# Machine Learning Using Tensorflow

## Week 9:
## Autoencoder and one-shot learning

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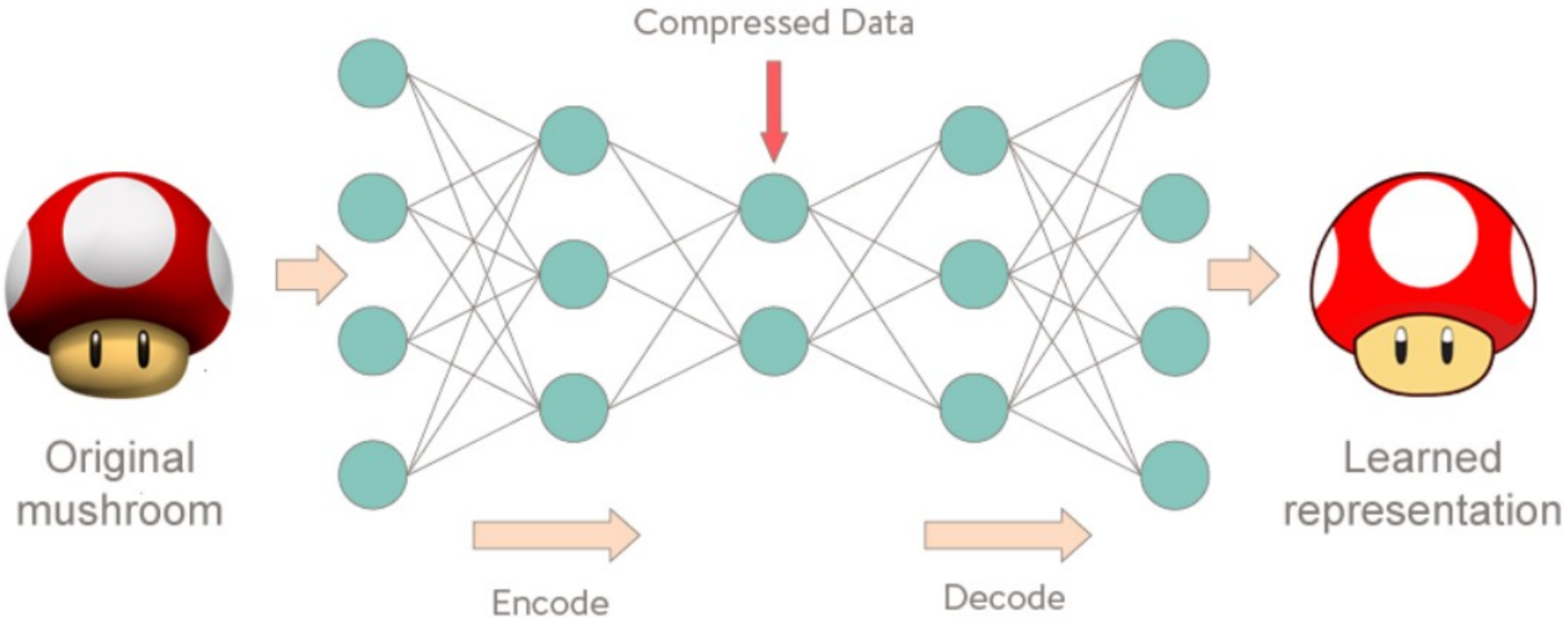
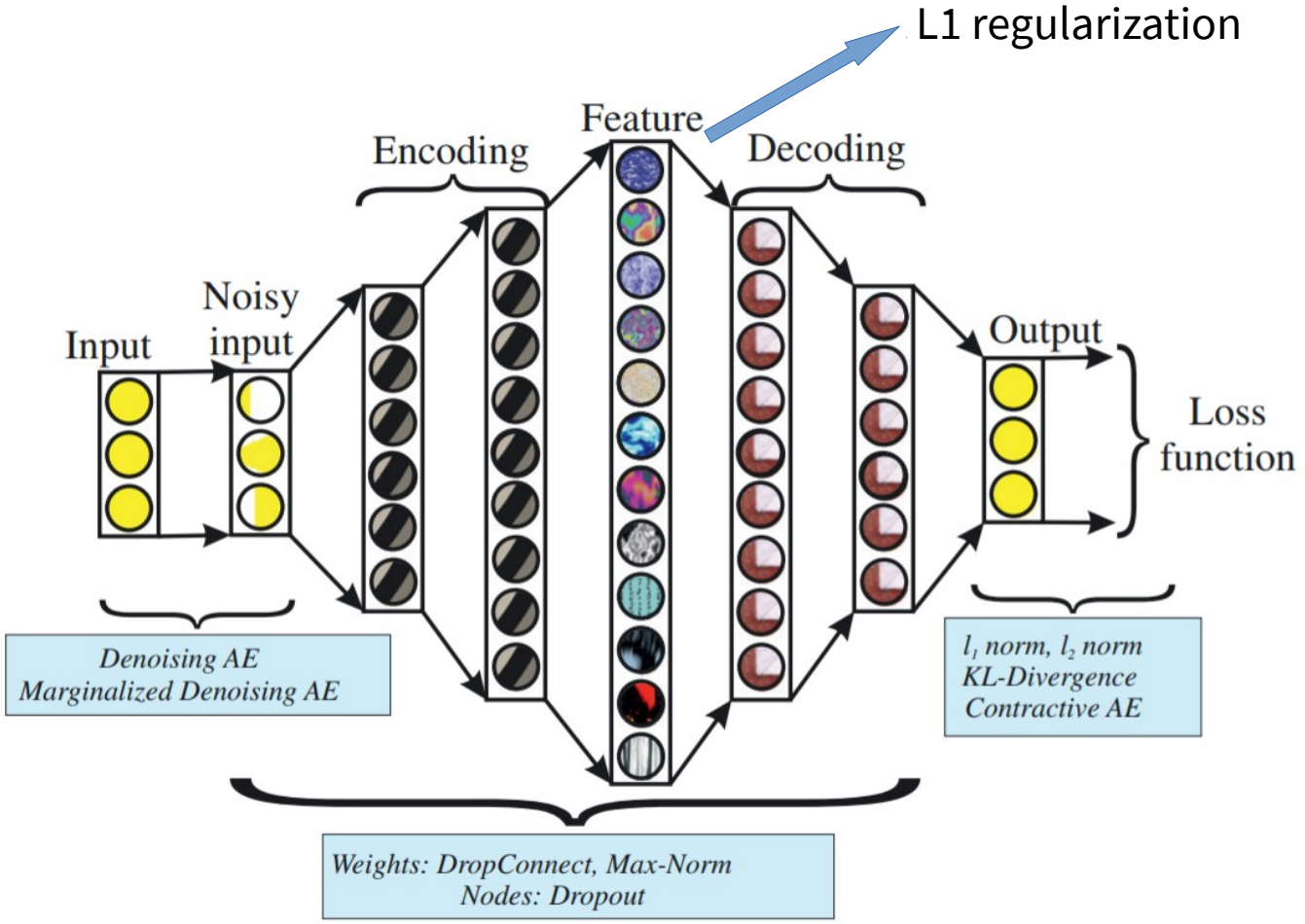
TensorFlow ™

