Neural networks

Deep learning - deep autoencoder

DEEP AUTOENCODER

Topics: deep autoencoder

• Pre-training can be used to initialize a deep autoencoder

‣ This is an example of a situation where underfitting is an issue

- perhaps surprisingly, pre-training initializes the optimization problem in a region with better local optima of training objective

‣ Each RBM used to initialize parameters both in encoder and decoder ("unrolling")

‣ Better optimization algorithms can also help

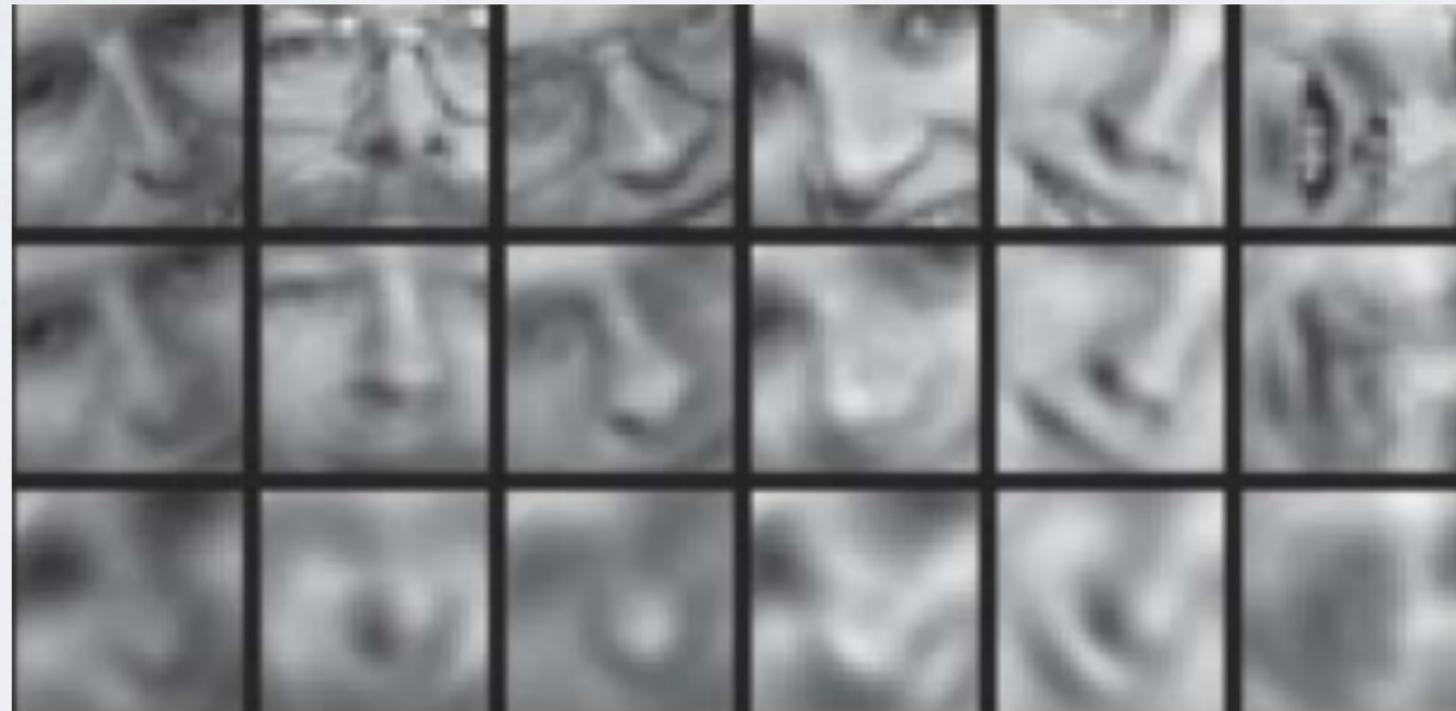- Deep learning via Hessian-free optimization. James Martens, 2010
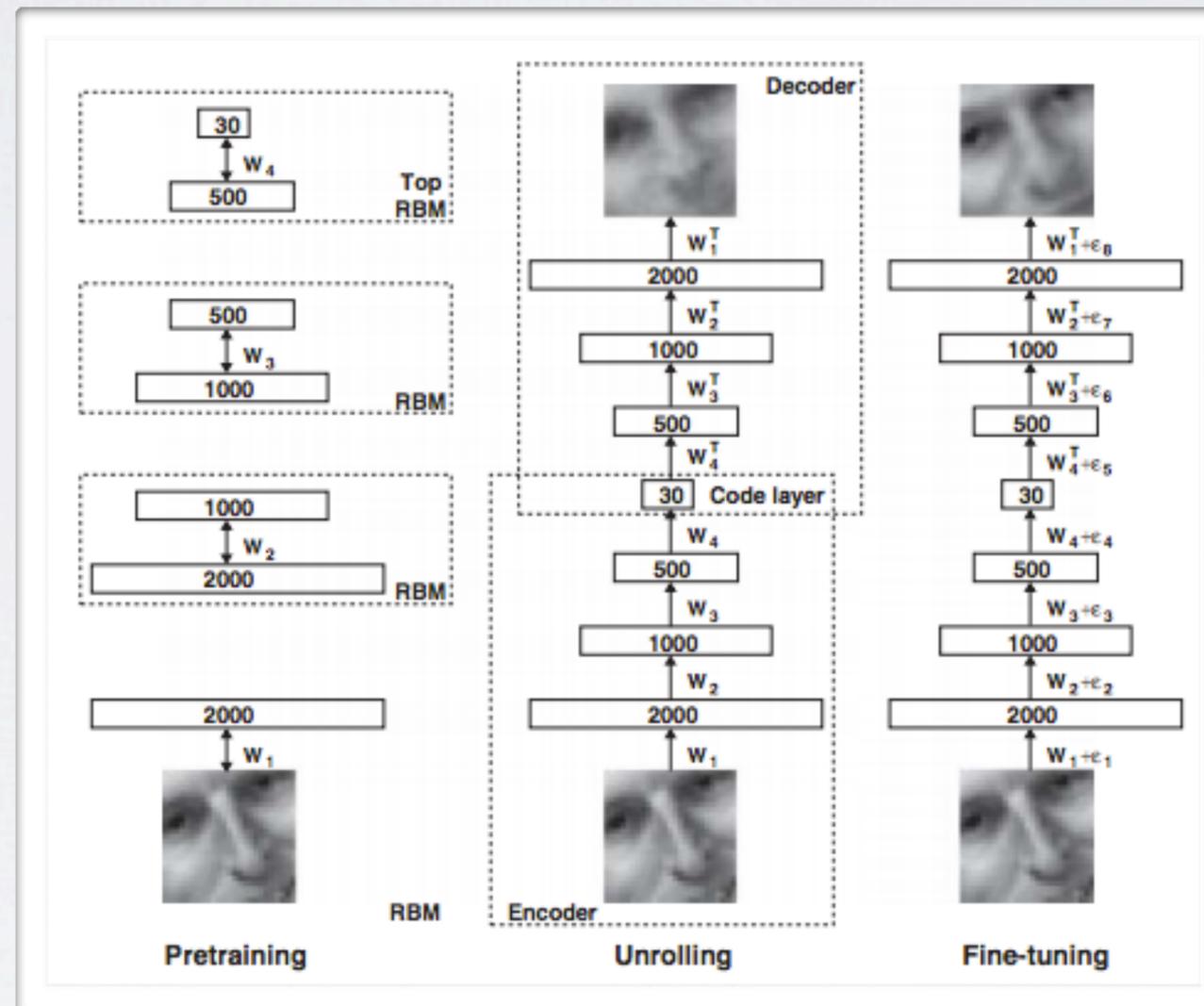
From Hinton and Salakhutdinov, Science, 2006

