

Assignment -5

Title: Bidirectional Associative Memory with two pairs of vectors.

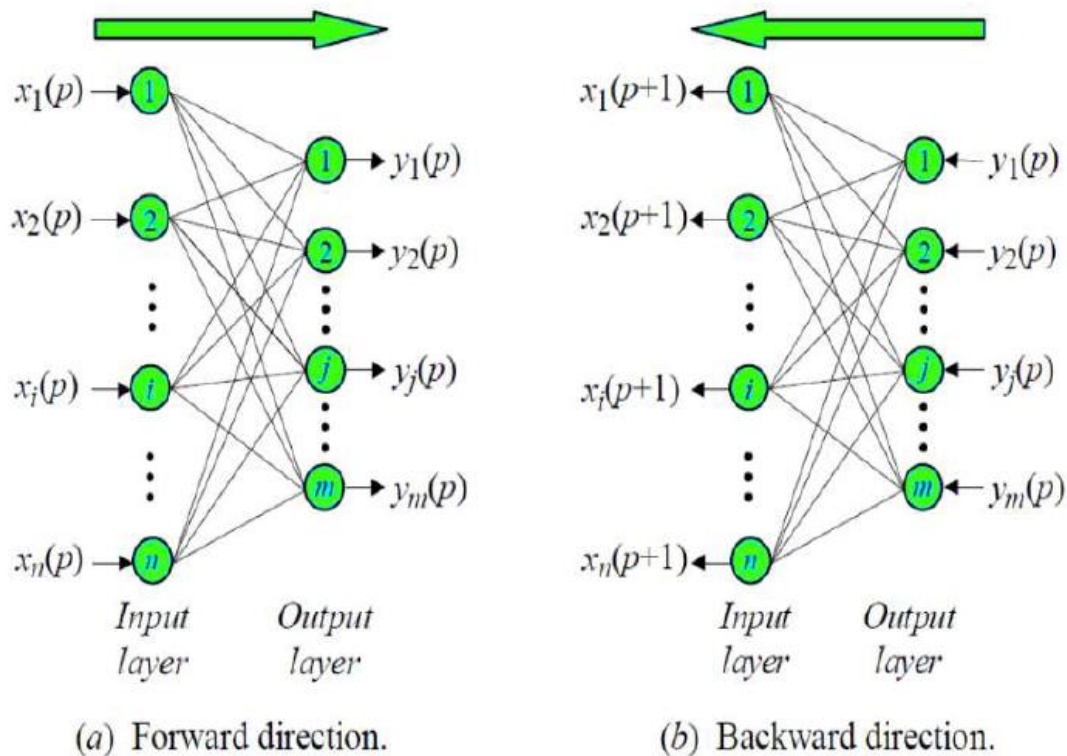
Aim: Write a python Program for Bidirectional Associative Memory with two pairs of vectors.

Objective: To learn about Bidirectional Associative Memory with two pairs of vectors.

Theory:

Bidirectional Associative Memory (BAM) is a supervised learning model in Artificial Neural Network. This is hetero-associative memory, for an input pattern, it returns another pattern which is potentially of a different size. This phenomenon is very similar to the human brain.

Human memory is necessarily associative. It uses a chain of mental associations to recover a lost memory like associations of faces with names, in exam questions with answers, etc. In such memory associations for one type of object with another, a Recurrent Neural Network (RNN) is needed to receive a pattern of one set of neurons as an input and generate a related, but different, output pattern of another set of neurons.



Algorithm:

Step 0: Initialize the weights to store p vectors. Also initialize all the activations to zero.

Step 1: Perform Steps 2-6 for each testing input.

Step 2: Set the activations of X layer to current input pattern, i.e., presenting the input pattern x to X layer similarly presenting the input pattern y to Y layer. Even though it is bidirectional memory, at one time step, signals can be sent from only one layer. So, either of the input patterns may be the zero vector

Step 3: Perform Steps 4-6 when the activations are not converged.

Step 4: Update the activations of units in the Y layer. Calculate the net input,

$$y_{inj} = \sum_{i=1}^n x_i w_{ij}$$

Applying activations, we obtain

$$y_j = f(y_{inj})$$

Send this signal to the X layer.

Step 5: Update the activations of units in X layer. Calculate the net input,

$$x_{ini} = \sum_{j=1}^m y_j w_{ij}$$

Applying activations, we obtain

$$x_i = f(x_{ini})$$

Send this signal to the Y layer.

Step 6: Test for convergence of the net. The convergence occurs if the activation vectors x and y reach equilibrium. If this occurs then stop, Otherwise, continue.

Conclusion:

We have successfully implemented python Program for Bidirectional Associative Memory with two pairs of vectors.

Questions:

1. Explain State Transition Diagram in detail.
2. Explain false minima problem in detail.
3. Explain stochastic update with example.
4. Explain simulated annealing with example.
5. Explain Automated Trading system used in ANN.