# What is autoencoder?

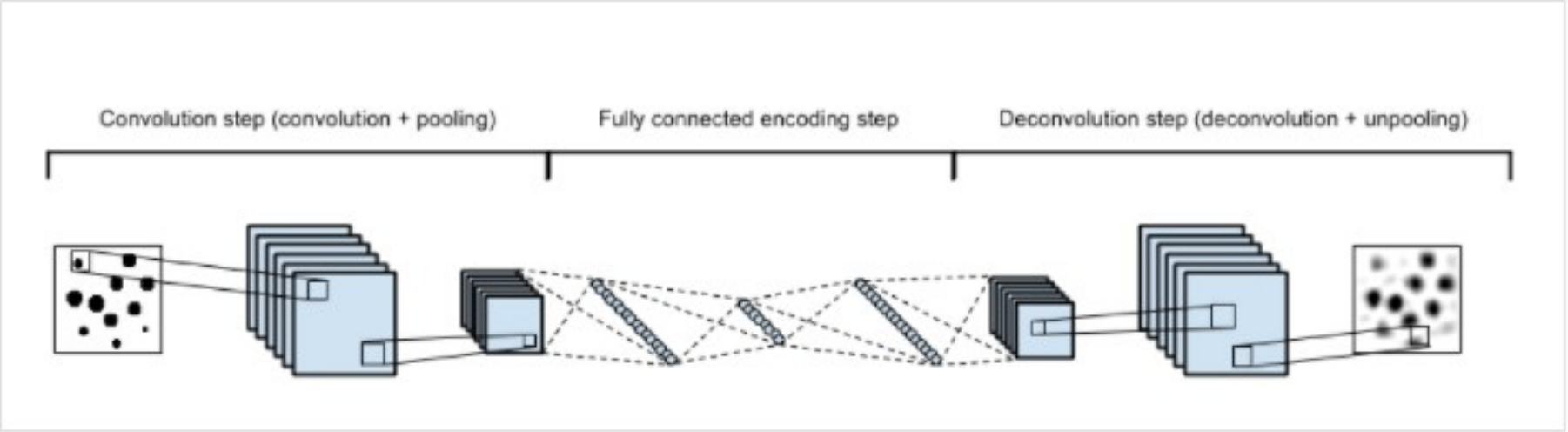


# Sparse autoencoder




**The lantern variable will become very "sparse"**

# CNN autoencoder



# Seq2Seq autoencoder

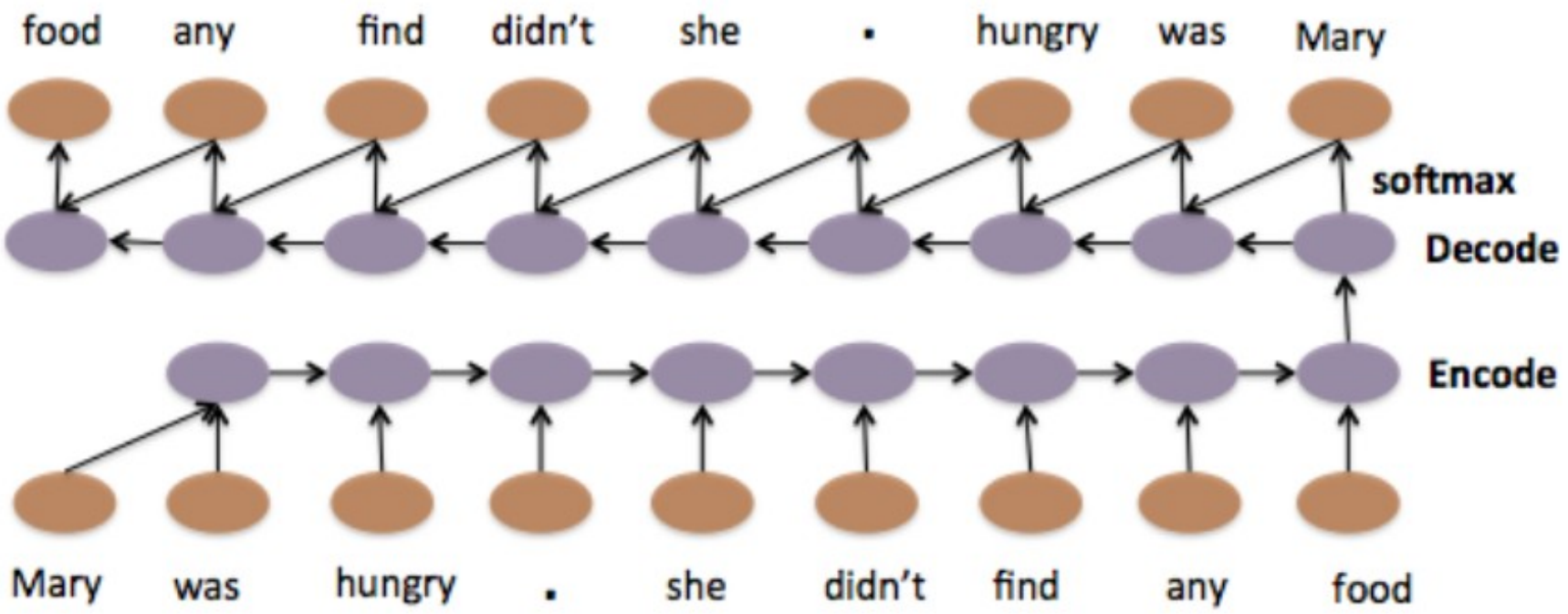
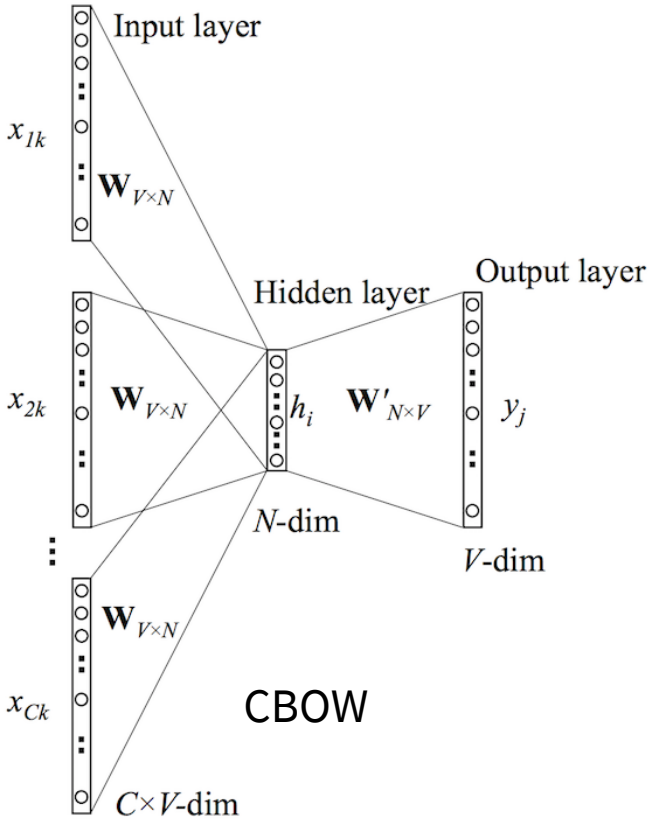


