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I use deterministic recurrent neural network. Last time, I used parameter that the looping will stop after the first loop. And with this experience, I think that is not enough, so I modify it to :

> the looping will stop after get (size of node+1 or 1 looping) times of same value.

In this report, I will compare some treatments for task 1 because it has local minimum problem. But actually I made a probabilistic option too for task 2.

Task 1 (solution: 1,1,1)

1.1. Deterministic

Initial input: (0,0,0) – opposite to the result	Initial input (1,1,0) --- Local minimum problem
Result: --(0,0,0) - E=0.0 ========== -change node 1 --S=0.0 --(1,0,0) - E=0.0 ========== -change node 2 --S=6.0 --(1,1,0) - E=0.0 ========== -change node 3 --S=4.0 --(1,1,1) - E=-1.0 ========== -change node 1 -- 1st same value --S=2.0 --(1,1,1) - E=-1.0 ========== -change node 2 -- 2nd same value --S=14.0 --(1,1,1) - E=-1.0 ========== -change node 3 -- 3rd same value --S=4.0 --(1,1,1) - E=-1.0 ========== -change node 1 -- 4th same value --S=4.0 --(1,1,1) - E=-1.0 ========== ==========END========== ==========	Result Deterministic: --(1,1,0) - E=3.0 ========== -change node 1 --S=6.0 --(1,1,0) - E=3.0 ========== -change node 2 --S=6.0 --(1,0,0) - E=1.0 ========== -change node 3 -- 1st same value --S=-4.0 --(1,0,0) - E=1.0 ========== -change node 1 – 2nd same value --S=0.0 --(1,0,0) - E=1.0 ========== -change node 2 – 3rd same value --S=6.0 --(1,0,0) - E=1.0 ========== -change node 3 – 4th same value --S=6.0 --(1,0,0) - E=1.0 ========== ==========END========== ==========

There is a local minimum problem if the initial input is (1,1,0) and the solution become (1,0,0). That is why the next part, I will compare it with probabilistic.

