Information Bottleneck in Deep Learning

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Today we are going to discuss information bottleneck principle and its use in Deep Learning. Information Bottleneck

It is similar to PCA in some sense, but PCA tries to encode X into Z in such a way that X is reconstructed well, and IB goal is to reconstruct Y. TODO: is it equivalent to PCA in case of autoencoding task, i.e. $Y = X$?

What I wanna say:

- IB is not a hidden variable model
- It requires joint — why then do we need to learn anything if we know the whole joint?
- We can estimate it empirically and get good generalization.
- Why learned representation should be useful?
- Degenerate solution for $\beta \leq 1$ (because of DPI).