

```

1 C:\Users\mille\Anaconda2\envs\penv3\python.exe C:/Users/
  mille/source/repos/Bianchi/PEL208-Special_Learning_Topics/
  Python_Assignments/mlp/iris.py
2 [2018-12-18 09:14:56.014836] training MLP [3] witn n=0.3
3 [2018-12-18 09:14:56.014836] iteration 0
4 [2018-12-18 09:14:57.644880] iteration 1
5 [2018-12-18 09:14:59.220986] iteration 2
6 [2018-12-18 09:15:00.868037] iteration 3
7 [2018-12-18 09:15:02.511096] iteration 4
8 [2018-12-18 09:15:04.115168] training MLP [3] witn n=0.1
9 [2018-12-18 09:15:04.115168] iteration 0
10 [2018-12-18 09:15:05.696261] iteration 1
11 [2018-12-18 09:15:07.274348] iteration 2
12 [2018-12-18 09:15:08.846443] iteration 3
13 [2018-12-18 09:15:10.423540] iteration 4
14 [2018-12-18 09:15:12.007628] training MLP [3] witn n=0.03
15 [2018-12-18 09:15:12.007628] iteration 0
16 [2018-12-18 09:15:13.602705] iteration 1
17 [2018-12-18 09:15:15.183781] iteration 2
18 [2018-12-18 09:15:16.814855] iteration 3
19 [2018-12-18 09:15:18.416937] iteration 4
20 [2018-12-18 09:15:20.085976] training MLP [3] witn n=0.01
21 [2018-12-18 09:15:20.085976] iteration 0
22 [2018-12-18 09:15:21.680042] iteration 1
23 [2018-12-18 09:15:23.256151] iteration 2
24 [2018-12-18 09:15:24.832238] iteration 3
25 [2018-12-18 09:15:26.408331] iteration 4
26 [2018-12-18 09:15:27.986409] training MLP [3] witn n=0.003
27 [2018-12-18 09:15:27.986409] iteration 0
28 [2018-12-18 09:15:29.567511] iteration 1
29 [2018-12-18 09:15:31.145603] iteration 2
30 [2018-12-18 09:15:32.723698] iteration 3
31 [2018-12-18 09:15:34.391722] iteration 4
32 ##### Iris Experiment - Layers [3]
33
34 Weights:
35 [matrix([[-8.35197588,  1.37219133,  1.27304378],
36           [-1.29447301, -1.55349051, -0.26197682],
37           [-3.33109439,  2.37854327,  2.09177955],
38           [ 1.76119285, -3.61777884, -1.98777772],
39           [ 1.89499224, -3.64648132, -2.05620642],
40           [ 0.26640921, -1.00445501, -0.15768243],
41           [ 0.60583775, -0.51355615, -0.03961874],
42           [-1.92279165,  1.9067116 ,  1.58843181],
43           [-1.2271354 ,  1.29786147,  1.17680809],
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File - iris

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44      [ 4.90561224, -2.27461838, -1.40964128],  
45      [ 5.71899948, -1.37682998, -0.89785383],  
46      [ 4.84859947, -2.2864464 , -1.40992022],  
47      [ 5.50114809, -1.47999352, -1.03826657]]), array  
([[[-4.4517383 , 3.85703738, -2.46029869],  
48      [-3.07760858, -7.42299554, 5.97755109],  
49      [ 5.15752573, -6.08599913, -4.02446113],  
50      [ 3.66191006, -1.78671731, -5.48729087]]])  
51  
52 Best n:  
53 0.3  
54 Confusion Matrix:  
55 [[10  0  0]  
56 [ 0 10  0]  
57 [ 0  0 10]]  
58 Precision:  
59 1.0  
60 [2018-12-18 09:15:36.156722] training MLP [4] witn n=0.3  
61 [2018-12-18 09:15:36.156722] iteration 0  
62 [2018-12-18 09:15:37.802756] iteration 1  
63 [2018-12-18 09:15:39.476805] iteration 2  
64 [2018-12-18 09:15:41.140847] iteration 3  
65 [2018-12-18 09:15:42.750925] iteration 4  
66 [2018-12-18 09:15:44.911665] training MLP [4] witn n=0.1  
67 [2018-12-18 09:15:44.911665] iteration 0  
68 [2018-12-18 09:15:46.549721] iteration 1  
69 [2018-12-18 09:15:48.219771] iteration 2  
70 [2018-12-18 09:15:49.828849] iteration 3  
71 [2018-12-18 09:15:51.465890] iteration 4  
72 [2018-12-18 09:15:53.087968] training MLP [4] witn n=0.03  
73 [2018-12-18 09:15:53.087968] iteration 0  
74 [2018-12-18 09:15:54.773996] iteration 1  
75 [2018-12-18 09:15:56.435029] iteration 2  
76 [2018-12-18 09:15:58.036118] iteration 3  
77 [2018-12-18 09:15:59.609217] iteration 4  
78 [2018-12-18 09:16:01.188308] training MLP [4] witn n=0.01  
79 [2018-12-18 09:16:01.188308] iteration 0  
80 [2018-12-18 09:16:02.769380] iteration 1  
81 [2018-12-18 09:16:04.342474] iteration 2  
82 [2018-12-18 09:16:05.912570] iteration 3  
83 [2018-12-18 09:16:07.507651] iteration 4  
84 [2018-12-18 09:16:09.104746] training MLP [4] witn n=0.003  
85 [2018-12-18 09:16:09.104746] iteration 0  
86 [2018-12-18 09:16:10.687837] iteration 1  
87 [2018-12-18 09:16:12.297893] iteration 2
```

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88 [2018-12-18 09:16:13.959954] iteration 3
89 [2018-12-18 09:16:15.548023] iteration 4
90 ##### Iris Experiment - Layers [4]
91
92 Weights:
93 [matrix([[ 1.24483838,  1.13781106,  6.47327169,  4.
