Encoder / Decoder

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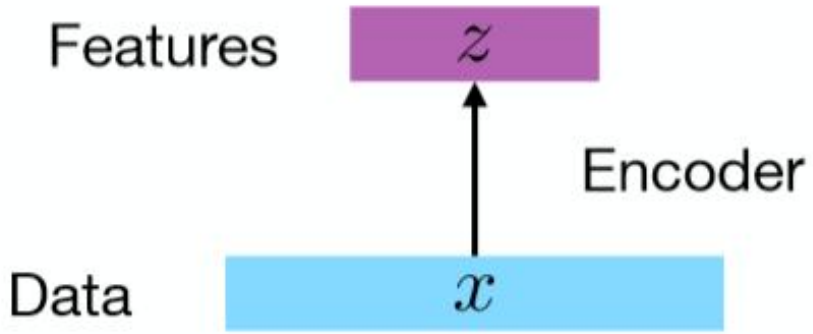
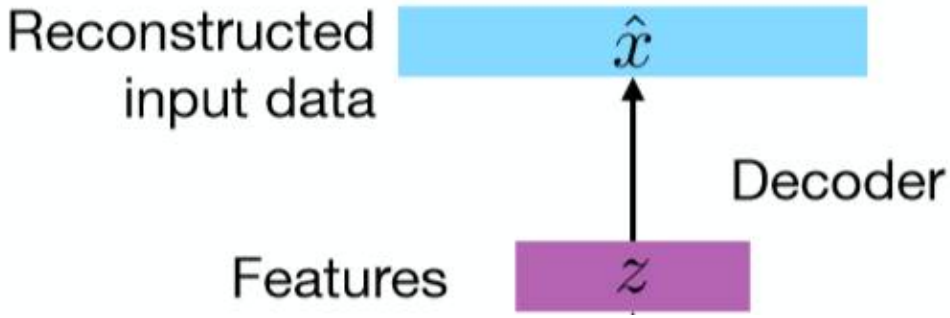
Encoder and Decoder

- Encoder(g) : Feature Extracter (X -> z)
- Decoder(f) : Generator from Feature (z -> X')

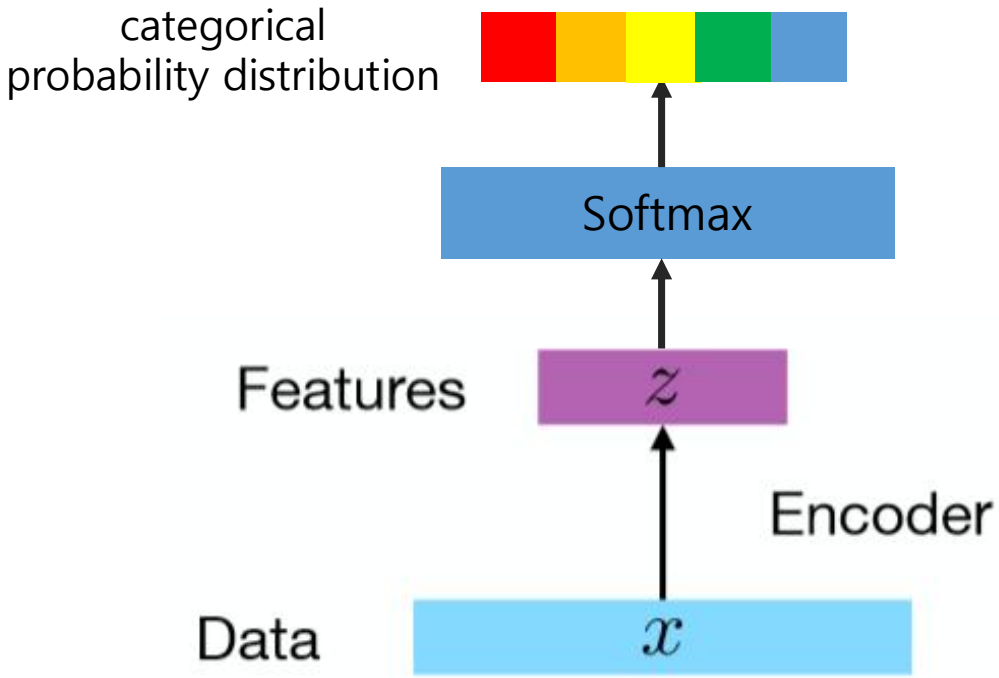




cs231n spring 2018 slide: Lecture 12. p. 45~49

Classification Task

- 어떤 데이터 X가 어떤 class인지 분류하는 문제를 풀기 위해 우리는 지금까지 CNN이나 RNN을 Encoder 로 활용해 왔다.



