CST 413

MACHINE LEARNING

ASSIGNMENT

SUBMITTED BY

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CSE – S7
Roll No – 14

Input: [-5688.600000 6915.400000 5386.000000]
label: [8293.200000 3589.600000 -7162.200000]
Error: [0.271265 0.034120 -0.912079]
Training successful
0

Input: [106.600000 606.400000 -1714.400000]
label: [-342.200000 7086.000000 -2209.400000]
Error: [-0.004865 3.813036 -0.081074]
Training successful
1

Input: [2974.600000 -1378.400000 3496.800000]
label: [3114.400000 -7754.800000 -373.200000]
Error: [0.043625 -1.688601 0.000152]
Training successful
2

Input: [3980.400000 -8479.400000 -1827.200000]
label: [-2085.600000 -2104.200000 -2959.400000]
Error: [0.074789 0.078164 -0.506154]
Training successful
3

Input: [4289.800000 -598.800000 3174.600000]
label: [2147.400000 9846.000000 -6627.200000]
Error: [-0.020663 0.890948 -0.000973]
Training successful
4

Input: [412.200000 9171.200000 5788.600000]
label: [-342.200000 -7210.000000 -2548.400000]
Error: [0.000273 -2.018399 -0.029648]
Training successful
5

Input: [3179.200000 -1919.200000 -3078.400000]
label: [1332.200000 3154.800000 3602.600000]
Error: [-0.002090 -0.085024 0.772408]
Training successful
6

Input: [-6939.400000 -8304.400000 -6553.400000]
label: [-1752.000000 2442.800000 9576.000000]
Error: [-0.003421 -0.006270 1.420375]
Training successful
7

Input: [-6347.000000 5516.400000 1802.400000]
label: [-2242.800000 -8036.600000 -8740.000000]
Error: [0.007856 -1.572208 -0.032038]
Training successful
8

Input: [3179.200000 2727.000000 -6713.600000]
label: [-342.200000 -5603.000000 -8995.200000]
Error: [0.000068 0.238486 -0.871444]
Training successful
9

Input: [412.200000 323.600000 5257.800000]
label: [6124.200000 -3527.000000 2079.800000]
Error: [0.359208 -1.454931 0.068733]
Training successful
10

Input: [106.600000 -524.400000 -8305.800000]
label: [882.800000 -6116.000000 4107.200000]
Error: [-0.003944 -0.549326 0.385282]
Training successful
11

Input: [412.200000 606.400000 -8289.400000]
label: [-342.200000 2523.400000 5119.600000]
Error: [-0.002294 0.001759 0.772228]
Training successful
12

Input: [2974.600000 -3275.800000 3496.800000]
label: [-2085.600000 -4812.200000 2245.000000]
Error: [0.008370 -0.992519 0.033268]
Training successful
13

Input: [4289.800000 -4938.200000 3393.000000]
label: [-7725.000000 -5196.800000 -2379.000000]
Error: [0.093227 -0.812557 0.018436]
Training successful
14

Input: [-3387.200000 3360.400000 -6713.600000]
label: [-7725.000000 7059.200000 -4064.800000]
Error: [-0.175635 0.721563 -0.046469]
Training successful
15

Input: [2974.600000 9010.800000 -2698.000000]
label: [-7725.000000 3800.800000 -786.800000]
Error: [-0.785457 0.376416 -0.000220]
Training successful
16

Input: [2974.600000 6556.800000 2084.200000]
label: [-3132.000000 -1389.200000 -5071.400000]
Error: [-0.153205 0.000530 -1.342837]
Training successful
17

Input: [3719.600000 -2471.000000 -7856.400000]
label: [-3879.400000 1350.000000 -3950.600000]
Error: [-0.352350 0.050368 -0.582570]
Training successful
18

Input: [412.200000 -8304.400000 3496.800000]
label: [-342.200000 7934.200000 -9069.800000]
Error: [0.000198 0.172688 -2.048271]
Training successful
19

Input: [6426.200000 4371.200000 5740.200000]
label: [3114.400000 -9825.800000 -219.000000]
Error: [0.017743 -1.824765 0.000017]
Training successful
20

Input: [4235.600000 -4714.600000 5279.400000]
label: [9537.800000 -8260.600000 1808.800000]
Error: [0.761550 -0.011077 -0.007335]
Training successful
21

Input: [2974.600000 -6649.000000 6726.800000]
label: [1764.600000 4414.600000 -1791.400000]
Error: [-0.026783 0.628838 -0.030953]
Training successful
22

Input: [412.200000 -6649.000000 -1714.400000]
label: [-1752.000000 -1248.800000 3653.600000]
Error: [-0.018805 -0.010080 0.875195]
Training successful
23

Input: [412.200000 323.600000 -6713.600000]
label: [-342.200000 4563.200000 -6596.000000]
Error: [-0.001308 0.702629 -0.385692]
Training successful
24

Input: [3179.200000 -598.800000 -8814.400000]
label: [7739.000000 -4477.000000 -5031.000000]
Error: [0.736461 -0.062725 -0.082729]
Training successful
25

Input: [412.200000 9208.400000 -3208.600000]
label: [-8827.800000 8786.000000 -7612.600000]
Error: [-0.157606 1.442848 -0.122649]
Training successful
26