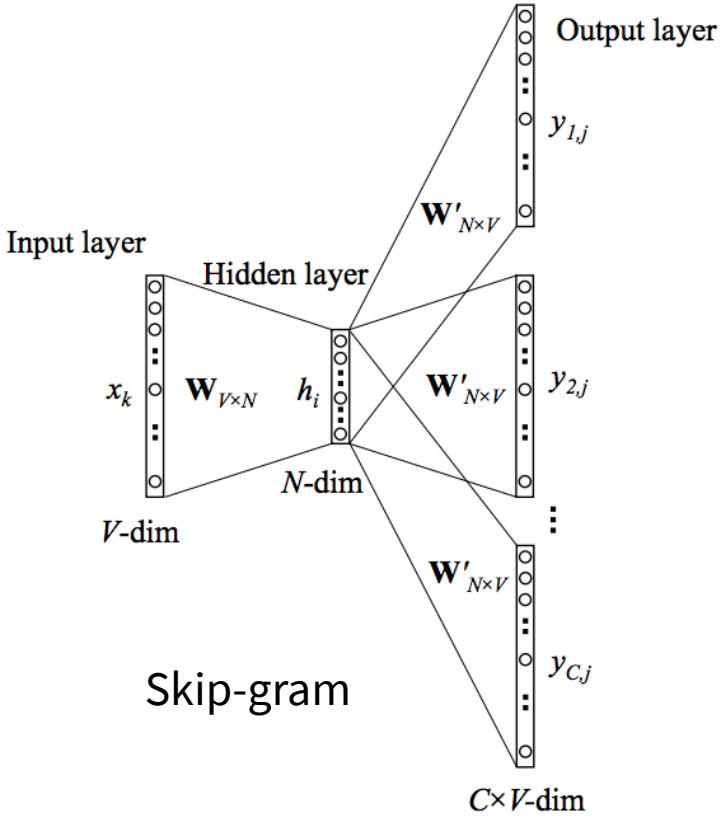

Figure 1: Standard Sequence to Sequence Model.