94           15686683],
95           [-1.3871977 , -1.24988261,  0.99929537,  0.
96           53004727],
97           [ 2.15410799,  2.00726741,  2.42824827,  2.
98           24327083],
99           [-3.17974185, -3.03677172, -1.16591642, -1.
100          31179619],
101          [-3.15296391, -2.98757634, -1.54351212, -1.
102          44798418],
103          [-0.89122474, -0.78587034, -0.27205293, -0.
104          07978826],
105          [-0.47265144, -0.4210102 , -0.51969544, -0.
106          20463883],
107          [ 1.67358094,  1.59176064,  1.2668253 ,  1.
108          45448838],
109          [ 1.15128921,  1.13789163,  0.79256282,  0.
110          97810595],
111          [-2.07896471, -1.94722273, -3.78426788, -2.
112          60093351],
113          [-1.26049686, -1.19376453, -4.52903815, -2.
114          86187084],
115          [-2.03798395, -1.90864279, -4.09487094, -2.
116          60807078],
117          [-1.24109704, -1.23484167, -4.56678775, -2.
118          70953833]]), array([-5.51545353, -3.4476431 ,  3.
119          71850021],
120          [ 4.12934727, -4.90401593, -3.30623634],
121          [ 3.88183526, -4.38946365, -3.33583772],
122          [ 0.3748116 ,  5.68277865, -4.2893077 ],
123          [ 1.61440479,  2.51511981, -4.72397229]])]
124
125 Best n:
126 0.3
127 Confusion Matrix:
128 [[10  0  0]
129  [ 0 10  0]
130  [ 0  0 10]]
131 Precision:
132 1.0

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119 [2018-12-18 09:16:17.271029] training MLP [5] witn n=0.3
120 [2018-12-18 09:16:17.271029] iteration 0
121 [2018-12-18 09:16:18.877122] iteration 1
122 [2018-12-18 09:16:20.497185] iteration 2
123 [2018-12-18 09:16:22.182023] iteration 3
124 [2018-12-18 09:16:24.138909] iteration 4
125 [2018-12-18 09:16:25.718366] training MLP [5] witn n=0.1
126 [2018-12-18 09:16:25.719366] iteration 0
127 [2018-12-18 09:16:27.297881] iteration 1
128 [2018-12-18 09:16:28.887857] iteration 2
129 [2018-12-18 09:16:30.475275] iteration 3
130 [2018-12-18 09:16:32.059925] iteration 4
131 [2018-12-18 09:16:33.650091] training MLP [5] witn n=0.03
132 [2018-12-18 09:16:33.650091] iteration 0
133 [2018-12-18 09:16:35.232881] iteration 1
134 [2018-12-18 09:16:36.818617] iteration 2
135 [2018-12-18 09:16:38.470677] iteration 3
136 [2018-12-18 09:16:40.062760] iteration 4
137 [2018-12-18 09:16:41.650846] training MLP [5] witn n=0.01
138 [2018-12-18 09:16:41.650846] iteration 0
139 [2018-12-18 09:16:43.277900] iteration 1
140 [2018-12-18 09:16:44.904960] iteration 2
141 [2018-12-18 09:16:46.513047] iteration 3
142 [2018-12-18 09:16:48.103130] iteration 4
143 [2018-12-18 09:16:49.780153] training MLP [5] witn n=0.
003
144 [2018-12-18 09:16:49.780153] iteration 0
145 [2018-12-18 09:16:51.431214] iteration 1
146 [2018-12-18 09:16:53.030297] iteration 2
147 [2018-12-18 09:16:54.622380] iteration 3
148 [2018-12-18 09:16:56.209462] iteration 4
149 ##### Iris Experiment - Layers [5]
150
151 Weights:
152 [matrix([[ 1.53746648,  2.50760041,  5.42642554,  9.
95526335, 10.41454227],
153      [-1.1639044 , -2.0714908 , -0.55495302, -0.
90864243, -1.22045064],
154      [ 1.81684722,  2.93003189,  1.759624 ,  3.
4065463 ,  3.79656608],
155      [-2.93798579, -4.67677351, -1.82072997, -2.
