

ML ASSIGNMENT : 7

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Semester 5

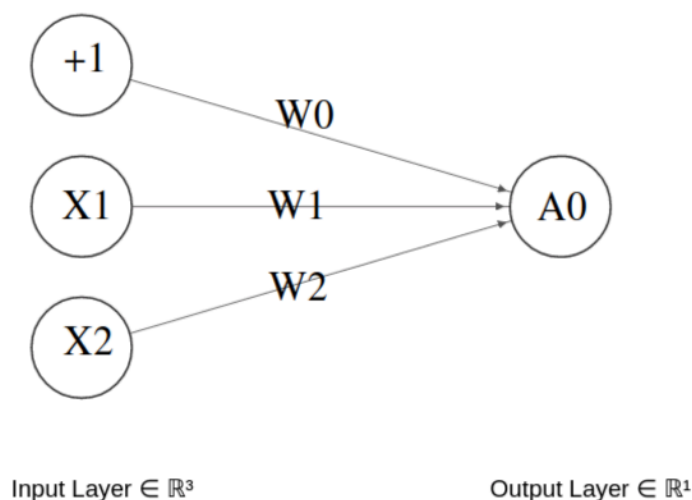
INTRODUCTION

We were told to implement Perceptron training algorithms for AND, OR, NAND and NOR gates and verify our trained algorithms.

The perceptron algorithm states that :

$$\text{Prediction } (y') = 1 \text{ if } Wx+b > 0 \text{ and } 0 \text{ if } Wx+b \leq 0$$

The basic shape/example of a perceptron training algorithm is :



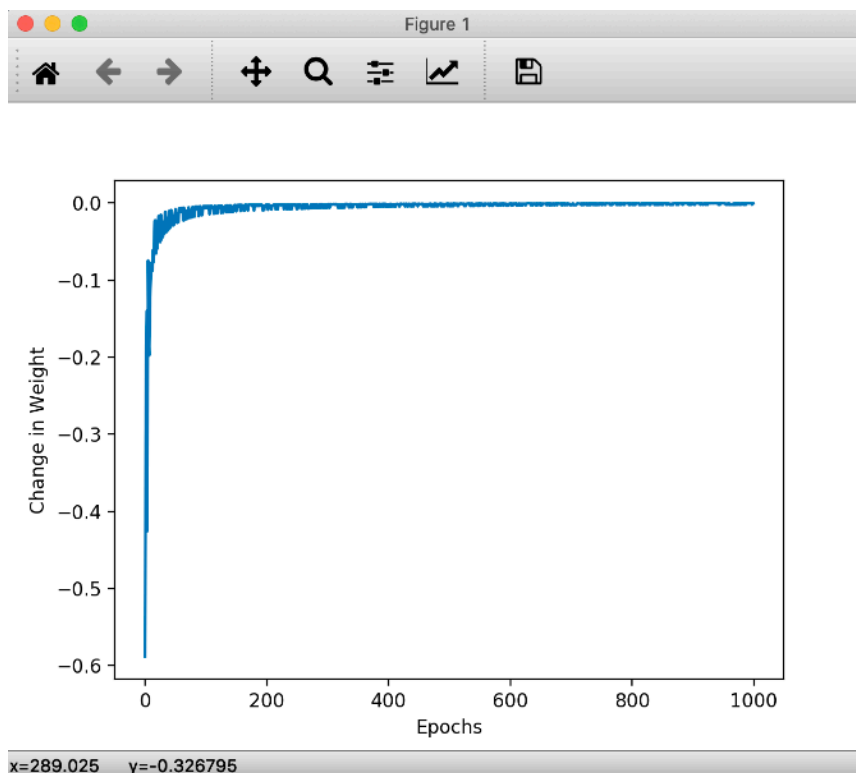
VERIFICATION

In order to verify our trained algorithm we plot the change in weight in every loop and also test our training algorithm against same training data. Since the training data consists of all combination of inputs available for the Gates, we can verify whether our trained algorithm is accurate or fallible.

For AND Gate, our output is shown below in table format.

INPUT 1	INPUT 2	EXPECTED OUTPUT	PREDICTED LUTPUT
0	0	0	0
1	0	0	0
0	1	0	0
1	1	1	1

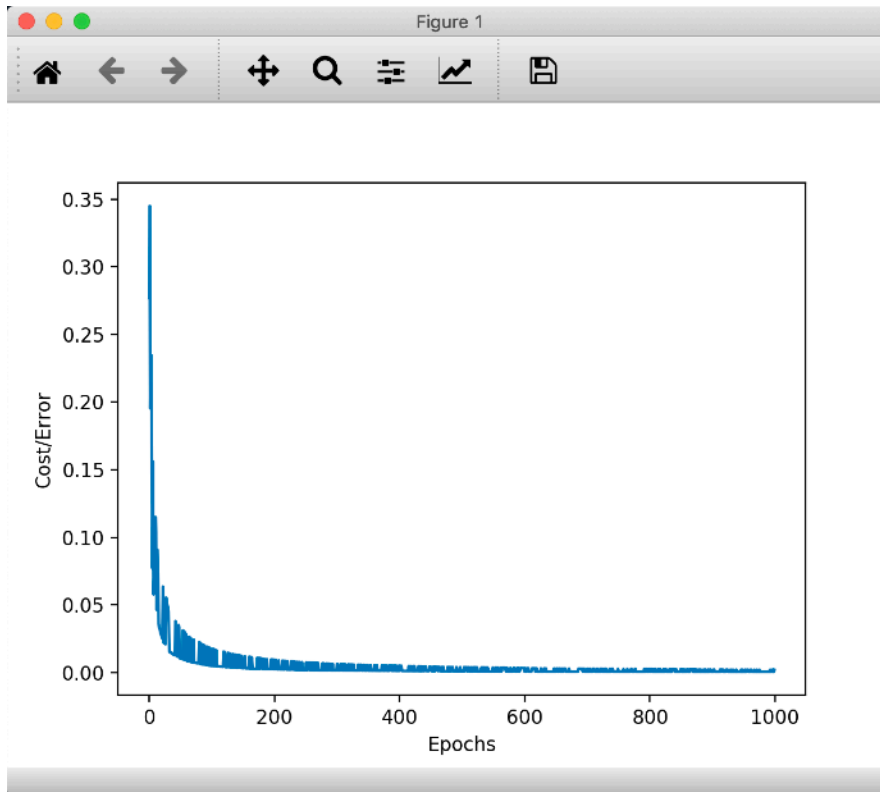
The accuracy of our trained model against AND gate is 100%. The graph is shown below :