- Data가 timely sequential하다면?
  => RNN Encoder
- Data가 spatial locality를 가진다면?
  => CNN Encoder

How to make Decoder?

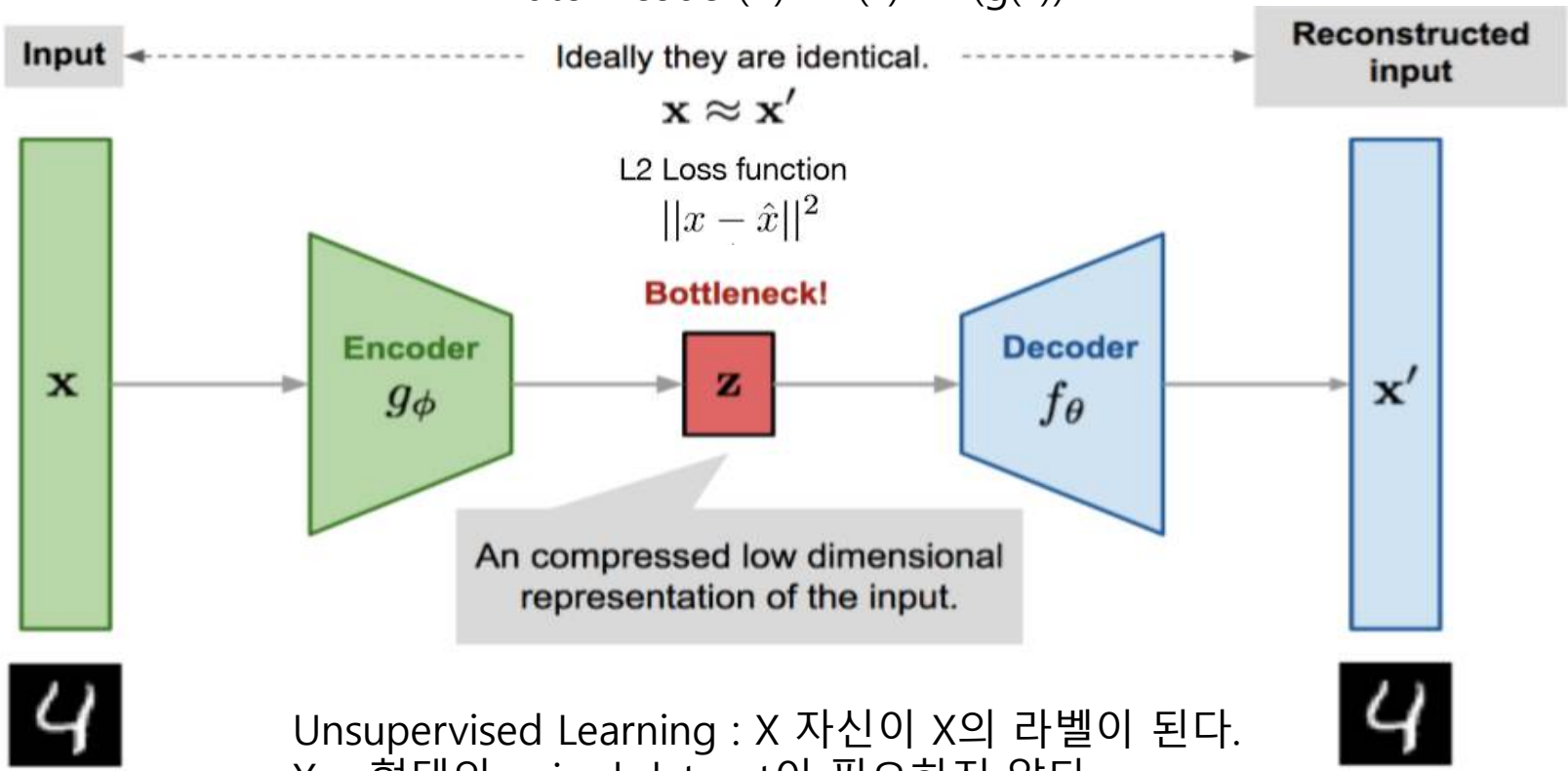
- We can extract feature z from data X during classification.
- But how can we handle feature z directly?