74623711, -1.79640378],
156      [-2.9888777 , -4.58689732, -0.7748454 , -0.
67496693, -0.41272521],
157      [-0.76578611, -1.19677741, -0.94081095, -1.

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157 78126778, -2.34028819],
158      [-0.37276946, -0.64857929, -0.37585611, -0.
       6107344 , -1.10002191],
159      [ 1.38511967,  2.18783025,  0.91487252,  1.
        48384895,  0.78482523],
160      [ 1.00718632,  1.56151482,  1.30579925,  1.
        94440352,  1.3351717 ],
161      [-1.94533694, -2.88405804, -3.88029501, -7.
        12530659, -6.66446482],
162      [-1.29782344, -1.70269978, -4.31080918, -8.
        19925468, -8.07811446],
163      [-2.10213475, -2.76774617, -2.67322531, -4.
        62360342, -5.17716065],
164      [-1.44401691, -1.65841286, -3.39833536, -6.
        08186791, -7.0173522 ]]), array([[[-7.22175732, -5.
        43683578,  5.88045804],
165      [ 4.5693442 , -4.6104831 , -3.7011246 ],
166      [ 6.71374025, -10.55150612, -2.91502578],
167      [ 1.78902154,  1.73930797, -5.64632541],
168      [ 0.48695727,  6.26270863, -6.32907474],
169      [-0.63355347,  6.9291928 , -5.40715452]]]
170
171 Best n:
172 0.3
173 Confusion Matrix:
174 [[10  0  0]
175  [ 0 10  0]
176  [ 0  0 10]]
177 Precision:
178 1.0
179 [2018-12-18 09:16:57.890482] training MLP [6] witn n=0.3
180 [2018-12-18 09:16:57.890482] iteration 0
181 [2018-12-18 09:16:59.501567] iteration 1
182 [2018-12-18 09:17:01.106642] iteration 2
183 [2018-12-18 09:17:02.710719] iteration 3
184 [2018-12-18 09:17:04.325777] iteration 4
185 [2018-12-18 09:17:06.160720] training MLP [6] witn n=0.1
186 [2018-12-18 09:17:06.160720] iteration 0
187 [2018-12-18 09:17:07.994664] iteration 1
188 [2018-12-18 09:17:09.671710] iteration 2
189 [2018-12-18 09:17:11.272775] iteration 3
190 [2018-12-18 09:17:12.858862] iteration 4
191 [2018-12-18 09:17:14.453956] training MLP [6] witn n=0.03
192 [2018-12-18 09:17:14.453956] iteration 0
193 [2018-12-18 09:17:16.037050] iteration 1

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194 [2018-12-18 09:17:17.776032] iteration 2
195 [2018-12-18 09:17:19.501037] iteration 3
196 [2018-12-18 09:17:21.086138] iteration 4
197 [2018-12-18 09:17:22.684218] training MLP [6] witn n=0.01
198 [2018-12-18 09:17:22.684218] iteration 0
199 [2018-12-18 09:17:24.281298] iteration 1
200 [2018-12-18 09:17:25.872382] iteration 2
201 [2018-12-18 09:17:27.643350] iteration 3
202 [2018-12-18 09:17:29.283417] iteration 4
203 [2018-12-18 09:17:30.865510] training MLP [6] witn n=0.
003
204 [2018-12-18 09:17:30.865510] iteration 0
205 [2018-12-18 09:17:32.453602] iteration 1
206 [2018-12-18 09:17:34.054670] iteration 2
207 [2018-12-18 09:17:35.658733] iteration 3
208 [2018-12-18 09:17:37.261827] iteration 4
209 ##### Iris Experiment - Layers [6]
210
211 Weights:
212 matrix([[ 12.39736943,    1.86533326,    7.32362614,    3.
92292536,
213             1.59990364,    2.13056779],
214             [-1.46060098,   -1.5226468 ,   -1.12037794,    0.
84687223,
215             -1.1317489 ,   -1.70483726],
216             [ 4.59030303,    1.9564073 ,    2.97801779,    0.
19632103,
217             1.84378667,    2.22947017],
218             [-2.73496929,   -3.3936283 ,   -2.04671366,   -0.
40425442,
219             -2.87193455,   -3.81732122],
220             [-0.30344667,   -3.29886144,   -0.58697098,    0.
14331463,
221             -2.89114643,   -3.70392499],
222             [-2.60033848,   -0.87030148,   -1.72999917,    0.
24567488,
223             -0.64922726,   -1.07446386],
224             [-1.15840338,   -0.51556373,   -0.75552465,    0.
40332942,
225             -0.35415743,   -0.49628497],
226             [ 1.61580852,    1.47278531,    1.6422822 ,   -1.
36592428,
227             1.39809684,    1.63199817],
228             [ 2.07537291,    1.05330074,    1.7795951 ,   -0.
63561442,

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229          0.97327814,   1.19584124],
230          [ -8.73710965,  -2.13515407,  -5.19052262,  -3.
62998141,
231          -1.90510189,  -2.40224806],
232          [-10.40559086, -1.22853594,  -5.95598124,  -4.