# Application of autoencoder

# Word2Vec

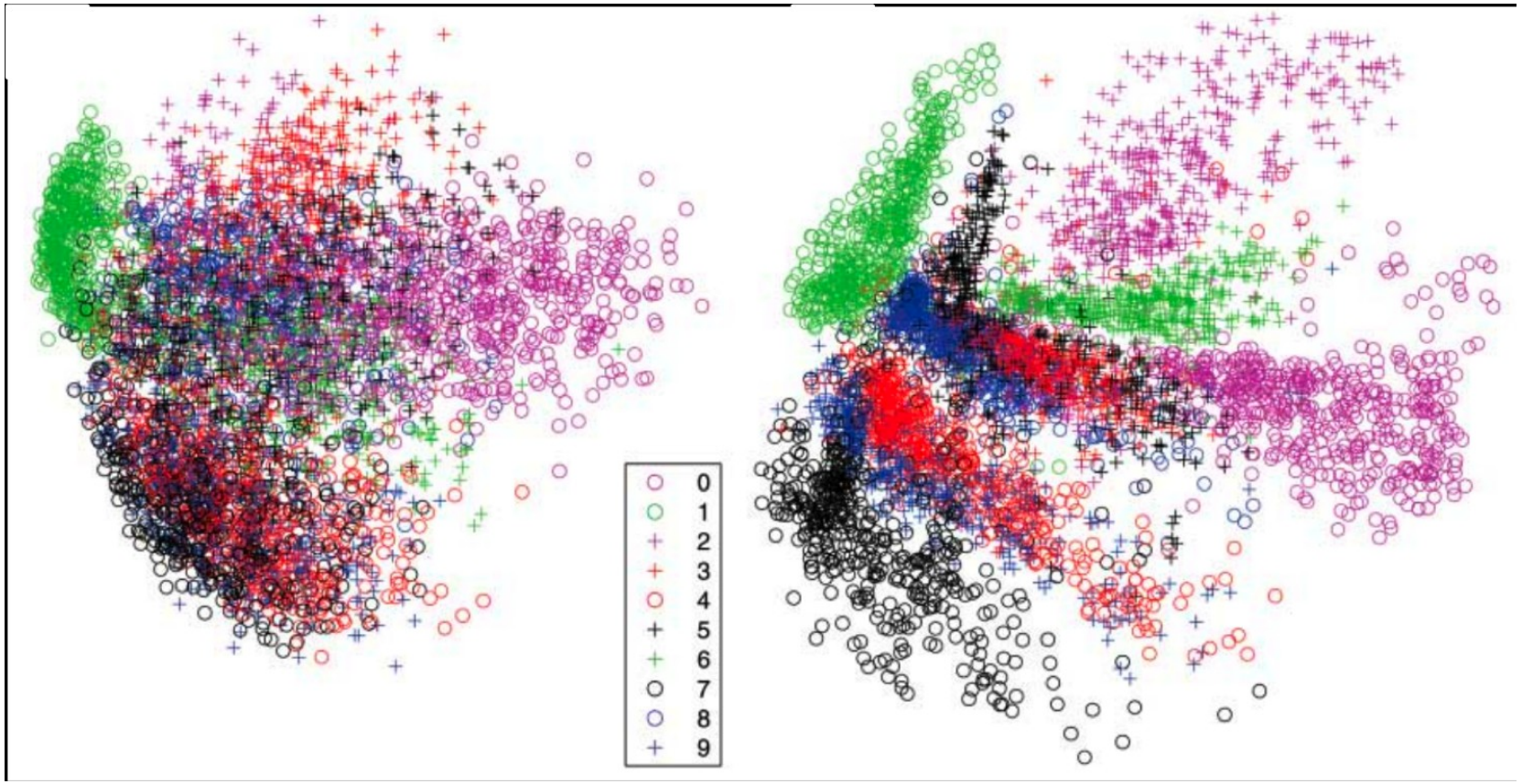



CBOW




Skip-gram

# Clustering of MNIST