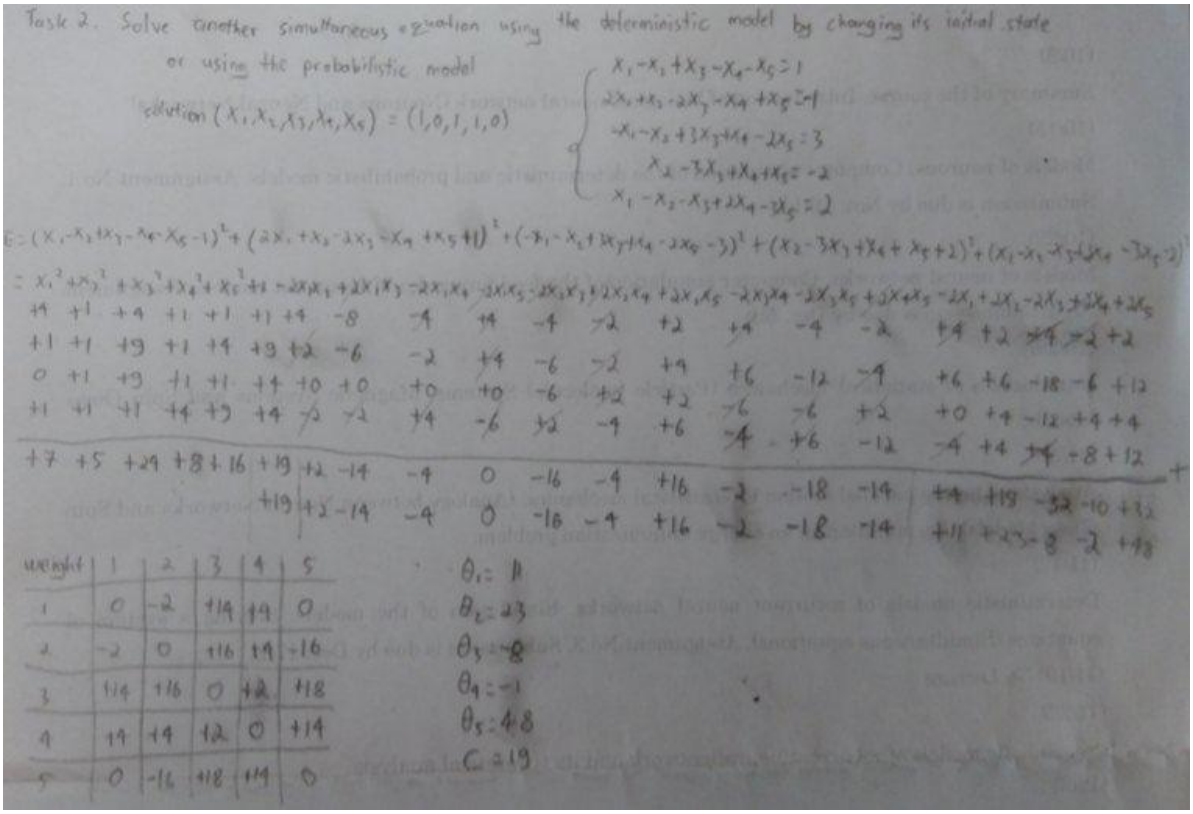
1.2. Probabilistic

The important thing in probabilistic is alpha. In next table, I will explain how many times it get the right solution from 10 tries. Note: the looping will stop after get (size of node+1 or 1 looping) times of same value. I am using (1,1,0) which has a local minimum problem as an input.

Alpha	X out of 10 right
0.1	1 out of 10
0.3	6 out of 10
0.5	7 out of 10
0.7	4 out of 10
1.0	4 out of 10
1.2	0 out of 10

From those data I think alpha 0.5 is the best. But I think we need to use more data and more tries for each alpha so the best alpha will be more accurate.

Task 2 (1,0,1,1,0)



Initial input: (0,1,0,0,1) – opposite to the result	Initial input (1,1,1,1,1)
Result: --(0,1,0,0,1) - E=87.0	Result: --(1,1,1,1,1) - E=18.0

========== -change node 1 --S=-2.0 --(0,1,0,0,1) - E=87.0 ========== -change node 2 --S=-16.0 --(0,0,0,0,1) - E=48.0 ========== -change node 3 --S=18.0 --(0,0,1,0,1) - E=22.0 ========== -change node 4 --S=16.0 --(0,0,1,1,1) - E=4.0 ========== -change node 5 --S=32.0 --(0,0,1,1,0) - E=-12.0 ========== -change node 1 --S=18.0 --(1,0,1,1,0) - E=-19.0 ========== -change node 2 – 1st same value --S=18.0 --(1,0,1,1,0) - E=-19.0 ========== -change node 3 – 2nd same value --S=16.0 --(1,0,1,1,0) - E=-19.0 ========== -change node 4 – 3rd same value --S=6.0 --(1,0,1,1,0) - E=-19.0 ========== -change node 5 – 4th same value --S=32.0 --(1,0,1,1,0) - E=-19.0 ========== -change node 1 – 5th same value --S=18.0 --(1,0,1,1,0) - E=-19.0 ========== -change node 2 – 6th same value --S=18.0 --(1,0,1,1,0) - E=-19.0 ========== ==========END========== ==========	========== -change node 1 --S=16.0 --(1,1,1,1,1) - E=18.0 ========== -change node 2 --S=2.0 --(1,0,1,1,1) - E=-3.0 ========== -change node 3 --S=34.0 --(1,0,1,1,1) - E=-3.0 ========== -change node 4 --S=20.0 --(1,0,1,1,1) - E=-3.0 ========== -change node 5 --S=32.0 --(1,0,1,1,0) - E=-19.0 ========== -change node 1 – 1st same value --S=18.0 --(1,0,1,1,0) - E=-19.0 ========== -change node 2 – 2nd same value --S=18.0 --(1,0,1,1,0) - E=-19.0 ========== -change node 3—3rd same value --S=16.0 --(1,0,1,1,0) - E=-19.0 ========== -change node 4 – 4th same value --S=6.0 --(1,0,1,1,0) - E=-19.0 ========== -change node 5 – 5th same value --S=32.0 --(1,0,1,1,0) - E=-19.0 ========== -change node 1 – 6th same value --S=32.0 --(1,0,1,1,0) - E=-19.0 ========== ==========END========== ==========

After a few tries, I didn't get any local minimum problem in this task.