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 and hidden units modeled using Bernoulli distribution
* This can be referred to as the Bernoulli-Bernoulli RBM

2) Gaussian - Bernoulli RBM

* There are variants of the RBM that model visible units as Gaussian and hidden units as Bernoulli
* This is referred to as Gaussian - Bernoulli RBM

This allows visible units to take real-valued input that are modelled using normal distribution

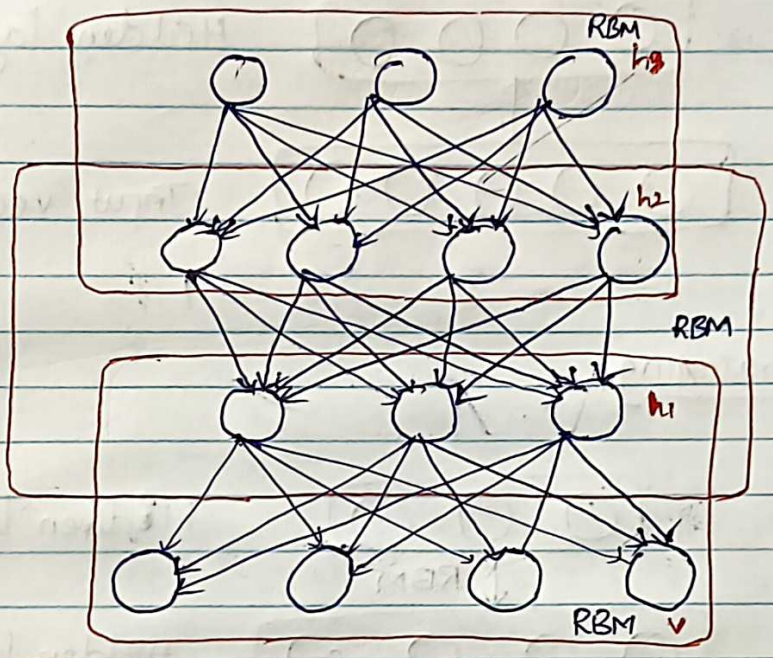
3. Conditional RBM

* The visible units are modelled using Gaussian distribution and the hidden units use rectified linear unit transformation (RELU)
* Binary value restricts the number of latent features but relu helps to represent more features

4. Deep Belief Network (DBN)

* They stack RBMs to represent the features of training data as a hierarchy
* The training in deep belief networks is a greedy layer-wise unsupervised training

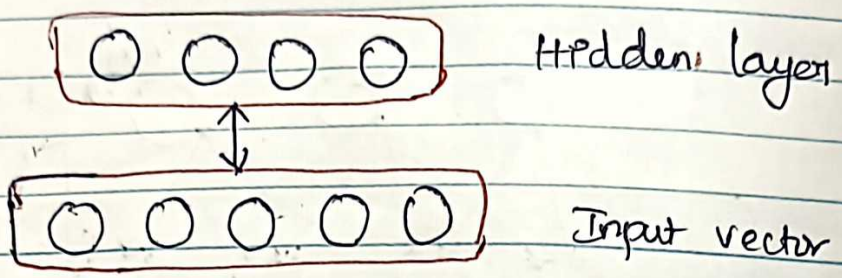
* During training, the first RBM trained has the input vector in the visible layer and the first hidden layer



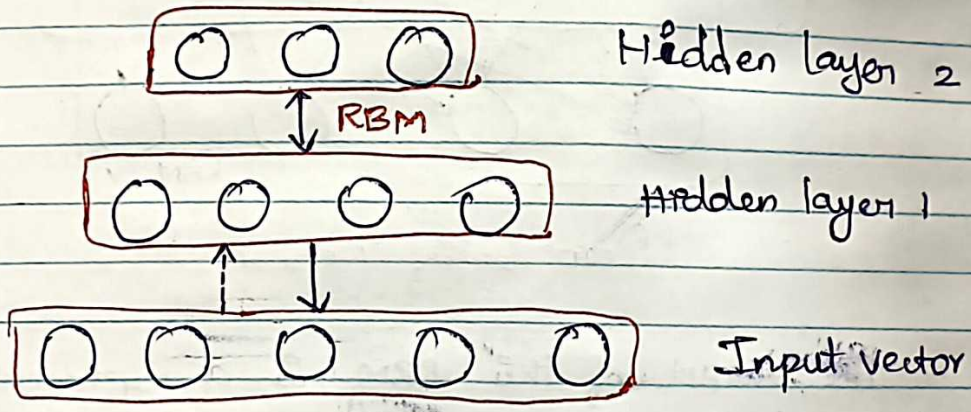
Deep belief Network

* 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