Koushal Kumar Sharma

MIT2019066

SOC Assignment - BAM

Bi - Directional Associative Memory

A Bidirectional Associative Memory(BAM) is implemented to store the following M = 4 pairs of patterns:

Set A: $X_1 = [1\ 1\ 1\ 1\ 1\ 1]^T$,

$X_2 = [-1\ -1\ -1\ -1\ -1\ -1]^T$,

$X_3 = [1\ -1\ -1\ 1\ 1\ 1]^T$,

$X_4 = [1\ 1\ -1\ -1\ -1\ -1]^T$

Set B:

$Y_1 = [1\ 1\ 1]^T$,

$Y_2 = [-1\ -1\ -1]^T$,

$Y_3 = [-1\ 1\ 1]^T$,

$Y_4 = [1\ -1\ 1]^T$

Using Feed Forward and Feed Backward mechanism and Transformation function, the BAM is implement to learn associative patterns with the help of learning rate of 0.2

Then for using noise in last bit in both the sets, the associative patterns are predicted,

Sets after noise :-

X = ([1,1,1,1,1,-1],

[-1,-1,-1,-1,-1,1],

[1,-1,-1,1,1,-1],

[1,1,-1,-1,-1,1])

Y = ([1,1,-1],

[-1,-1,1],

[-1,1,-1],

[1,-1,-1])

Effect of noise :-

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output associative using Feed Forward with noise in last bit:-
[[ 1.  1.  1.]
 [-1. -1. -1.]
 [-1.  1.  1.]
 [ 1. -1.  1.]]
input associative using Feed Backward with noise in last bit:-
[[ 1.  1.  1.  1.  1.  1.]
 [ 1. -1. -1. -1. -1. -1.]
 [-1. -1.  1.  1.  1.  1.]
 [-1.  1.  1. -1. -1. -1.]]
```

In this output associative came same, no effect of noise. But input associative came bit different in few pairs.