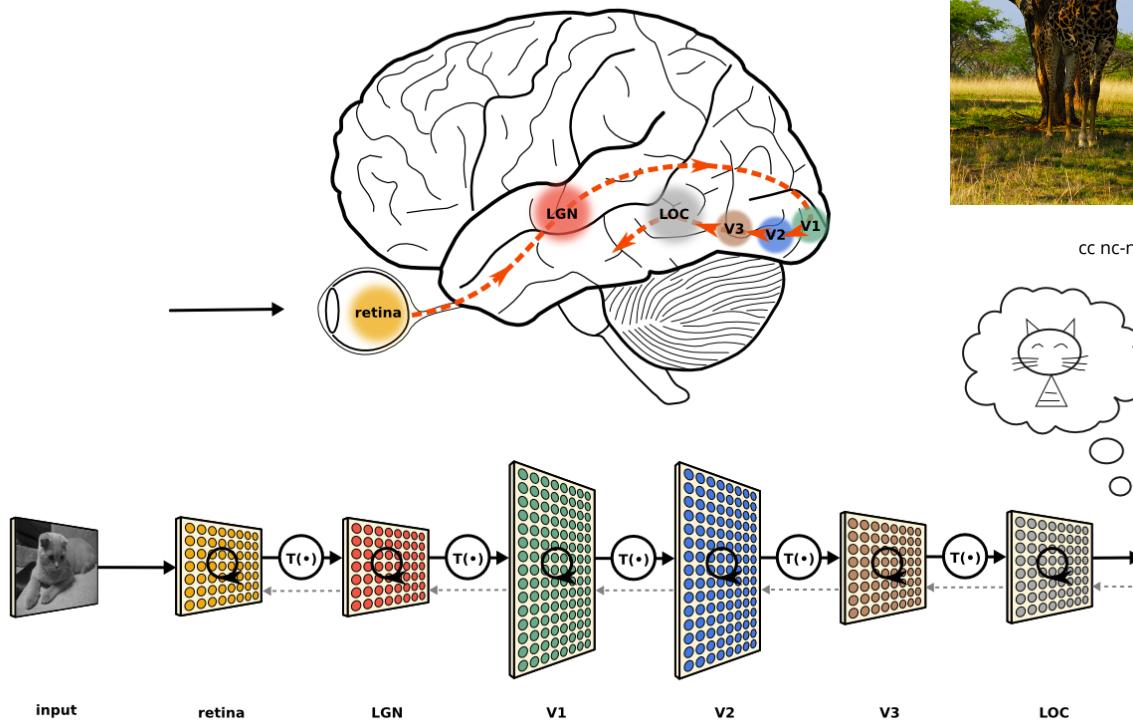
Kubilius et al. (Journal of Vision, 2014)

Feedforward



cc by 3.0 – Kubilius (figshare, 2013)

