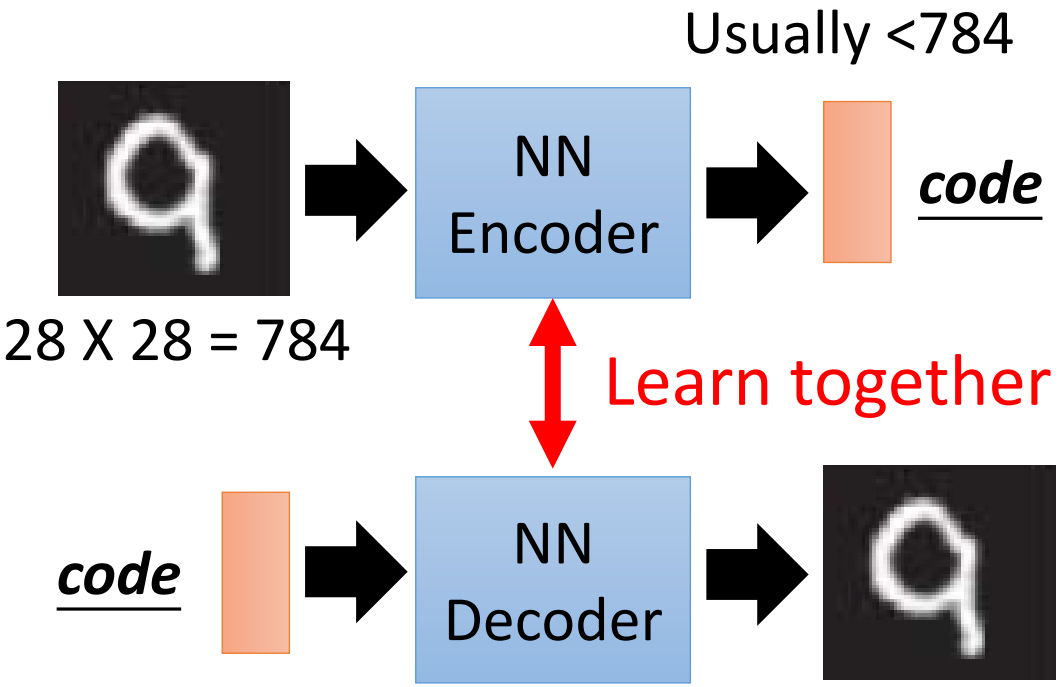
Unsupervised Learning:
Deep Auto-encoder

