Deep Belief Network

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In machine learning, a deep belief network (DBN) is a generative graphical model [2], or alternatively a class of deep neural network. Its schematic overview is shown as Fig. 1. We can see that it is composed of multiple layers of latent variables[1], with connections between the layers but not between units within each layer.

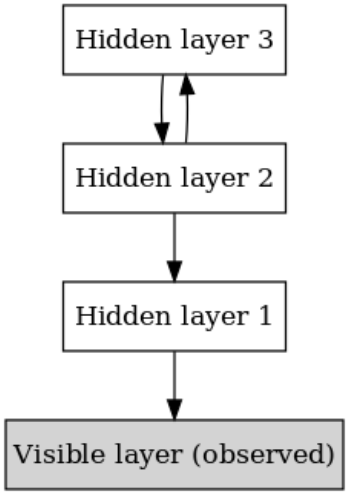

Figure 1: Schematic overview of a deep belief net

DBN was first introduced by Geoffrey Hinton in 2006 [1] which is regarded as milestone of deep learning eve.

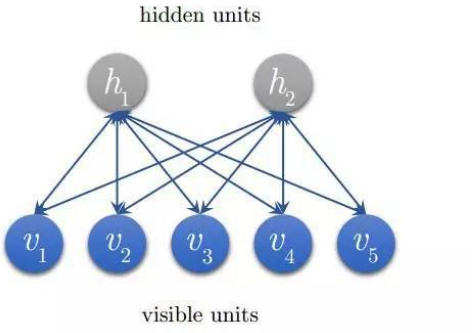

Figure 2: The structure of RBM

DBNs can be viewed as a composition of simple, unsupervised networks such as restricted Boltzmann machines (RBMs[2]). A RBM is an undirected, generative energy-based model with a "visible" input layer and a hidden layer and connections between but not within layers. The structure of RBM is demonstrated in Fig. 2

References

[1] Geoffrey E. Hinton and *et al.* A fast learning algorithm for deep belief nets.

[1] variables that are not directly observed but are rather inferred from other observed variables.

[2] generative stochastic artificial neural networks which can learn a probability distribution over its set of inputs

Neural Comput., 18(7):1527–1554, July 2006.

[2] Wikipedia. Deep belief network. https://en.wikipedia.org/wiki/Deep_belief_network.