Introduction to Machine Learning
Justification report Assignment 7

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Question : Justify perceptron training algorithms.

Dataset : Logics were used as a training data.

AND	NAND	OR	NOR
AB	$\overline{AB}$	$A+B$	$\overline{A+B}$
			

B	A	X
0	0	**0**
0	1	**0**
1	0	**0**
1	1	**1**

B	A	X
0	0	**1**
0	1	**1**
1	0	**1**
1	1	**0**

B	A	X
0	0	**0**
0	1	**1**
1	0	**1**
1	1	**1**

B	A	X
0	0	**1**
0	1	**0**
1	0	**0**
1	1	**0**

As the logics are linearly separable, we can train perceptrons using these logics.

Verification:

1. For verification test data which varied slightly from the boolean values 0 and 1 was used. This is done as

neural networks can identify data with slight variation from the absolute values.

2. The values for 0 were like 0.1, 0.3, -0.3, -0.1 and values for 1 were like 1.1, 1.3, 1.4, -0.7, -0.9, -0.8 etc.

Analysis:

Technique	Alpha	Epochs	Accuracy (in %)
NAND	0.2	200	86.66%
NAND	0.25	200	93.33%
OR	0.35	200	60.00%
OR	0.40	200	73.33%
AND	0.40	200	60.00%
AND	0.35	200	66.67%
NOR	0.35	200	73.33%
NOR	0.30	200	60.00%

And can be seen from analysis, the accuracy is maximum for NAND gates and is minimum for AND gates. Seeing from the accuracies for the gates the algorithm is working correctly and thus the logic is justified.