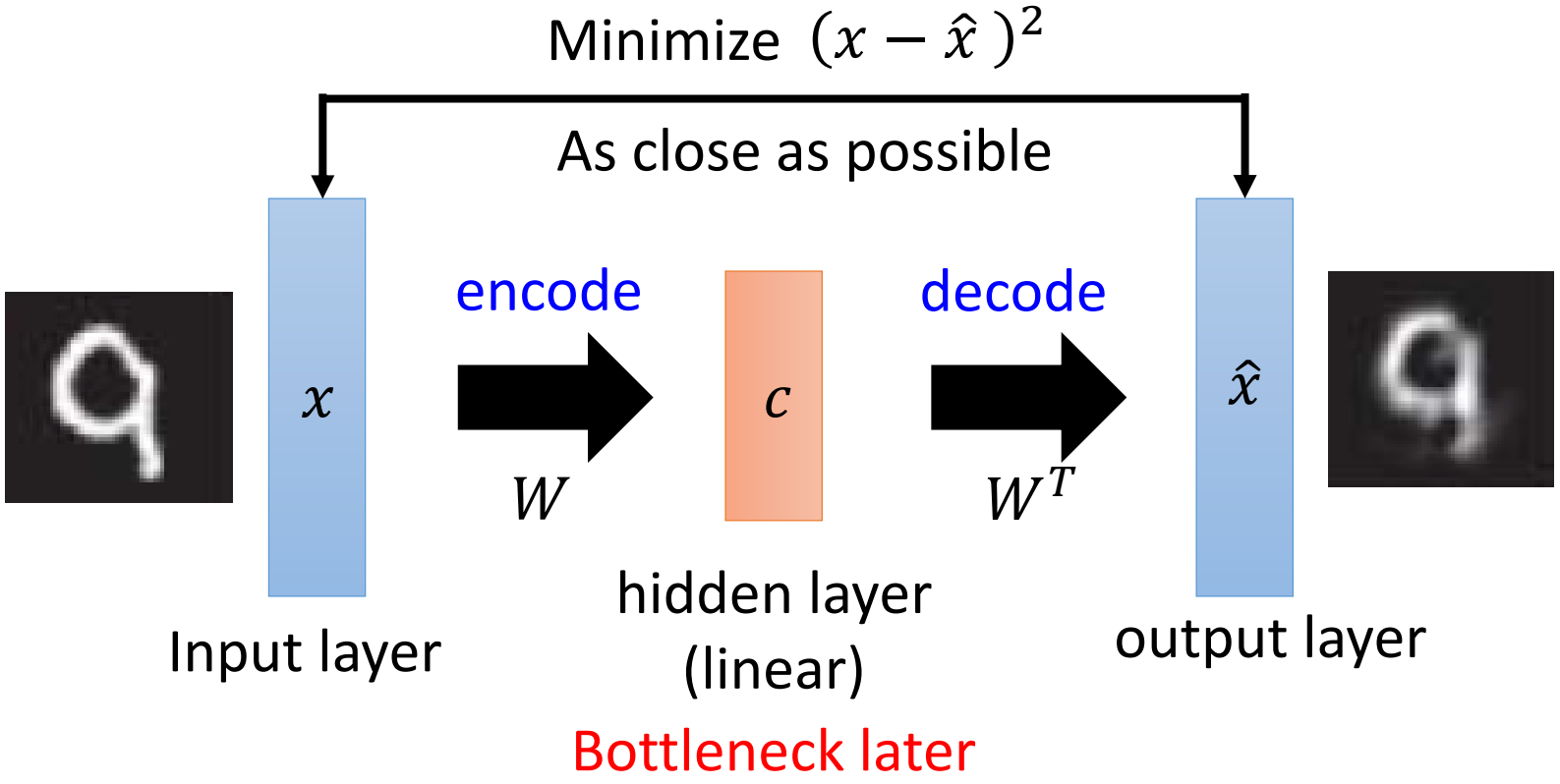
Auto-encoder



Compact representation of the input object

Can reconstruct the original object

Recap: PCA

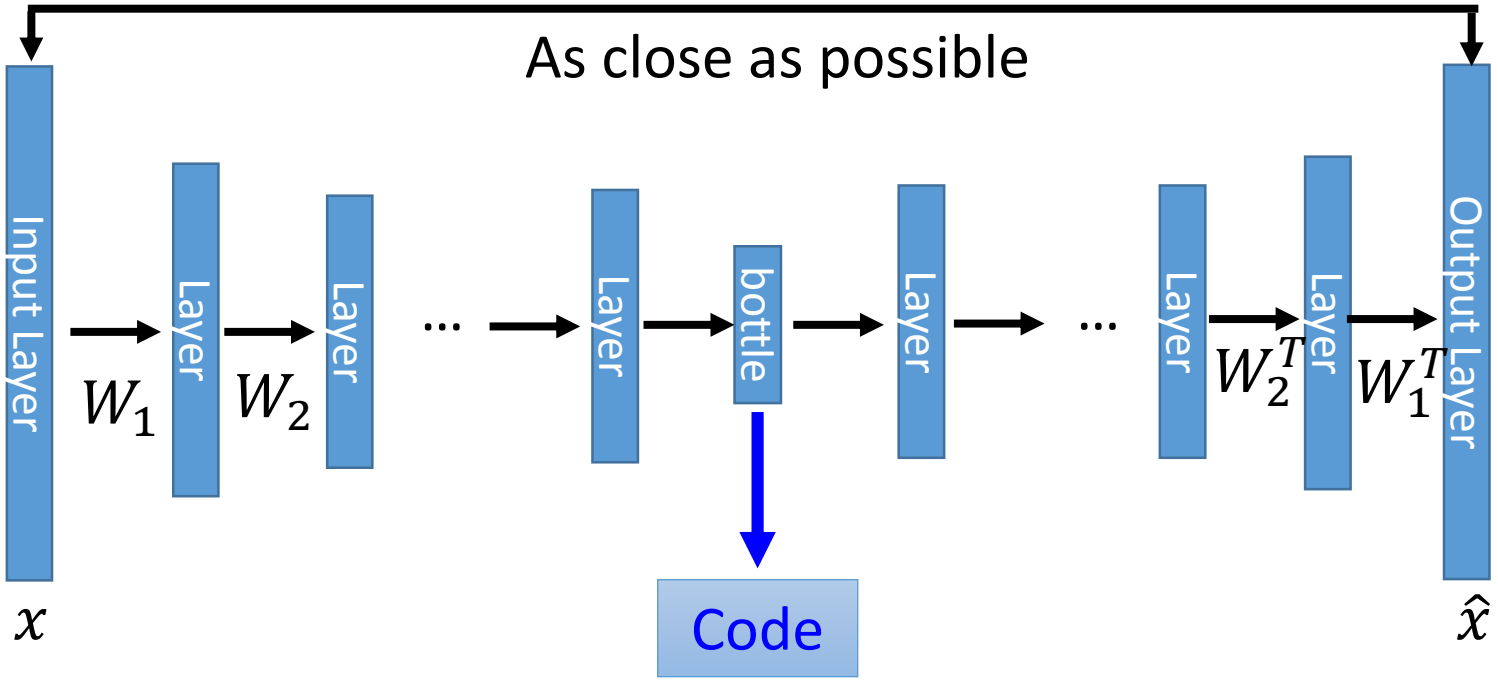