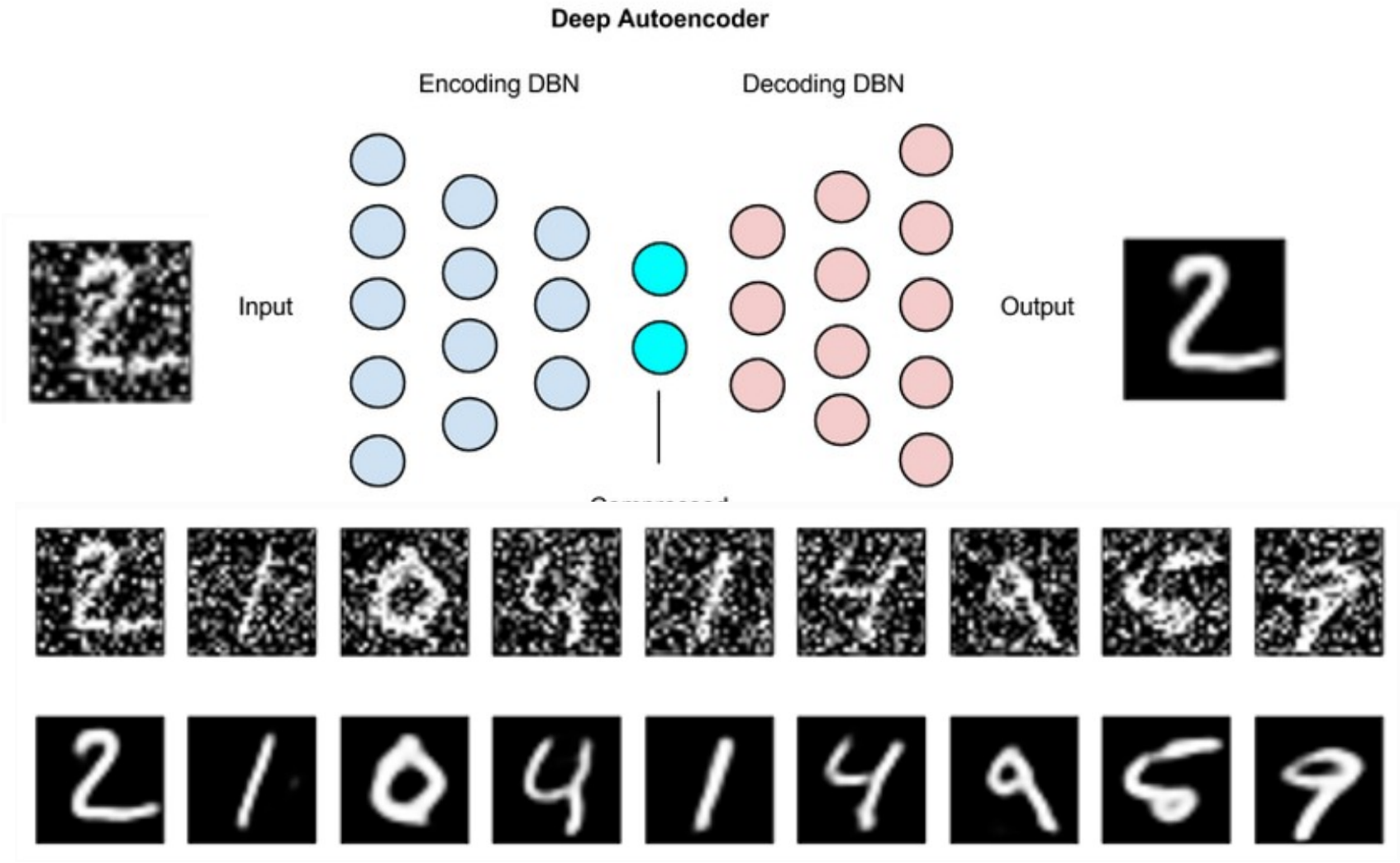



PCA

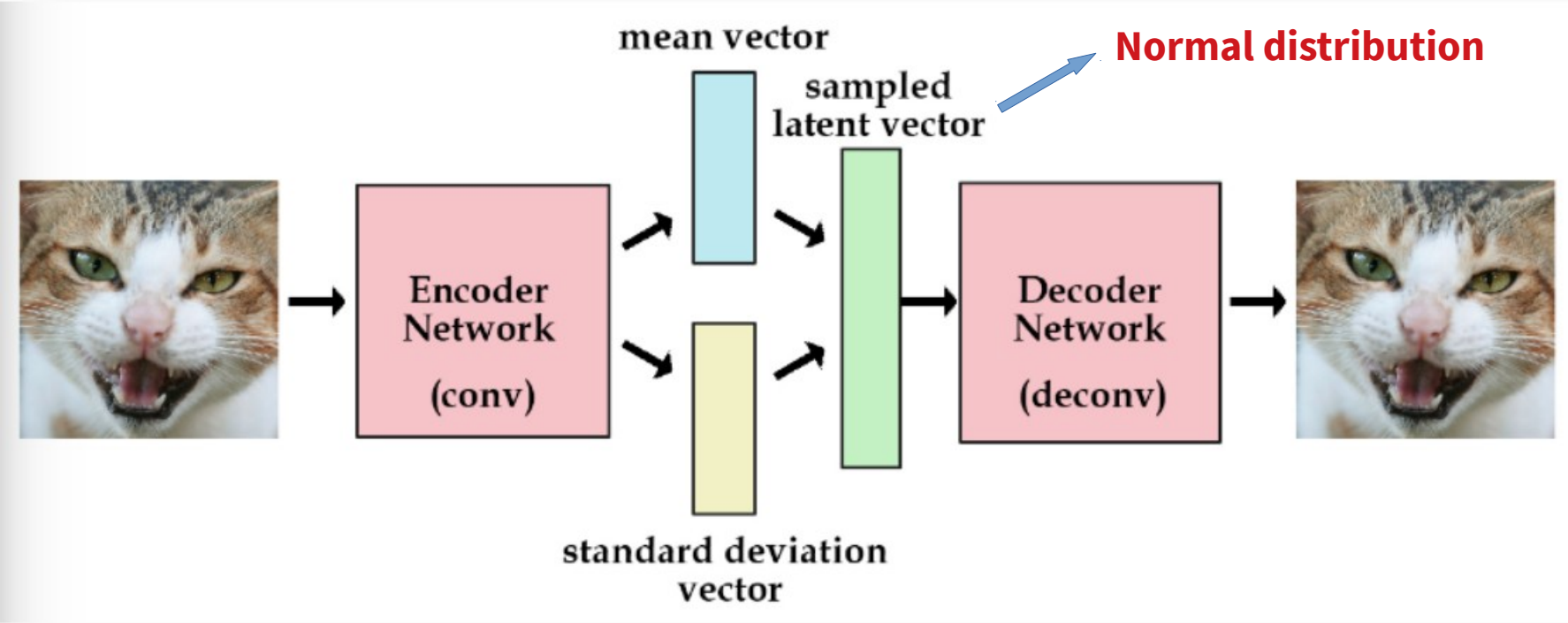
Autoencoder

Autoenoder works much better than PCA, so what is autoencoder?

