

Define Auto Encoder

We assume 1 layer encoder and decoder

Let x denotes input, f is activation func

w denotes encoder's weight

b denotes encoder's bias

For Decoder, $\hat{f}$ is activation function

$\hat{w}$ denotes weight

$\hat{b}$ denotes bias

s.t. $\dim(x) = \dim(\hat{z}) \gg \dim(z)$

where.

$z = f(wx + b)$ is latent variable

$\hat{z} = \hat{f}(\hat{w}z + \hat{b})$

Loss = $\sum_{n=1}^N \|x_n - \hat{z}_n\|$ as reconstruction loss

By minimizing reconstruction loss,

we aim to gain latent variable
(representation)

because dimension of input and that of
output is
same

under the condition of small number
of dimension for latent variable.

it can be used for

{ clustering.

anomaly detection

noise reduction.