60754921,
233          -1.24748337,  -1.33900788],
234          [ -5.85534684,  -2.11115849,  -3.42074968,  -2.
98090462,
235          -1.98987097,  -2.33321017],
236          [ -7.98286913,  -1.29288714,  -4.56187282,  -4.
16703664,
237          -1.34774434,  -1.33888799]]), array([[[-6.
42423481, -4.95444554,  5.5050092 ],
238          [-0.25521883,  8.9300032 , -7.09266577],
239          [ 4.03766918, -5.67800421, -3.14538321],
240          [ 0.95173675,  3.68094017, -6.33474305],
241          [-0.86175882,  3.00405533, -3.79028867],
242          [ 4.26931536, -4.20234477, -4.26340715],
243          [ 4.4935151 , -6.95847266, -2.95043706]]]
244
245 Best n:
246 0.3
247 Confusion Matrix:
248 [[10  0  0]
249 [ 0 10  0]
250 [ 0  0 10]]
251 Precision:
252 1.0
253 [2018-12-18 09:17:38.991813] training MLP [3, 3] witn n=0
.3
254 [2018-12-18 09:17:38.991813] iteration 0
255 [2018-12-18 09:17:40.799773] iteration 1
256 [2018-12-18 09:17:42.593740] iteration 2
257 [2018-12-18 09:17:44.392704] iteration 3
258 [2018-12-18 09:17:46.180687] iteration 4
259 [2018-12-18 09:17:47.972655] training MLP [3, 3] witn n=0
.1
260 [2018-12-18 09:17:47.972655] iteration 0
261 [2018-12-18 09:17:49.759627] iteration 1
262 [2018-12-18 09:17:51.548597] iteration 2
263 [2018-12-18 09:17:53.338565] iteration 3
264 [2018-12-18 09:17:55.129534] iteration 4
265 [2018-12-18 09:17:56.919508] training MLP [3, 3] witn n=0
.03
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266 [2018-12-18 09:17:56.919508] iteration 0
267 [2018-12-18 09:17:58.717457] iteration 1
268 [2018-12-18 09:18:00.735311] iteration 2
269 [2018-12-18 09:18:02.524278] iteration 3
270 [2018-12-18 09:18:04.304252] iteration 4
271 [2018-12-18 09:18:06.085230] training MLP [3, 3] witn n=0
.01
272 [2018-12-18 09:18:06.085230] iteration 0
273 [2018-12-18 09:18:07.867188] iteration 1
274 [2018-12-18 09:18:09.663151] iteration 2
275 [2018-12-18 09:18:11.445125] iteration 3
276 [2018-12-18 09:18:13.232103] iteration 4
277 [2018-12-18 09:18:15.019069] training MLP [3, 3] witn n=0
.003
278 [2018-12-18 09:18:15.019069] iteration 0
279 [2018-12-18 09:18:16.814034] iteration 1
280 [2018-12-18 09:18:18.611018] iteration 2
281 [2018-12-18 09:18:20.436950] iteration 3
282 [2018-12-18 09:18:22.514754] iteration 4
283 ##### Iris Experiment - Layers [3, 3]
284
285 Weights:
286 [matrix([[ 1.49515491, -2.36375402, -4.77860881],
287           [-1.90921367, -0.83815876, -1.0719437 ],
288           [ 3.35829512, -1.14088566, -1.59586128],
289           [-4.61153734,  1.98867363,  1.40296842],
290           [-4.68262553,  1.40577615,  1.10359346],
291           [-1.17622516, -0.34854733, -0.09229874],
292           [-0.59546789, -0.09390565,  0.32307629],
293           [ 2.57000805, -1.40282849, -1.4122191 ],
294           [ 1.79458912, -1.13538646, -1.10694617],
295           [-2.82260992,  2.608176 ,  2.87005859],
296           [-1.69558246,  2.90696768,  3.35113256],
297           [-2.89614519,  1.86899717,  2.36574054],
298           [-1.75708508,  2.14495336,  2.8103358 ]]), matrix
299 ([[ 0.0436545 ,  0.06103717,  0.08229001],
300           [ 1.2027301 ,  1.2290318 ,  1.19001257],
301           [-2.24386387, -1.35663859,  0.20471038],
302           [-1.06391732, -0.84549988, -0.68012988]]), array
303 ([[[-11.61600473, -0.41278038,  6.3266791 ],
304           [ 6.8357564 , -1.393541 , -9.19566277],
305           [ 7.07436022, -0.51657585, -9.49932373],
306           [ 6.33550147,  0.11290787, -8.5520757 ]]])

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307 0.3
308 Confusion Matrix:
309 [[10  0  0]
310 [ 0 10  0]
311 [ 0  0 10]]
312 Precision:
313 1.0
314 [2018-12-18 09:18:24.445640] training MLP [3, 4] witn n=0
.3
315 [2018-12-18 09:18:24.445640] iteration 0
316 [2018-12-18 09:18:26.362550] iteration 1
317 [2018-12-18 09:18:28.345396] iteration 2
318 [2018-12-18 09:18:30.439190] iteration 3
319 [2018-12-18 09:18:32.335114] iteration 4
320 [2018-12-18 09:18:34.134063] training MLP [3, 4] witn n=0
.1
321 [2018-12-18 09:18:34.134063] iteration 0
