Types of RBM

Based on the distribution used and the structure of the hidden layers many types of RBM are possible.

1) Bernoulli – Bernoulli RBM

* The units in the RBM are taking binary values. The probability density function is conditioned to a Bernoulli distribution. Visible & hidden units modeled using Bernoulli distribution

2) Gaussian – Bernoulli RBM

* There are variant of RBM that model visible unit as Gaussian and hidden unit as Bernoulli.
* This allows visible unit to take real-valued input that are modelled using normal distribution.

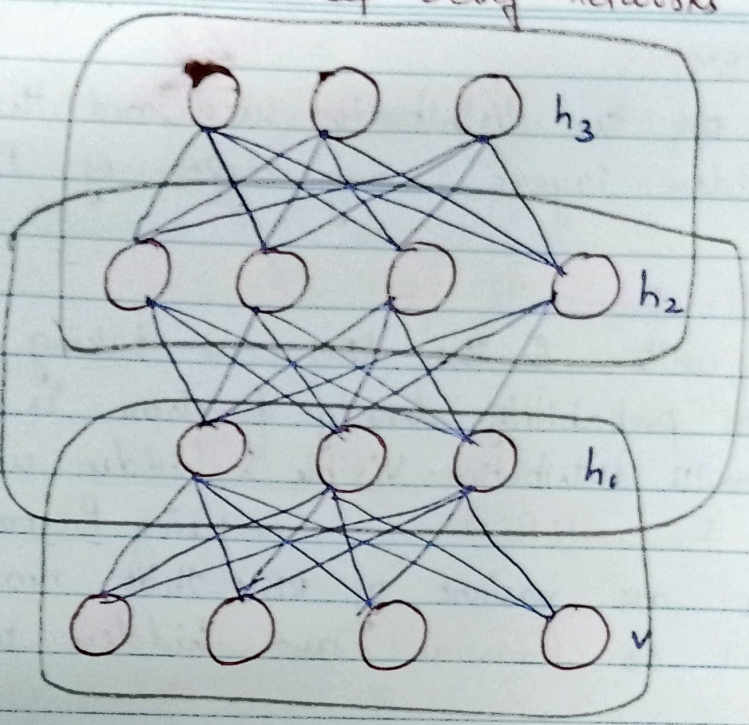
3) Conditional RBM

* The visible units are modelled using Gaussian distribution and the hidden units use rectified linear unit transformation (RELU)
* Binary value restrict the no. of. latent features but relu helps to represent more features.

4) Deep Belief Network (DBN)

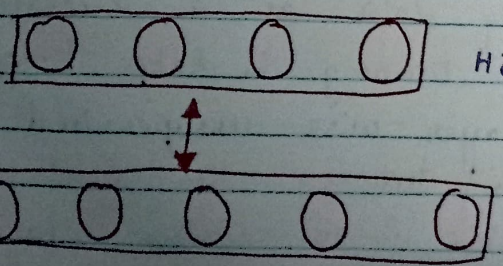
* They stack RBMs to represent the features of the training data as a hierarchy.
* The training in deep belief networks is a greedy layer-wise unsupervised training.
* During training, the first RBM trained has the input vector in the visible layer and the first hidden layer.

Deep belief networks

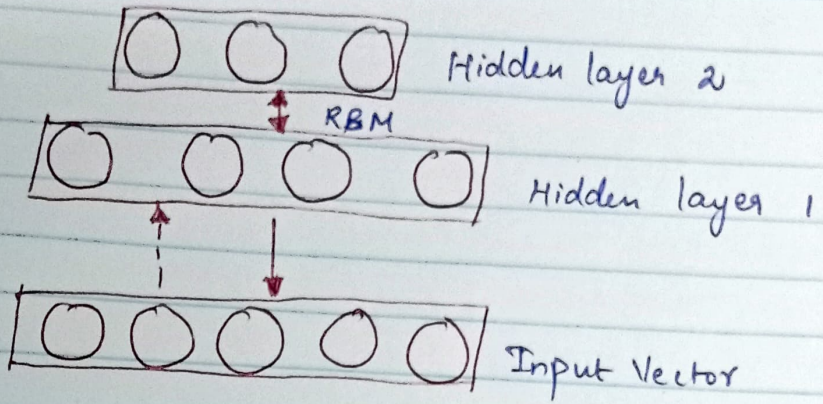


* The output of this RBM is a representation of the input and is given as input to the next layer
* Training is performed using contrastive divergence
* The output of this layer can be used to train the next layer.
* The process is repeated till the desired condition is met.
* Each layer has higher level representation when compared to the previous layer.

First level of training



Second training



Three layer DBN