Output of the hidden layer is the code

Deep Auto-encoder

Symmetric is not necessary.

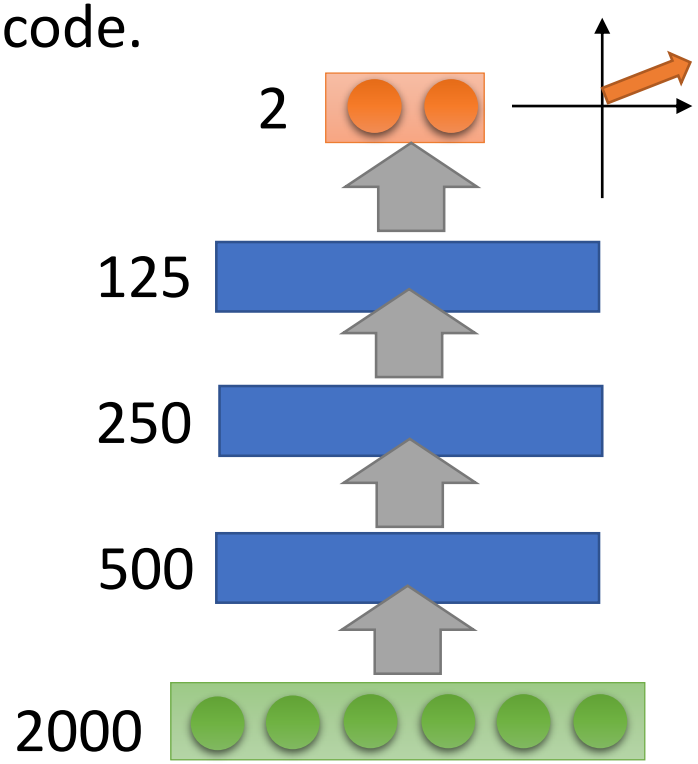
- Of course, the auto-encoder can be deep



