Neural networks
Autoencoder - definition
**Topics:** unsupervised learning

- Unsupervised learning: only use the inputs $x^{(t)}$ for learning
  - automatically extract meaningful features for your data
  - leverage the availability of unlabeled data
  - add a data-dependent regularizer to trainings

- We will see 3 neural networks for unsupervised learning
  - restricted Boltzmann machines
  - autoencoders
  - sparse coding model
Topics: autoencoder, encoder, decoder, tied weights

- Feed-forward neural network trained to reproduce its input at the output layer

\[
\hat{x} = o(\hat{a}(x)) = \text{sigm}(c + W^* h(x))
\]

for binary inputs

\[
h(x) = g(a(x)) = \text{sigm}(b + Wx)
\]