Visual Cortex Inspired Hierarchical Deep-Generative Model of Natural Images

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Visual cortex: does it care?





03.05.2022



Visual cortex: does it really care?



Lee & Nguyen, PNAS, 2001 03.05.2022

visual cortex neural response



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Deep discriminative models



1. hierarchical

2. unsupervised

3. top-down

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Unsupervised learning: Deep generative models











TDVAE: contributions to effective inference

- effective inference: contextual prior
- effective inference: expressive posterior



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Image imprinting (unmasking)



Din et al, 2020, IEEE Access

03.05.2022



Deception? Image imprinting?









Lee & Nguyen, PNAS, 2001 03.05.2022

- contextual information defines a prior
- ➡ image imprinting in TDVAE
- ➡ illusory contour responses in visual cortex



Renresentation learning what to look for?





Functional significance of correlations: effective inference

texture families



accuracy

Iccuracy

g



decoding from **mean** response



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Functional significance of correlations: effective inference

texture families







accuracy



 \Rightarrow co-activations are constrained

 \Rightarrow should be reflected in the posterior

decoding from response correlations









Take home



skipVAE







Acknowledgements



Ferenc Csikor



Balázs Meszéna



Bence Szabó

03.05.2022

Funding



Human Frontiers Science Program



ARTIFICIAL INTELLIGENCE National Laboratory







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