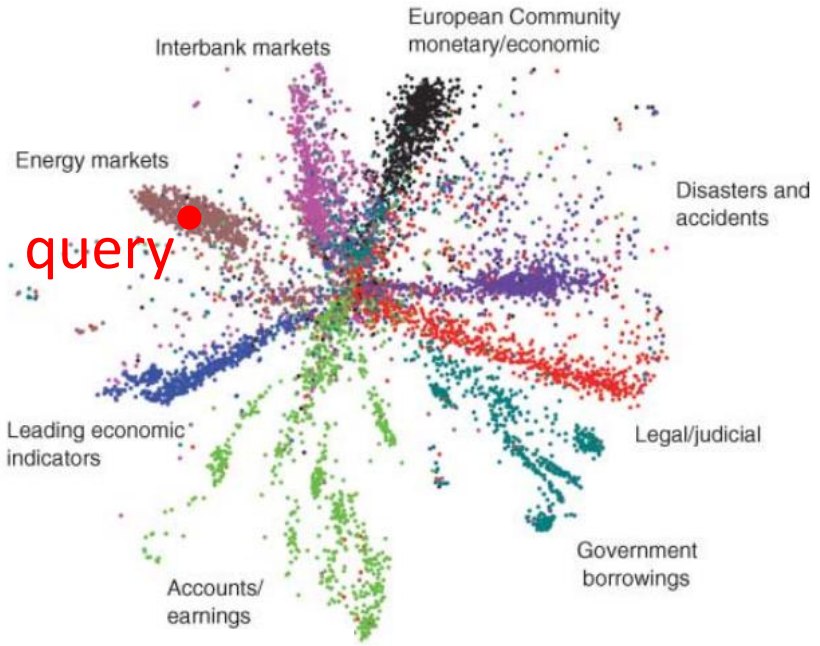
Initialize by RBM layer-by-layer

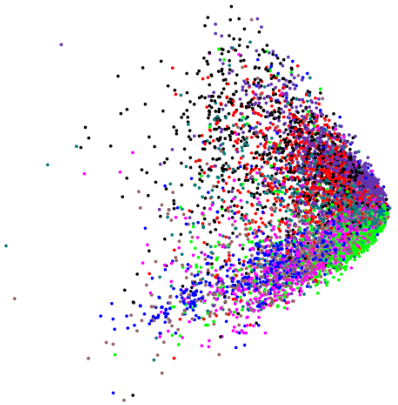
Auto-encoder – Text Retrieval

The documents talking about the same thing will have close code.



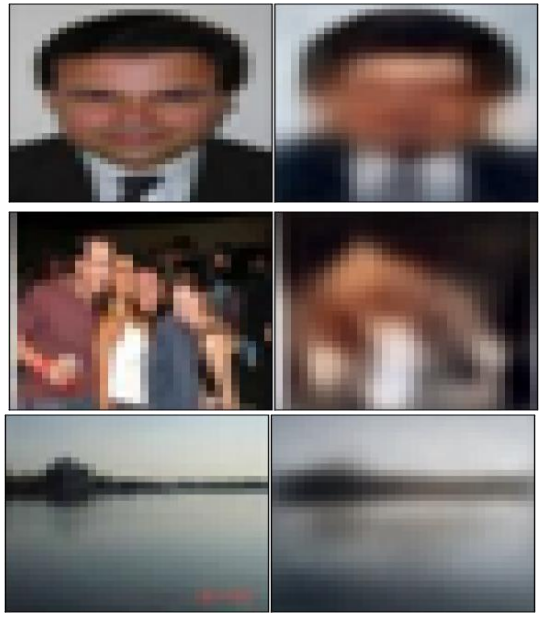
Bag-of-word
(document or query)