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Topics: deep autoencoder

• Can be used to reduce the dimensionality of the data

‣ will have better reconstruction than a single layer network (i.e. PCA)
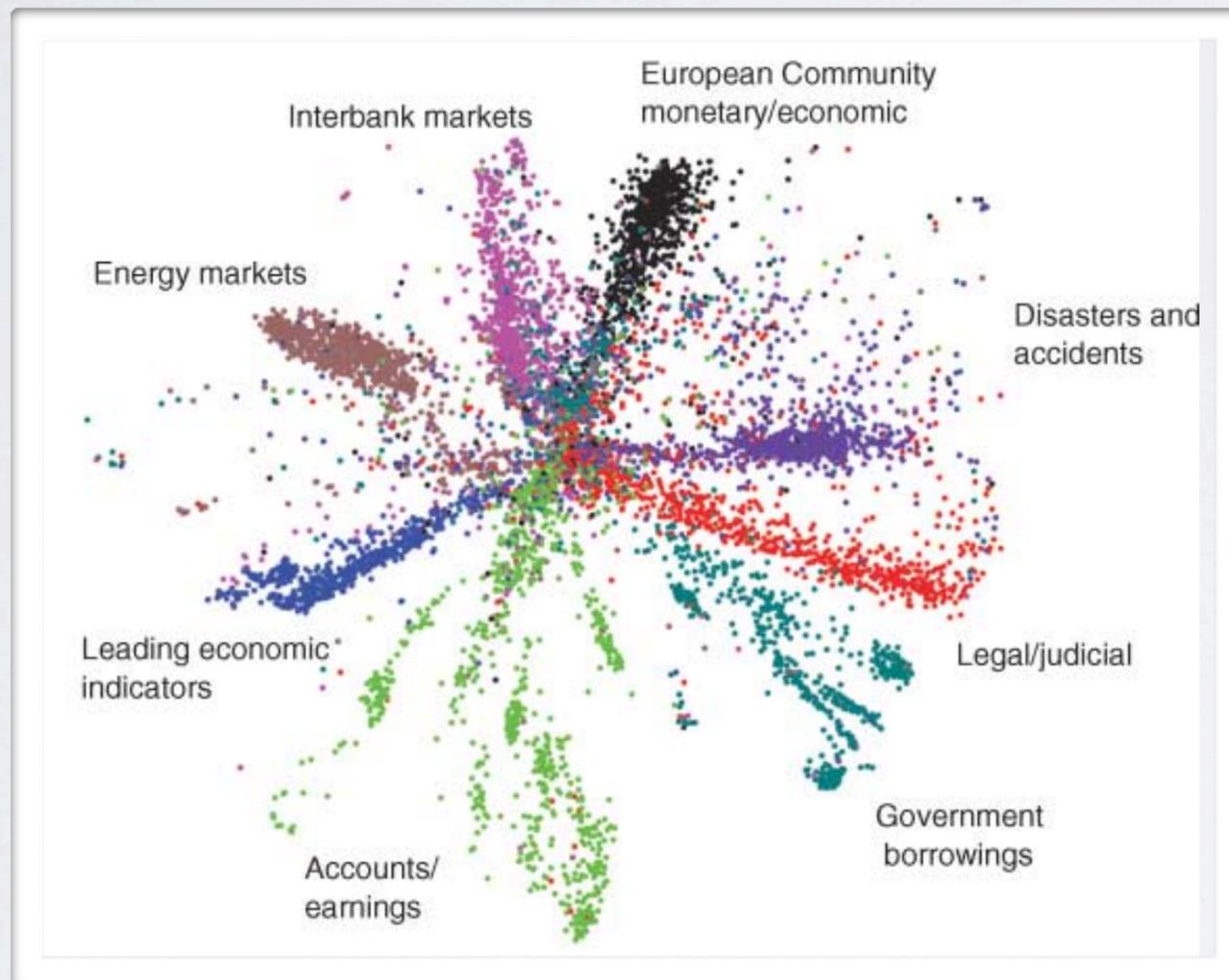
Original data

Deep autoencoder
reconstruction

PCA reconstruction

From Hinton and Salakhutdinov, Science, 2006

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Topics: deep autoencoder

- If we reduce to 2D, we can visualize the data (e.g. a collection of document)

From Hinton and Salakhutdinov, Science, 2006