322 [2018-12-18 09:18:35.932039] iteration 1
323 [2018-12-18 09:18:37.791955] iteration 2
324 [2018-12-18 09:18:39.625916] iteration 3
325 [2018-12-18 09:18:41.419879] iteration 4
326 [2018-12-18 09:18:43.215845] training MLP [3, 4] witn n=0
.03
327 [2018-12-18 09:18:43.215845] iteration 0
328 [2018-12-18 09:18:45.013806] iteration 1
329 [2018-12-18 09:18:46.809776] iteration 2
330 [2018-12-18 09:18:48.593753] iteration 3
331 [2018-12-18 09:18:50.375722] iteration 4
332 [2018-12-18 09:18:52.163697] training MLP [3, 4] witn n=0
.01
333 [2018-12-18 09:18:52.163697] iteration 0
334 [2018-12-18 09:18:53.962657] iteration 1
335 [2018-12-18 09:18:55.753625] iteration 2
336 [2018-12-18 09:18:57.538602] iteration 3
337 [2018-12-18 09:18:59.324569] iteration 4
338 [2018-12-18 09:19:01.113538] training MLP [3, 4] witn n=0
.003
339 [2018-12-18 09:19:01.113538] iteration 0
340 [2018-12-18 09:19:02.895515] iteration 1
341 [2018-12-18 09:19:04.673490] iteration 2
342 [2018-12-18 09:19:06.457462] iteration 3
343 [2018-12-18 09:19:08.242434] iteration 4
344 ##### Iris Experiment - Layers [3, 4]
345
346 Weights:
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347 [matrix([[ 0.98246054, -6.0816015 ,  0.31264849],
348          [-0.6673648 , -1.01387927, -0.98040198],
349          [ 2.35182436, -2.61459708,  2.43550913],
350          [-2.50995017,  1.19155035, -3.07506221],
351          [-2.83883611,  1.97689101, -3.4230362 ],
352          [-0.28691184,  0.08263087, -0.49521888],
353          [-0.10184282,  0.34995989, -0.24819784],
354          [ 1.79340087, -1.54319179,  2.01556147],
355          [ 1.29380837, -0.96820835,  1.44939937],
356          [-1.64844191,  3.1152853 , -2.03033831],
357          [-1.07161152,  3.60517601, -1.28481133],
358          [-1.97993067,  3.78739336, -2.37883355],
359          [-1.34035092,  4.15331707, -1.6460327 ]]), matrix
   ([[ 0.01484502,  0.00312084,  0.02364971,  0.09286691],
360          [ 0.80431711,  1.08636925,  1.68496949, -1.
35231183],
361          [-0.47413551, -0.51903973, -1.82823046, -0.
6646347 ],
362          [ 0.57420564,  0.59984694,  2.00021082,  0.
42238722]]), array([-6.0472195 ,  0.05997173,  4.
34267014],
363          [ 2.55838533, -0.62816275, -4.00225537],
364          [ 3.59134898, -0.60368762, -5.13104718],
365          [ 6.9996101 ,  0.08874305, -9.89795003],
366          [-8.15410782,  1.63377269,  6.87077832]])]
367
368 Best n:
369 0.3
370 Confusion Matrix:
371 [[10  0  0]
372  [ 0 10  0]
373  [ 0  0 10]]
374 Precision:
375 1.0
376 [2018-12-18 09:19:10.140346] training MLP [3, 5] witn n=0
.3
377 [2018-12-18 09:19:10.140346] iteration 0
378 [2018-12-18 09:19:11.956282] iteration 1
379 [2018-12-18 09:19:13.912157] iteration 2
380 [2018-12-18 09:19:15.898012] iteration 3
381 [2018-12-18 09:19:17.697989] iteration 4
382 [2018-12-18 09:19:19.488962] training MLP [3, 5] witn n=0
.1
383 [2018-12-18 09:19:19.488962] iteration 0
384 [2018-12-18 09:19:21.287909] iteration 1

```

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385 [2018-12-18 09:19:23.093869] iteration 2
386 [2018-12-18 09:19:24.891833] iteration 3
387 [2018-12-18 09:19:26.687799] iteration 4
388 [2018-12-18 09:19:28.556725] training MLP [3, 5] witn n=0
.03
389 [2018-12-18 09:19:28.556725] iteration 0
390 [2018-12-18 09:19:30.656516] iteration 1
391 [2018-12-18 09:19:32.525451] iteration 2
392 [2018-12-18 09:19:34.327413] iteration 3
393 [2018-12-18 09:19:36.122380] iteration 4
394 [2018-12-18 09:19:37.923343] training MLP [3, 5] witn n=0
.01
395 [2018-12-18 09:19:37.923343] iteration 0
396 [2018-12-18 09:19:39.727304] iteration 1
397 [2018-12-18 09:19:41.538261] iteration 2
398 [2018-12-18 09:19:43.341223] iteration 3
399 [2018-12-18 09:19:45.300084] iteration 4
400 [2018-12-18 09:19:47.177019] training MLP [3, 5] witn n=0
.003
401 [2018-12-18 09:19:47.177019] iteration 0
402 [2018-12-18 09:19:48.985973] iteration 1
403 [2018-12-18 09:19:50.785923] iteration 2
404 [2018-12-18 09:19:52.589884] iteration 3
405 [2018-12-18 09:19:54.390847] iteration 4
