**BAM Assignment**

**MIT2019090, Vishal Kumar**

Bidirectional Associative Memory (BAM) is a special type of artificial neural network that can perform various type of associations. In this assignment we have to perform some associations on the given pair of datasets, so that we can have a weight matrix. Using that matrix, we can retrieve the given pair of datasets.

We have a transmission function that is based on the classic Verhulst equation extended to a cubic form with a saturating limit at ±1.

y[y<-1] = -1

y[y>1] = 1

**Given Input:**

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]]

**Methodology:**

Learning was carried out according to the following procedure:

1) Random selection of a pair of patterns (x(0) and y(0)).

2) Computation of x(t) and y(t) according to the transmission function (1).

3) Computation of the weight matrices update according to (4).

4) Repetition of steps 1) to 3) until all of the pairs have been presented.

5) Repetition of steps 1) to 4) for an a-priori set number of epochs.

**Observation:**

Final weight matrix: [[2 4 2 0 0 0]

[2 0 2 4 4 4]

[4 2 0 2 2 2]]

We can obtain each pair using this weight matrix.

Bidirectional associative memory (BAM) is the best bidirectional neural architecture known. Typically, this model has ever been used for information storage and associations. It can be used in short-term memory also.