LSA: project documents to 2 latent topics

Auto-encoder – Similar Image Search



32x32

8192

4096

2048

1024

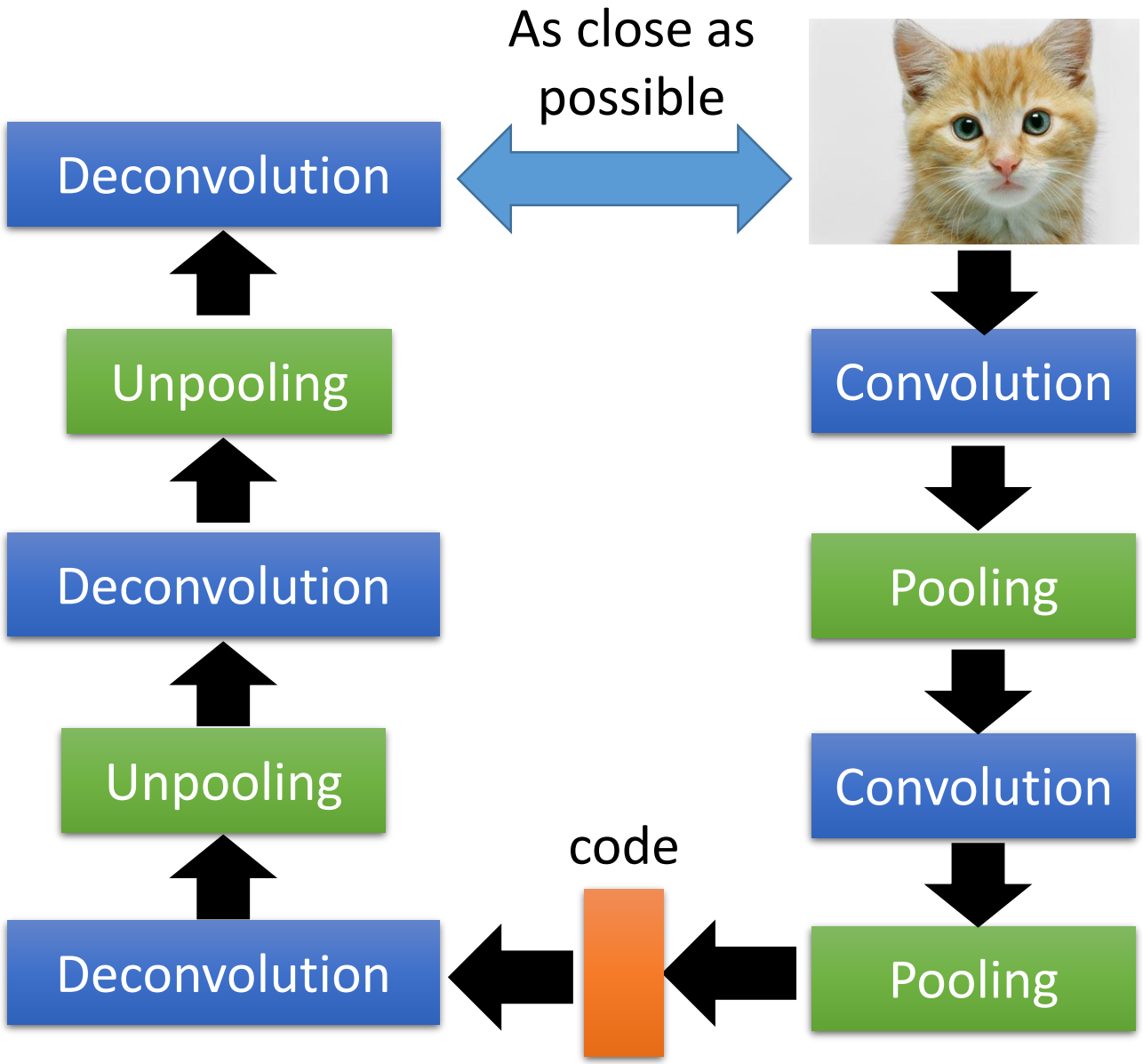
512

code

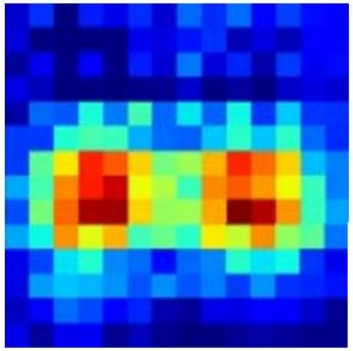
256

(crawl millions of images from the Internet)

