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Assignment 4

Oct 31st , 2021

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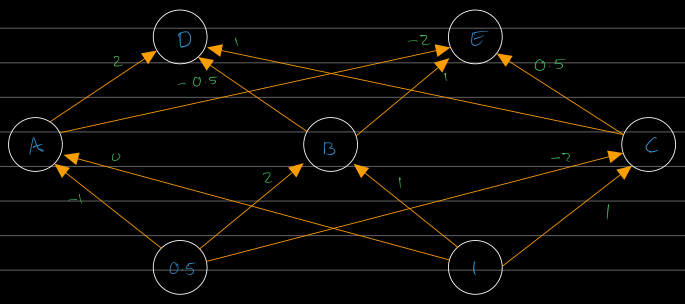
For Questions 2 and 5 refer to the link below:
https://github.com/Arsham1024/Introduction_ML/tree/master/P4_DeepLearning%26Genetic

The rest of the Questions are in the following pages

Question 3

a)



A = (0.5 x -1) + (1 x 0) = -0.5

B = (0.5 x 2) + (1 x 1) = 2

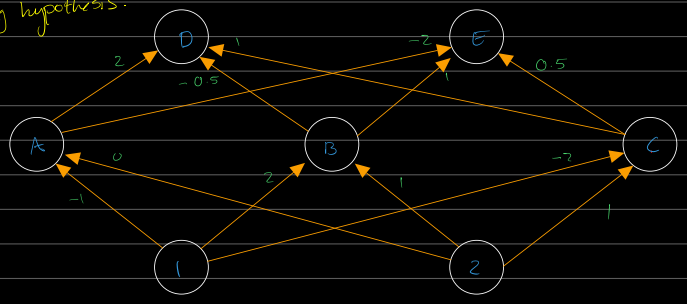
C = (0.5 x -2) + (1 x 1) = -1

D = (A x 2) + (B x -0.5) + (C x 1) = -3
(A x 2) = -1, (B x -0.5) = -1, (C x 1) = -1

E = (A x -2) + (B x 1) + (C x 0.5) = 2.5
(A x -2) = 1, (B x 1) = 2, (C x 0.5) = -0.5

b) input (1,2) is Double last input (0.5,1) so I can just Double the output.

Testing hypothesis:



A = (1 x -1) + (2 x 0) = -1

B = (1 x 2) + (2 x 1) = 4

C = (1 x -2) + (2 x 1) = 0
(1 x -2) = -2, (2 x 1) = 2

D = ~~(A x 2)~~ + ~~(B x -0.5)~~ + (C x 0.5) = -4
~~(A x 2)~~ = -2, ~~(B x -0.5)~~ = -2, (C x 0.5) = 0

E = ~~(A x -2)~~ + ~~(B x 1)~~ + ~~(C x 0.5)~~ = 6
~~(A x -2)~~ = 2, ~~(B x 1)~~ = 4, ~~(C x 0.5)~~ = 0

	activation f(x)	heaviside												
	n	0.4												
1.a														
logical AND														
			x1	x2	x0	w1	w2	w0	t	z(net)	y	t-y	delta-W1	delta-W2	delta-W0
		1	0	0	1	1	1	1	0	1	1	-1	-0.4	-0.4	-0.4
		2	0	1	1	0.6	0.6	0.6	0	1.2	1	-1	-0.24	-0.24	-0.24
		3	1	0	1	0.36	0.36	0.36	0	0.72	1	-1	-0.144	-0.144	-0.144
		4	1	1	1	0.216	0.216	0.216	1	0.648	1	0	0	0	0
		5	0	1	1	0.216	0.216	0.216	1	0.432	1	0	0	0	0
		6	0	0	1	0.216	0.216	0.216	1	0.216	1	0	0	0	0
		7	1	1	1	0.216	0.216	0.216	1	0.648	1	0	0	0	0
		8	1	0	1	0.216	0.216	0.216	1	0.432	1	0	0	0	0
		9	0	0	1	0.216	0.216	0.216	1	0.216	1	0	0	0	0

	Activation f(x)	heaviside										
	n	0.1										
1.b												
Logical NOT			x1	x0	w1	w0	t	z(net)	y	t-y	delta-W1	delta-W0
		1	0	1	0	0	1	0	0	1	0	0
		2	1	1	0	0	0	0	0	0	0	0
		3	1	1	0	0	-1	0	0	-1	0	0
		4	0	1	0	0	-2	0	0	-2	0	0

Question 5

	chromosome	Fitness	P(#i)	rank		
C1	1001001	0.2	0.1	4		
C2	0100101	0.6	0.3	2	highest accuracy	C3, C2
C3	1011000	0.8	0.4	1		
C4	1101100	0.4	0.2	3		

cross over:			mask		
C3	1011000	1110000	C5	1011100	
C4	1101100		C6	1101000	

Gen 1

	chromosome	fitness	P(#i)	rank		
C2	0100101	0.6	0.2142857143	4		
C3	1011000	0.8	0.2857142857	2	highest accuracy	C3, C5
C5	1011100	0.8	0.2857142857	1		
C6	1101000	0.6	0.2142857143	3		

cross over:			mask			
C3	1011000	0001100	C7	1011000	They don't change ??!?!	
C5	1011100		C8	1011100		

Gen 2:

	chromosome	fitness	P(#i)	rank		
C3	1011000	0.8	0.25	1		
C5	1011100	0.8	0.25	1	highest	all
C7	1011000	0.8	0.25	1		
C8	1011100	0.8	0.25	1		

mutation

		mutated	accuracy
C3	1011000	1011010	1
C7	1011000	1011010	1

Return:

Chromosomes	genes sequence	accuracy
C3 , C7	1011010	1

Question 6

	chromosome	Fitness	P(#i)	rank		
C1	000	0	0	4		
C2	001	640	0.3333333333	2	highest	C3
C3	010	710	0.3697916667	1		
C4	100	570	0.296875	3		

cross over:

		mask		
C2	001	110	C5	000
C4	100		C6	101

		mask		
C2	001	110	C7	000
C3	010		C8	011

Gen 1:

	chromosome	Fitness	P(#i)	rank		
C5	000	0	0	3		
C6	101	1210	0.47265625	1	highest	C6
C7	000	0	0	2		
C8	011	1350	0.52734375	-	overweight	

cross over:

		mask		
C6	101	100	C9	101
C6	101		C10	101

		mask		
C6	101	100	C11	100
C7	000		C12	001

Gen 2:

	chromosome	Fitness	P(#i)	rank		
C9	101	1210	0.3333333333	1	highest	C9

C10	101	1210	0.3333333333	2	
C11	100	570	0.1570247934	4	
C12	001	640	0.1763085399	3	

Mutation:

	mutated	Fitness
C9	101	100	570
C10	101	100	570

Gen 3:

	chromosome	Fitness	P(#i)	rank		
C9	100	570	0.2425531915	4	highest	C12
C10	100	570	0.2425531915	3		
C11	100	570	0.2425531915	2		
C12	001	640	0.2723404255	1		

return:

C12	001	640	0.2723404255	1