406 ##### Iris Experiment - Layers [3, 5]
407
408 Weights:
409 [matrix([[-2.06502069, -7.51412384, -7.71928512],
410           [ 2.11864043, -0.71897152, -0.80853048],
411           [-3.46132614, -3.65605881, -3.59703839],
412           [ 4.92280144,  2.56899539,  2.54556046],
413           [ 5.1193544 ,  3.28591441,  3.14129026],
414           [ 1.36530619,  0.16939306,  0.21948099],
415           [ 0.84188132,  0.36515702,  0.38075625],
416           [-2.65190333, -2.37842538, -2.29084128],
417           [-1.72865662, -1.5390905 , -1.51023556],
418           [ 3.16679032,  3.77652344,  3.90557685],
419           [ 1.88102996,  3.81922533,  3.97768054],
420           [ 3.28531304,  4.30796767,  4.48857206],
421           [ 2.13356265,  4.18380032,  4.44398461]]), matrix
([[ 0.09210692,  0.02227187,  0.08604756,  0.07177586,  0
.01026209],
422           [-0.52637609, -0.00232443, -0.81597759,  1.
98441468, -0.16315322],
423           [-1.61936864, -0.1615309 , -1.66390799, -0.

```

```
423 87600104, -0.17041173],  
424      [-1.56638532, -0.48494579, -1.69266694, -0.  
97852604, -0.59446114]]), array([[ -5.77821684, -9.  
03544309, 5.88425681],  
425      [ -1.62281075, 0.80107477, 2.75368617],  
426      [ -2.46206161, 1.23590236, 0.39072954],  
427      [ 20.58303872, -2.75780687, -14.54803469],  
428      [ 1.00994099, 12.263509, -7.51016572],  
429      [ -2.58338196, 1.04354808, 0.55553233]])]  
430  
431 Best n:  
432 0.3  
433 Confusion Matrix:  
434 [[10  0  0]  
435 [ 0 10  0]  
436 [ 0  0 10]]  
437 Precision:  
438 1.0  
439 [2018-12-18 09:19:56.288754] training MLP [3, 6] witn n=0  
.3  
440 [2018-12-18 09:19:56.288754] iteration 0  
441 [2018-12-18 09:19:58.276622] iteration 1  
442 [2018-12-18 09:20:00.095562] iteration 2  
443 [2018-12-18 09:20:01.900536] iteration 3  
444 [2018-12-18 09:20:03.721487] iteration 4  
445 [2018-12-18 09:20:05.531445] training MLP [3, 6] witn n=0  
.1  
446 [2018-12-18 09:20:05.531445] iteration 0  
447 [2018-12-18 09:20:07.344405] iteration 1  
448 [2018-12-18 09:20:09.145364] iteration 2  
449 [2018-12-18 09:20:10.962318] iteration 3  
450 [2018-12-18 09:20:12.770277] iteration 4  
451 [2018-12-18 09:20:14.846070] training MLP [3, 6] witn n=0  
.03  
452 [2018-12-18 09:20:14.846070] iteration 0  
453 [2018-12-18 09:20:16.901898] iteration 1  
454 [2018-12-18 09:20:18.698863] iteration 2  
455 [2018-12-18 09:20:22.210855] iteration 3  
456 [2018-12-18 09:20:25.674861] iteration 4  
457 [2018-12-18 09:20:28.628161] training MLP [3, 6] witn n=0  
.01  
458 [2018-12-18 09:20:28.628161] iteration 0  
459 [2018-12-18 09:20:31.509504] iteration 1  
460 [2018-12-18 09:20:34.581732] iteration 2  
461 [2018-12-18 09:20:34.126210] iteration 3
```

```

462 [2018-12-18 09:20:37.015546] iteration 4
463 [2018-12-18 09:20:40.797369] training MLP [3, 6] witn n=0
    .003
464 [2018-12-18 09:20:40.797369] iteration 0
465 [2018-12-18 09:20:44.777078] iteration 1
466 [2018-12-18 09:20:48.347023] iteration 2
467 [2018-12-18 09:20:51.968936] iteration 3
468 [2018-12-18 09:20:55.630828] iteration 4
469 ##### Iris Experiment - Layers [3, 6]
470
471 Weights:
472 [matrix([[-6.26680724, -2.2490646 , -2.24802488],
473           [-0.07641196,  1.47342523,  1.39619555],
474           [-3.20320993, -2.99864922, -2.94234692],
475           [ 1.79445797,  3.71227354,  3.57087922],
476           [ 2.64886874,  3.91819991,  3.91082308],
477           [ 0.70722098,  1.06640038,  1.03765595],
478           [ 0.74869156,  0.67944802,  0.73633504],
479           [-1.94007044, -2.19710946, -2.12754784],
480           [-1.25072275, -1.54069341, -1.48254001],
481           [ 2.57930696,  2.60605676,  2.51833833],
482           [ 2.52174842,  1.77140533,  1.78265052],
483           [ 3.51833254,  2.78381369,  2.80760324],
484           [ 3.41534517,  1.96622226,  1.96398231]]), matrix
        ([[ 0.03457982,  0.06479924,  0.06348826,  0.04646562,  0
    .08714035,
485             0.07199616],
486             [-0.0826587 , -0.08635273, -0.23220201,  1.