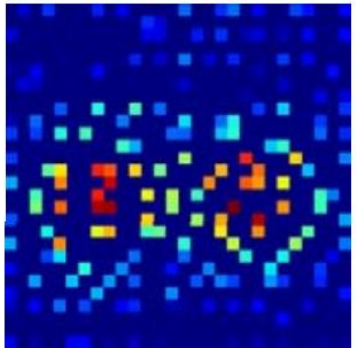
Auto-encoder for CNN



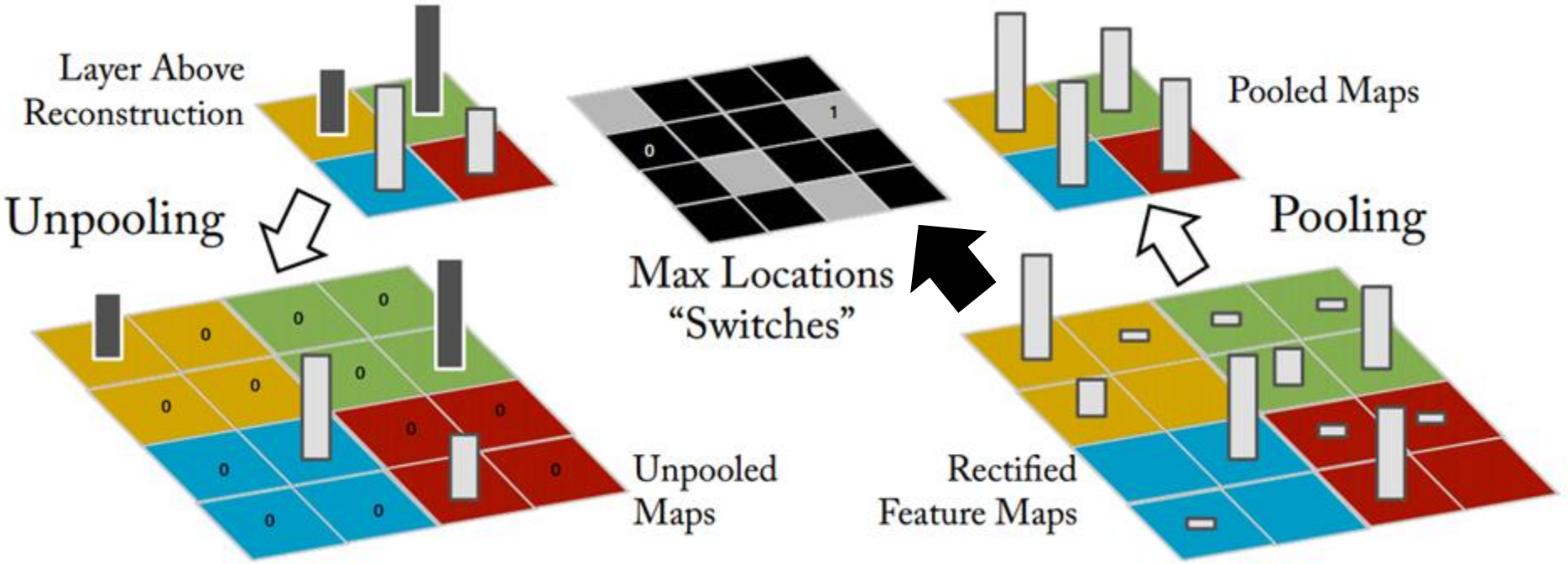
CNN -Unpooling



14 x 14