# Signal denoising



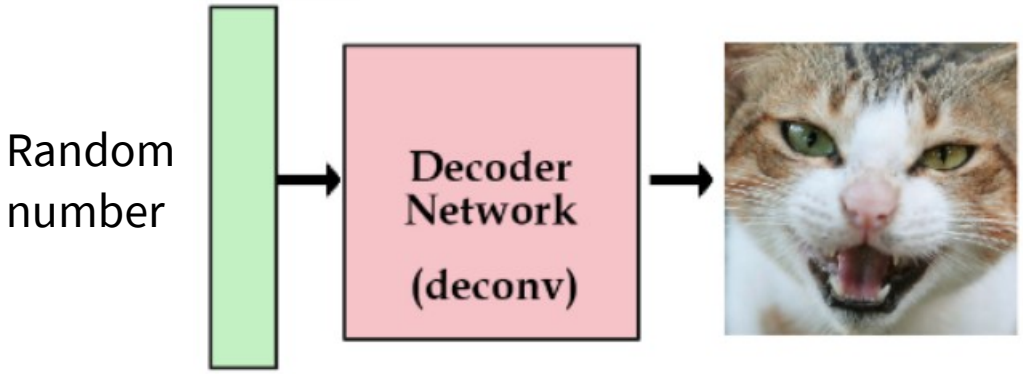
# Variation autoencoder

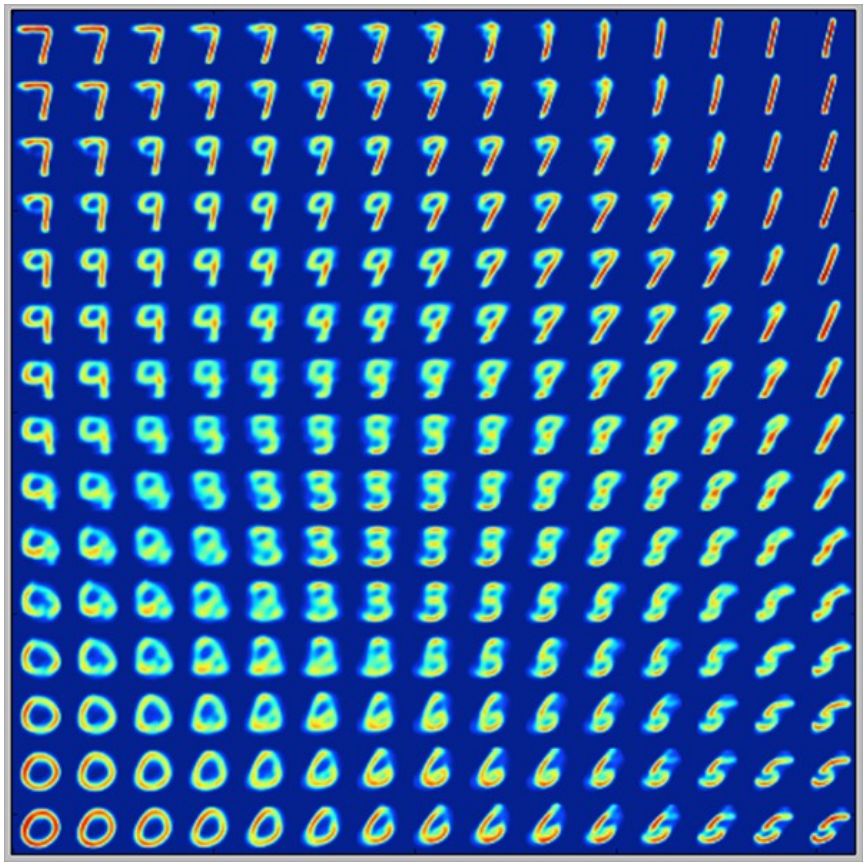



Fact: the latent vector is generated by an input in autoencoder
Question: How can we aviod this issue

*** loss = (diff of input and output image) + (KL div of laten vector and normal dist)**

# VAE is also a generative model



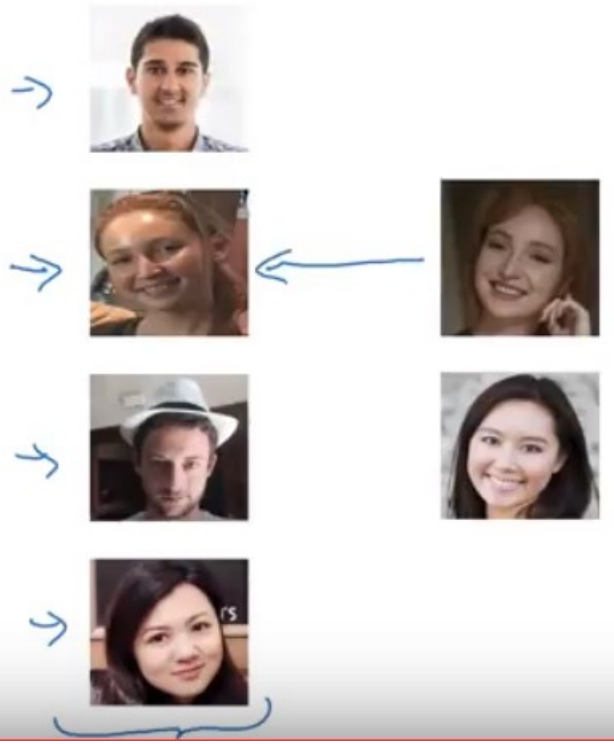
# One-Shot learning (Siamese networks)