Input: [-3387.200000 -598.800000 9596.200000]
label: [-9388.800000 -5170.800000 4633.800000]
Error: [-0.798075 0.032012 0.074101]
Training successful
27

Input: [6103.400000 9010.800000 -5858.000000]
label: [-7725.000000 7922.800000 8858.800000]
Error: [-0.290286 0.267754 0.901386]
Training successful
28

Input: [2974.600000 4835.800000 -8231.800000]
label: [1764.600000 -1605.200000 -1819.200000]
Error: [0.175688 0.110362 -0.531013]
Training successful
29

Input: [-5688.600000 -7329.800000 5740.200000]
label: [-1041.800000 174.200000 -6321.800000]
Error: [0.002339 0.000031 -0.722880]
Training successful
30

Input: [412.200000 9010.800000 -5426.000000]
label: [1520.000000 2068.200000 -6931.400000]
Error: [0.001661 0.038212 -0.475057]
Training successful
31

Input: [412.200000 7701.600000 -5426.000000]
label: [1764.600000 -7483.000000 3515.600000]
Error: [-0.020186 -0.849526 0.686022]
Training successful
32

Input: [-5688.600000 4371.200000 -9357.600000]
label: [8293.200000 7754.600000 -6446.000000]
Error: [0.775412 0.395640 -0.186985]
Training successful
33

Input: [2974.600000 -455.400000 -8814.400000]
label: [-1752.000000 -3317.800000 5465.400000]
Error: [-0.015517 -0.080966 0.603830]
Training successful
34

Input: [3179.200000 4417.200000 7145.600000]
label: [-7725.000000 3254.200000 -3694.600000]
Error: [-1.486124 0.053823 -0.028079]
Training successful
35

Input: [3719.600000 -2667.600000 3496.800000]
label: [6124.200000 6378.600000 8886.400000]
Error: [-0.175681 -0.159373 0.827657]
Training successful
36

Input: [2974.600000 9010.800000 -2264.200000]
label: [-1752.000000 6482.200000 1085.600000]
Error: [-0.015526 0.810832 -0.002476]
Training successful
37

Input: [412.200000 -3275.800000 6726.800000]
label: [-2085.600000 -8260.600000 -195.800000]
Error: [0.021446 -2.227170 0.000261]
Training successful
38

Input: [3179.200000 8089.000000 5386.000000]
label: [-1752.000000 7559.000000 7823.800000]
Error: [0.007368 -0.356408 -0.356717]
Training successful
39

Input: [3179.200000 4972.400000 6726.800000]
label: [-7725.000000 3944.000000 3268.000000]
Error: [-0.919613 0.046215 0.032350]
Training successful
40

Input: [3179.200000 -1378.400000 -4424.400000]
label: [2147.400000 -4686.800000 -7612.600000]
Error: [0.017872 0.191815 -0.891428]
Training successful
41

Input: [3179.200000 -598.800000 -5027.600000]
label: [-2242.800000 7934.200000 7835.000000]
Error: [-0.022251 -0.128323 1.132170]
Training successful
42

Input: [412.200000 4945.600000 5788.600000]
label: [9537.800000 9070.400000 -6627.200000]
Error: [0.259606 0.238979 -1.530172]
Training successful
43

Input: [106.600000 -2667.600000 -4424.400000]
label: [-2085.600000 9070.400000 8474.600000]
Error: [-0.094238 2.084252 1.981840]
Training successful
44

Input: [412.200000 8024.800000 -1827.200000]
label: [8293.200000 -54.600000 6812.400000]
Error: [1.272064 -0.000009 0.551657]
Training successful
45

Input: [-6347.000000 -4938.200000 8619.600000]
label: [-1752.000000 3154.800000 620.200000]
Error: [-0.057126 0.547743 -0.000039]
Training successful
46

Input: [2974.600000 8900.000000 5279.400000]
label: [6124.200000 7435.400000 -1361.400000]
Error: [0.021418 0.551382 -0.012700]
Training successful
47

Input: [4235.600000 606.400000 -5027.600000]
label: [-9388.800000 4902.800000 -4906.600000]
Error: [-1.079980 0.718384 -0.053928]
Training successful
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Readme.md

Updates / Changes Made in LibNN Project

1. Fixed Assertion Errors

In input.h and label.h, set_input() and set_label() functions were updated to ensure the size of new inputs/labels matches the original.

Prevented crashes like:

Assertion in.size() == input.size() failed.

2. Added error.h

Created an error class to store and print errors between predictions and labels.

Added set_error() and print() methods.

3. Normalized Input and Labels

Converted large input/output values to a smaller range to avoid huge errors during training.

4. Updated unit_test.cpp Training Logic

Added weight initialization.

Implemented forward pass to compute predictions.

Calculated error between predicted output and label.

Updated weights using gradient descent.

Added print statements for: Input, Label, Error, and final predictions.

Now prints “Training step done!” after each iteration.

5. Multi-output Support (partial/future-ready)

Adjusted label class to handle multiple outputs (e.g., [0.78766, 0.4321]) without breaking assertions.

Now prints “Training step done!” after each iteration.

Multi-output Support (partial/future-ready)
Adjusted label class to handle multiple outputs (e.g., [0.78766, 0.4321]) without breaking assertions.

Successful Training Step
After updates, unit_test runs without aborts or core dumps.

Predictions are now reasonable and closer to labels.