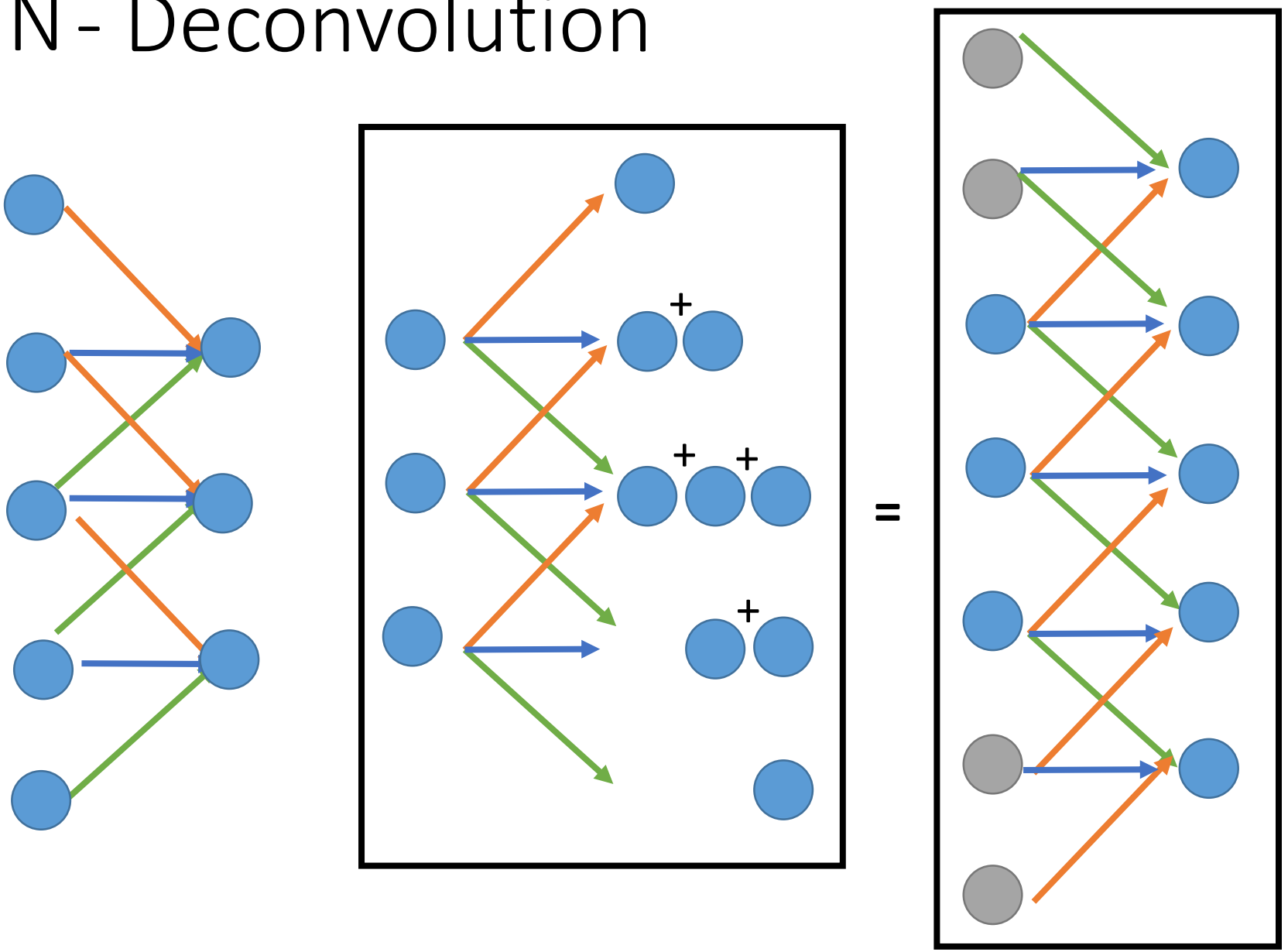
28 x 28



Alternative: simply repeat the values (Karas use this way)

Actually, deconvolution is convolution.