    22441743, -1.48328249,
487             -0.09142568],
488             [ 0.88826694,  0.93336627,  0.61278205,  2.
    19931425, -0.24810947,
489             0.72955726],
490             [ 0.85678638,  0.90149871,  0.66251682,  2.
    32502583, -0.18876449,
491             0.75461743]]), array([[ -4.70246605,  -4.
    82457888,   4.63960028],
492             [ -1.02443326,   1.39567736,  -0.71753043],
493             [ -1.19862317,   1.52131566,  -0.58250077],
494             [ -1.74789606,   0.53437222,   0.13821698],
495             [ -0.31645452,   1.24295333,  -0.58861251],
496             [ 19.71593248,  -1.54457844, -16.71981676],
497             [ -2.19791702,   0.47126358,   0.50502798]])]
498
499 Best n:

```

```
500 0.3
501 Confusion Matrix:
502 [[10  0  0]
503 [ 0 10  0]
504 [ 0  0 10]]
505 Precision:
506 1.0
507 [2018-12-18 09:20:59.616533] training MLP [4, 3] witn n=0
.3
508 [2018-12-18 09:20:59.616533] iteration 0
509 [2018-12-18 09:21:02.952611] iteration 1
510 [2018-12-18 09:21:06.216732] iteration 2
511 [2018-12-18 09:21:09.408894] iteration 3
512 [2018-12-18 09:21:12.299229] iteration 4
513 [2018-12-18 09:21:15.127602] training MLP [4, 3] witn n=0
.1
514 [2018-12-18 09:21:15.127602] iteration 0
515 [2018-12-18 09:21:17.809057] iteration 1
516 [2018-12-18 09:21:20.438543] iteration 2
517 [2018-12-18 09:21:23.045041] iteration 3
518 [2018-12-18 09:21:25.677526] iteration 4
519 [2018-12-18 09:21:28.300015] training MLP [4, 3] witn n=0
.03
520 [2018-12-18 09:21:28.300015] iteration 0
521 [2018-12-18 09:21:30.813568] iteration 1
522 [2018-12-18 09:21:33.310133] iteration 2
523 [2018-12-18 09:21:35.929623] iteration 3
524 [2018-12-18 09:21:38.509138] iteration 4
525 [2018-12-18 09:21:41.241563] training MLP [4, 3] witn n=0
.01
526 [2018-12-18 09:21:41.241563] iteration 0
527 [2018-12-18 09:21:43.933013] iteration 1
528 [2018-12-18 09:21:46.521522] iteration 2
529 [2018-12-18 09:21:49.172998] iteration 3
530 [2018-12-18 09:21:51.771500] iteration 4
531 [2018-12-18 09:21:54.371004] training MLP [4, 3] witn n=0
.003
532 [2018-12-18 09:21:54.371004] iteration 0
533 [2018-12-18 09:21:57.447233] iteration 1
534 [2018-12-18 09:22:00.077716] iteration 2
535 [2018-12-18 09:22:02.659230] iteration 3
536 [2018-12-18 09:22:05.491601] iteration 4
537 ##### Iris Experiment - Layers [4, 3]
538
539 Weights:
```

```

540 [matrix([[-4.21795128, -4.24319418, -3.10830541,  1.
      44343562],
541      [-0.7856321 , -0.82180642, -0.57634218, -1.
      47646042],
542      [-1.77285562, -1.81900303, -1.79164023,  3.
      02583541],
543      [ 1.01930451,  1.06974876,  1.26080233, -3.
      73331514],
544      [ 1.40666272,  1.37241757,  1.3874203 , -3.
      93273427],
545      [ 0.01256652,  0.03822415, -0.06343142, -0.
      92208612],
546      [ 0.32654245,  0.27660175,  0.06752039, -0.
      54544312],
547      [-1.18820648, -1.24174192, -1.33849337,  2.
      34301775],
548      [-0.84247599, -0.86189752, -0.96317638,  1.
      64780345],
549      [ 2.02724488,  2.13622424,  1.80094876, -2.
      33033679],
550      [ 2.36036391,  2.36381147,  1.93777492, -1.
      39490983],
551      [ 2.39477157,  2.44819071,  1.92309596, -2.