1) Make use of Encoder's feature extraction.
   ex.) AutoEncoder, seq2seq

2) Or, just sample from some Latent Variable Space.
   ex.) GAN

AutoEncoder

X' = AutoEncoder(X) = f(z) = f(g(x))

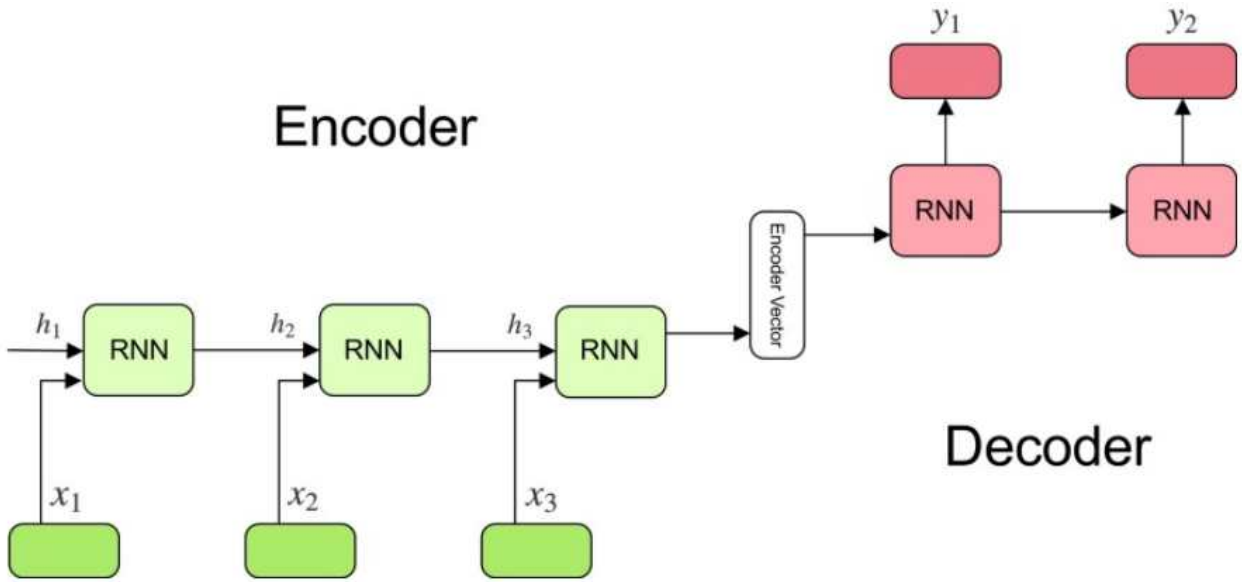


Unsupervised Learning : X 자신이 X의 라벨이 된다.
X-y 형태의 paired dataset이 필요하지 않다.

https://lilianweng.github.io/lil-log/2018/08/12/from-autoencoder-to-beta-vae.html

Combination of Encoder & Decoder

- 어떤 sequence X를 다른 sequence Y 로 **변환**하려면?
- 예) 한국어 -> 영어 번역문제
- 이런 문제는 X-Y paired dataset이 필요할 것이다.



https://towardsdatascience.com/understanding-encoder-decoder-sequence-to-sequence-model-679e04af4346

Feature는 반드시 Relation에서 얻어진다.

- Classification
  - Data - Feature - Class
- Next Prediction
  - Current - Feature(state) - Next
- AutoEncoder
  - Data - Feature - Data'
- Seq2Seq
  - sequenceX - Feature - sequenceY