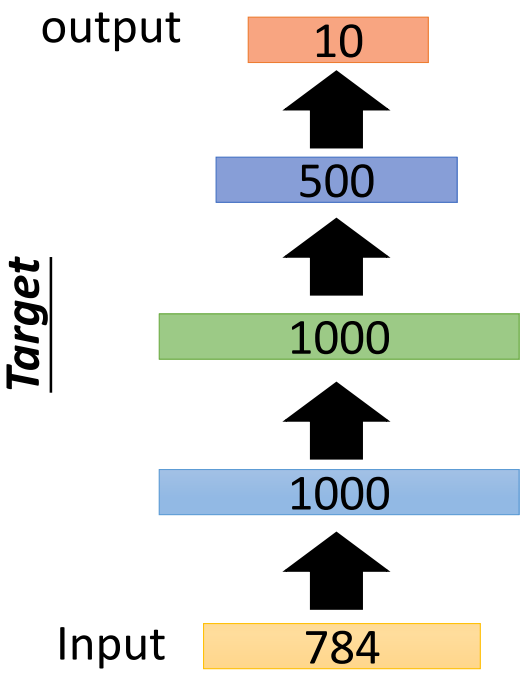
CNN - Deconvolution

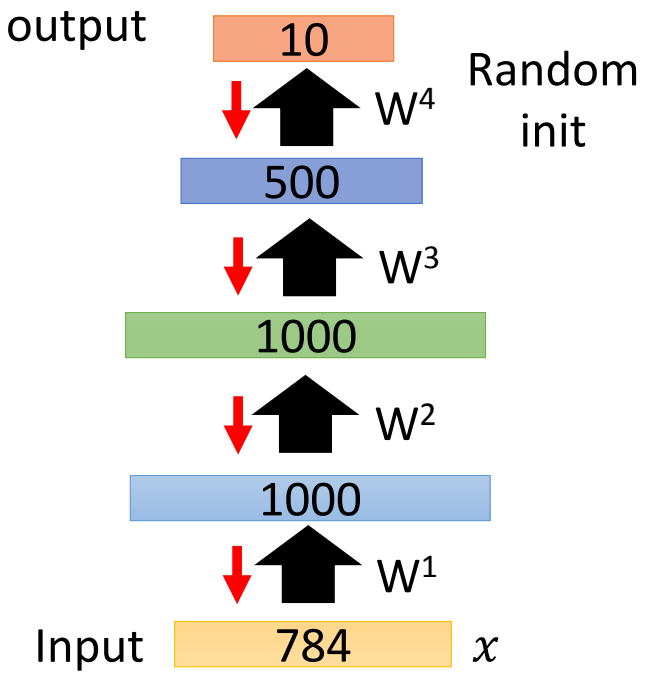


Auto-encoder – Pre-training DNN

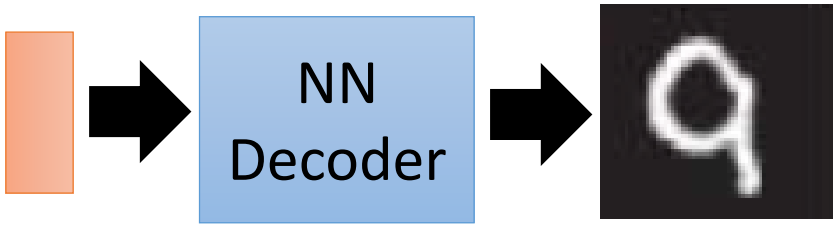
- Greedy Layer-wise Pre-training *again*
- Initialize by RBM layer-by-layer

Find-tune by backpropagation





Next .....



- Can we use decoder to generate something?