Information Bottleneck

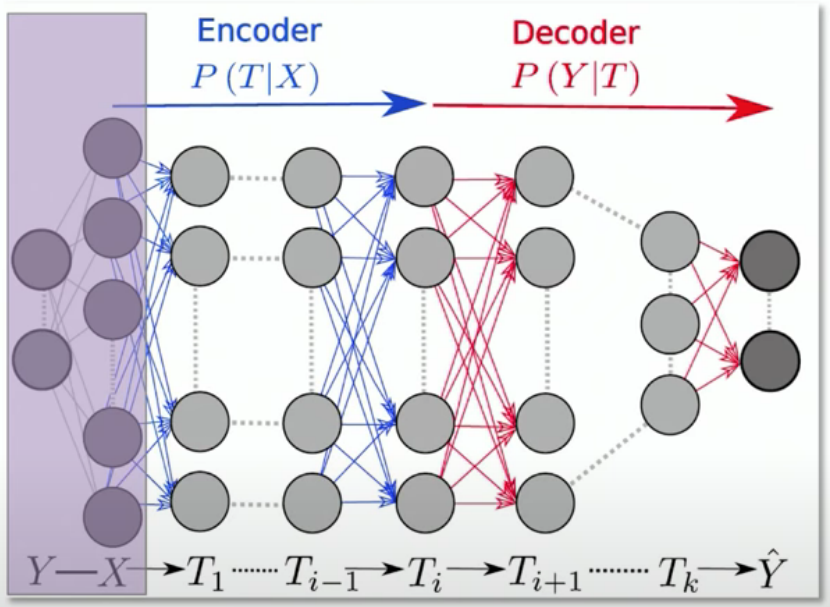
Problems ahead

- What Information Bottleneck ?
- How to use IB to explain Deep Neural Network ?

Question 1: How to consider neural network?

Each layer is characterized by its Encoder & Decoder Information

? ? ?



Theorem (Information Plane):

*For large typical **X**, the sample complexity of a DNN is completely determined by the encoder mutual information, **I(X;T)**, of the last hidden layer; the accuracy (generalization error) is determined by the decoder information, **I(T;Y)**, of the last hidden layer.*

The complexity of the problem shifts from the decoder to the encoder, across the layers…

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Question 2: How to understand Information-Plane?