Recurrent

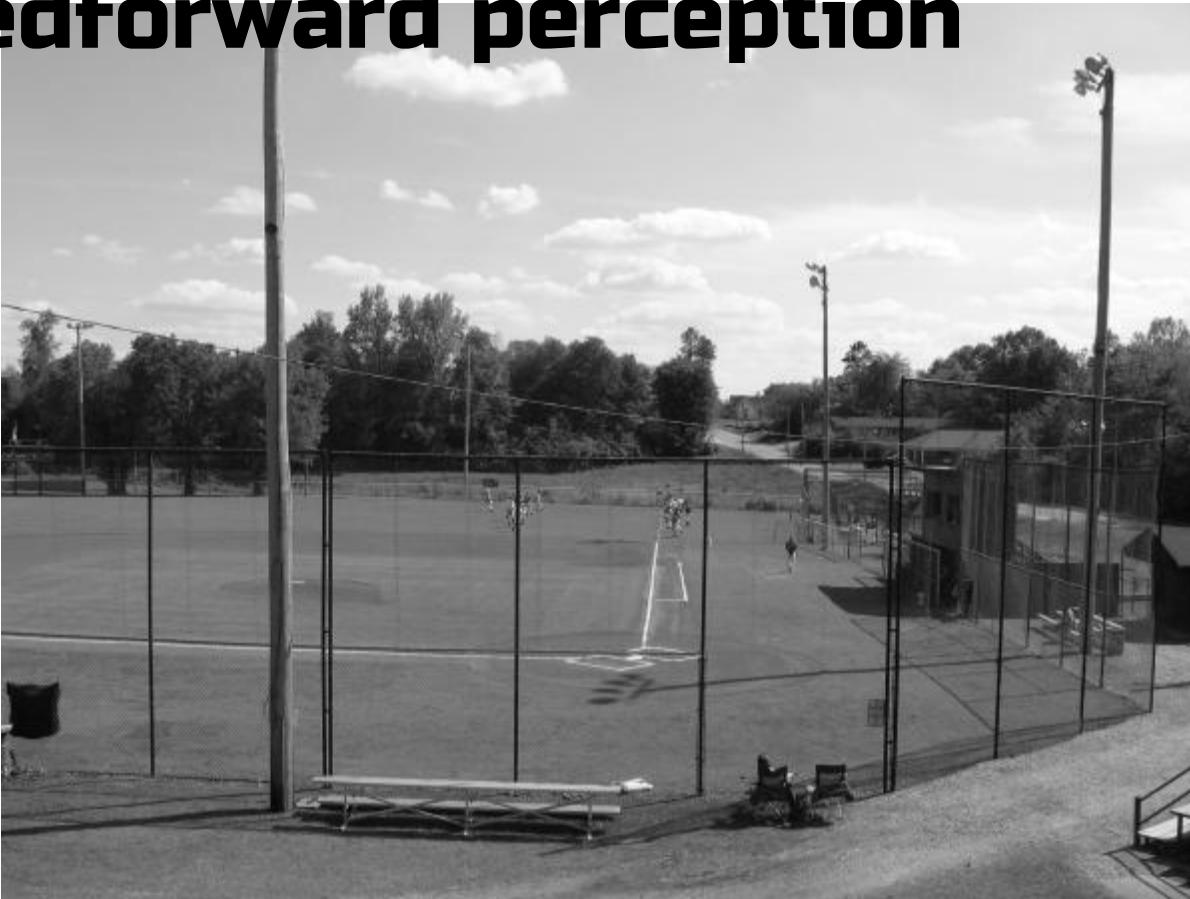


cc nc-nd 2.0 – Martin Heigan / flickr

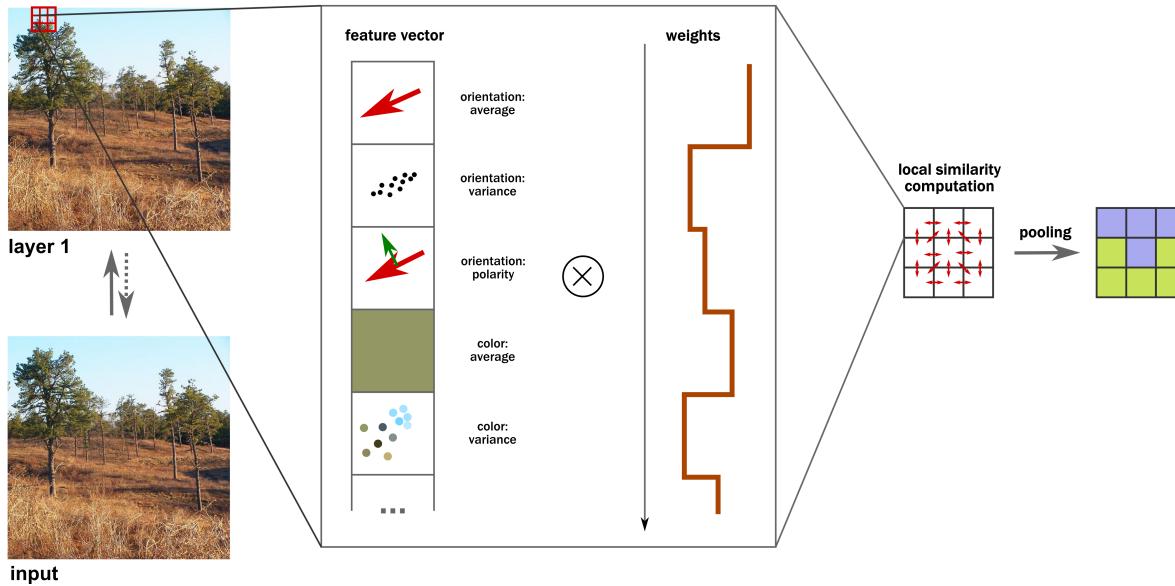


cc by 3.0 – Kubilius (figshare, 2013)

Feedforward perception

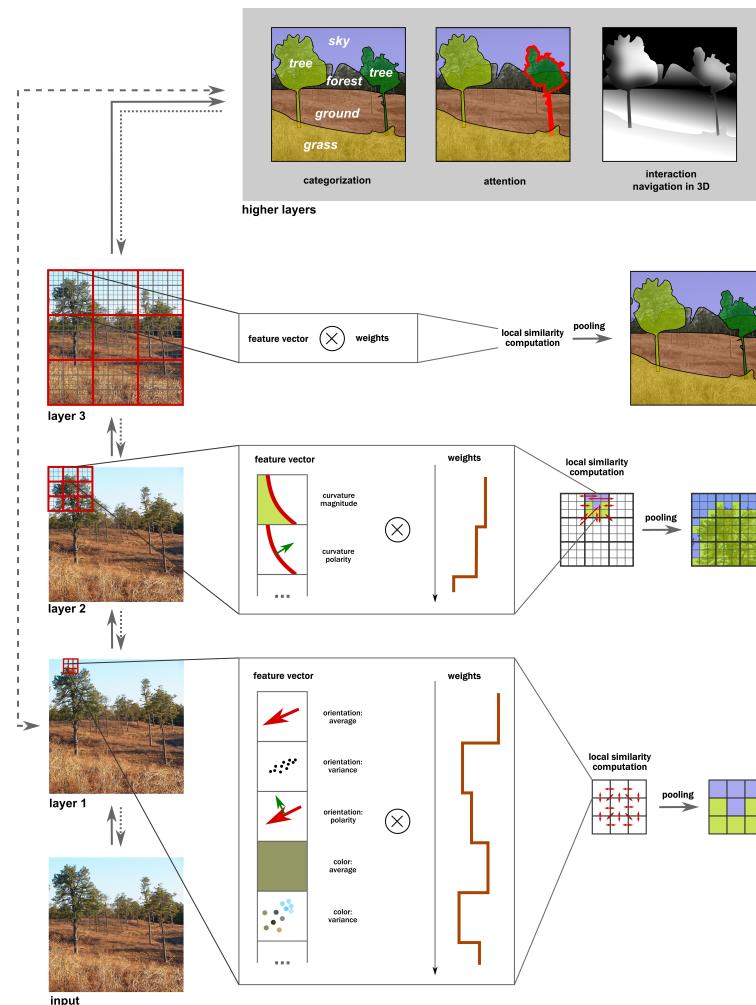


Similarity & pooling



cc by 4.0 – Kubilius et al. (Frontiers in Computational Neuroscience, 2014)

Full architecture



cc by 4.0 – Kubilius et al. (Frontiers in Computational Neuroscience, 2014)

But does it work?



Deep and dumb: State of the art in machine vision

Thank you!

slides available at [klab.lt](#)