Statistical models in neuroscience

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Contents

Deep Networks
Deep RBMs

[figure from David Reichert]
Deep RBMs

Conditioning on variables in even(odd) layer makes variables in odd(even) layer conditionally independent.
Deep Belief Network

(a) general BM

(b) restricted BM (RBM)

(c) deep BM (DBM)

(d) Deep Belief Net (DBN)

[figure from David Reichert, cf. Hinton and Salakhutdinov (2006)]
Auto-encoders

[figure from Salakhutdinov (2009)]
Auto-encoders

Reconstruction from auto-encoder (b) and PCA (c).
[figure from Salakhutdinov (2009)]
NNs as brain models?
NNs as brain models

Both optimise a cost function.

[figure from Marblestone et al. (2016)]
NN model of the ventral stream

Transforming images to voxel responses.
[figure from Güçlü and van Gerven (2015)]
NN model of the ventral stream

Features increase in complexity.
[figure from Güçlü and van Gerven (2015)]
NN model of the ventral stream

Higher visual areas correspond to deeper layers.

[figure from Güçlü and van Gerven (2015)]
NNs as brain models?

[figure from Yamins and DiCarlo (2016)]
References