# What is one-shot learning?

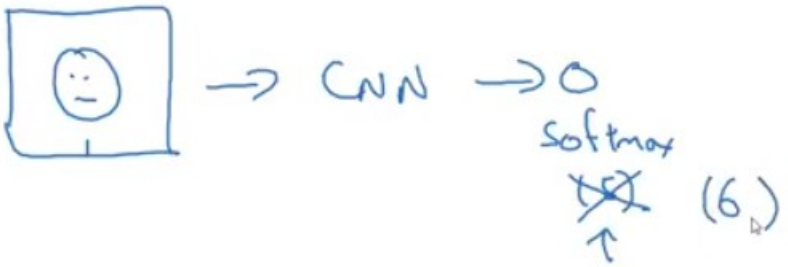
Does human need thousands or million images to recognize them?

# Real life application

## One-shot learning



Learning from one example to recognize the person again



# Equivalence Network

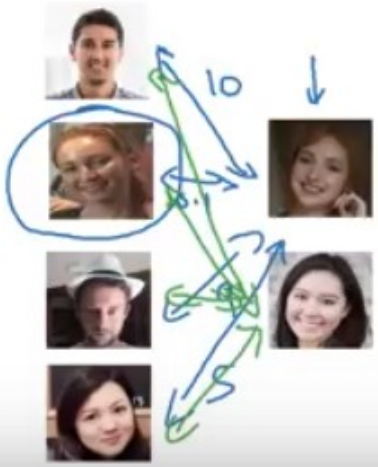
## Learning a "similarity" function

→ d(img1,img2) = degree of difference between images

If d(img1,img2) $\leq \tau$ "same"

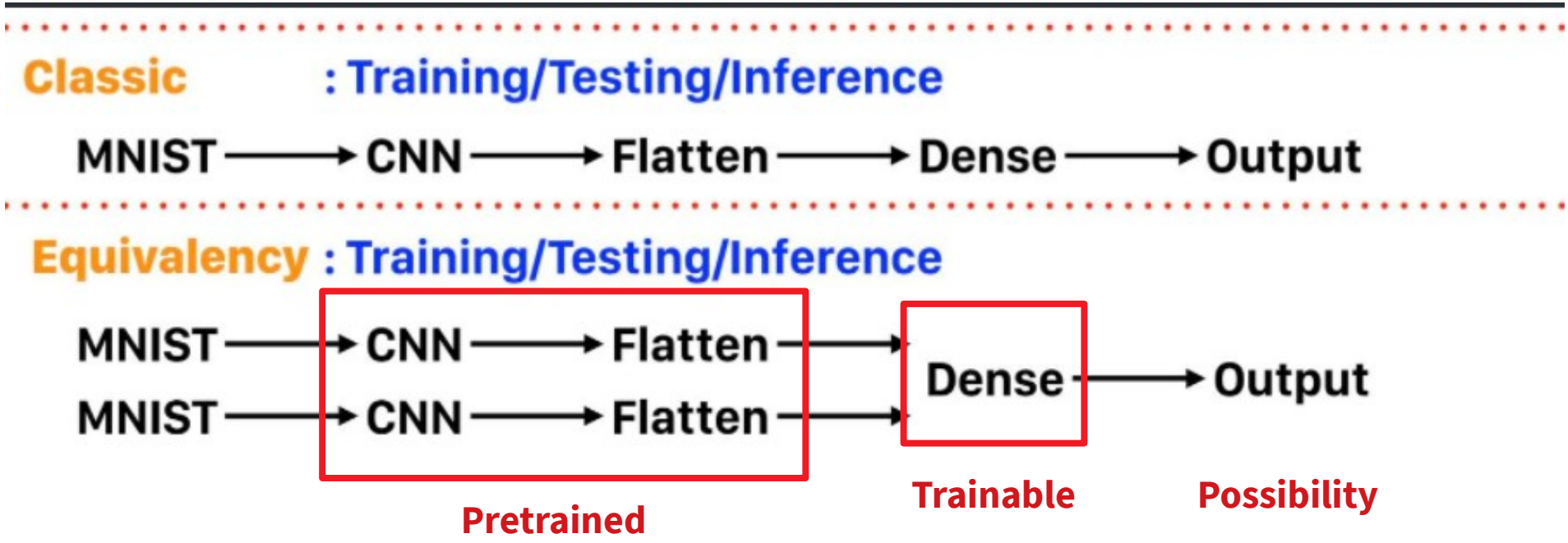
$> \tau$ "different"

} Verification.




d(img1, img2)

# Equivalence Network



# A few-shot learning