For NAND Gate, our output is shown below in table format.

INPUT 1	INPUT 2	EXPECTED OUTPUT	PREDICTED LUTPUT
0	0	1	1
1	0	1	1
0	1	1	1
1	1	0	0

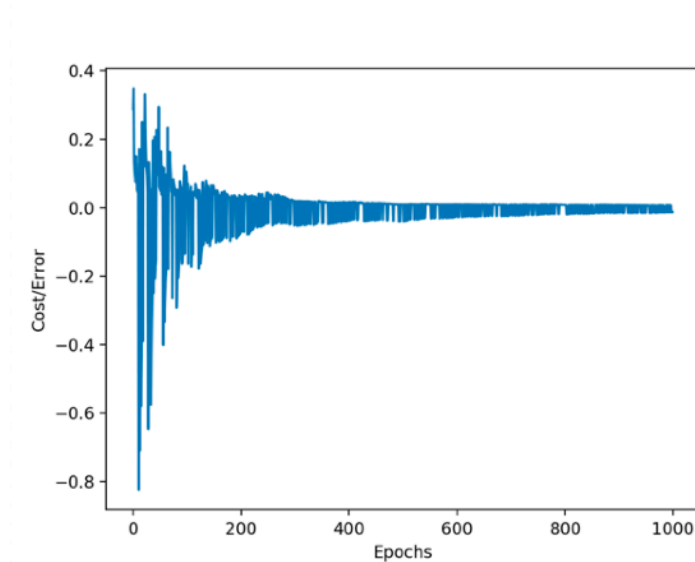
The accuracy of our trained model against NAND gate is 100%. The graph is shown below :



For OR Gate, our output is shown below in table format.

INPUT 1	INPUT 2	EXPECTED OUTPUT	PREDICTED LUTPUT
0	0	0	0
1	0	1	1
0	1	1	1
1	1	1	1

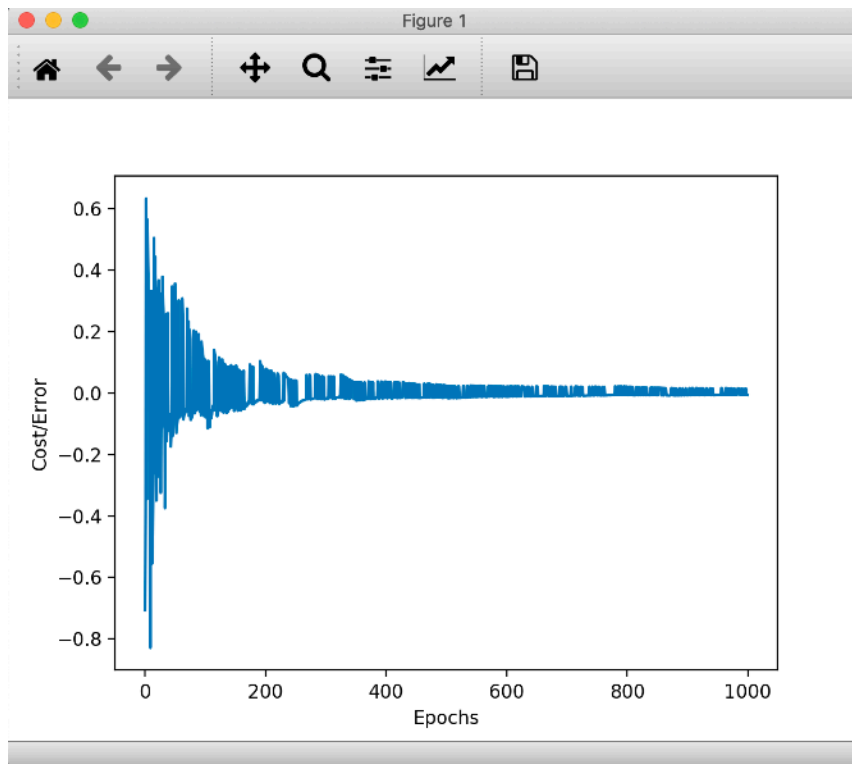
The accuracy of our trained model against OR gate is 100%. The graph is shown below :



For NOR Gate, our output is shown below in table format.

INPUT 1	INPUT 2	EXPECTED OUTPUT	PREDICTED LUTPUT
0	0	1	1
1	0	0	0
0	1	0	0
1	1	0	0

The accuracy of our trained model against NOR gate is 100%. The graph is shown below :



OUTPUT

The Output of all gates together are shown :