      51434699],
552      [ 2.64596091,  2.62935371,  1.99809451, -1.
      54121197]], matrix([[ 0.0168981 ,  0.02676183,  0.
      07509362],
553      [-0.52802787, -1.84957686, -0.49516565],
554      [-0.47689176, -1.82801298, -0.54639814],
555      [ 0.05430669, -2.36594098,  0.4693425 ],
556      [ 1.31401599,  1.1213696 ,  1.17336697]]], array
([[[-10.35580808, -0.4476173 ,  6.58190358],
557      [ 5.29369544,  0.54184096, -6.7858163 ],
558      [ 5.56434105, -1.49806425, -7.72428118],
559      [ 6.47870829,  0.5867952 , -7.47450179]])]
560
561 Best n:
562 0.3
563 Confusion Matrix:
564 [[10  0  0]
565  [ 0 10  0]
566  [ 0  0 10]]
567 Precision:
568 1.0
569 [2018-12-18 09:22:08.334962] training MLP [4, 4] witn n=0

```

```
569 .3
570 [2018-12-18 09:22:08.334962] iteration 0
571 [2018-12-18 09:22:11.036408] iteration 1
572 [2018-12-18 09:22:13.826799] iteration 2
573 [2018-12-18 09:22:16.728130] iteration 3
574 [2018-12-18 09:22:19.778374] iteration 4
575 [2018-12-18 09:22:22.756657] training MLP [4, 4] witn n=0
.1
576 [2018-12-18 09:22:22.756657] iteration 0
577 [2018-12-18 09:22:25.772922] iteration 1
578 [2018-12-18 09:22:28.790185] iteration 2
579 [2018-12-18 09:22:31.777463] iteration 3
580 [2018-12-18 09:22:34.835703] iteration 4
581 [2018-12-18 09:22:37.680065] training MLP [4, 4] witn n=0
.03
582 [2018-12-18 09:22:37.680065] iteration 0
583 [2018-12-18 09:22:40.623369] iteration 1
584 [2018-12-18 09:22:43.420759] iteration 2
585 [2018-12-18 09:22:46.293106] iteration 3
586 [2018-12-18 09:22:49.029529] iteration 4
587 [2018-12-18 09:22:51.753959] training MLP [4, 4] witn n=0
.01
588 [2018-12-18 09:22:51.753959] iteration 0
589 [2018-12-18 09:22:54.484389] iteration 1
590 [2018-12-18 09:22:57.184833] iteration 2
591 [2018-12-18 09:22:59.819315] iteration 3
592 [2018-12-18 09:23:02.603713] iteration 4
593 [2018-12-18 09:23:05.666949] training MLP [4, 4] witn n=0
.003
594 [2018-12-18 09:23:05.666949] iteration 0
595 [2018-12-18 09:23:08.661225] iteration 1
596 [2018-12-18 09:23:11.669492] iteration 2
597 [2018-12-18 09:23:14.777702] iteration 3
598 [2018-12-18 09:23:17.899905] iteration 4
599 ##### Iris Experiment - Layers [4, 4]
600
601 Weights:
602 [matrix([[-7.05143934, -6.85582817, -6.88943742, -2.
31009712],
603 [-0.68596281, -0.69304806, -0.67793773, 1.
80531415],
604 [-2.83643233, -2.6584228 , -2.66856032, -3.
27890217],
605 [ 2.07674624,  1.97024164,  1.93156787,  4.
51275217],
```

```

606      [ 2.35732366,  2.2265687 ,  2.23297053,  4.
    74369995],
607      [ 0.3172813 ,  0.25134774,  0.23211803,  1.
    16291741],
608      [ 0.43957411,  0.43066621,  0.47315391,  0.
    68986263],
609      [-1.9027272 , -1.79484781, -1.80881194, -2.
    40491446],
610      [-1.34708523, -1.28099847, -1.21817462, -1.661559
    ],
611      [ 3.52608438,  3.39210305,  3.43265369,  2.
    88056743],
612      [ 3.67364548,  3.5969058 ,  3.59924056,  1.
    78215635],
613      [ 3.53307032,  3.45162777,  3.50893581,  3.
    07615376],
614      [ 3.62785242,  3.5490766 ,  3.56914146,  1.
    99777809]], matrix([[ 0.04075318,  0.04275781,  0.
    02380948,  0.03463129],
615      [-0.60653549, -0.7795683 ,  0.04590158,  1.
    2112391 ],
616      [-1.06267318, -0.9047246 , -0.57233483,  0.
    6018811 ],
617      [-1.00559295, -0.89690002, -0.59270431,  0.
    6565727 ],
618      [ 1.3681671 , -0.65646972,  1.10567797, -2.
    00846291]], array([[ -4.60227136, -2.52445175,   2.
    23714858,
619      [ -2.29156852,   6.99008834, -2.58281211],
620      [ 17.68704535, -1.18528531, -15.74421055],
621      [ -4.00180477,   2.7883205 ,  0.26062062],
622      [  3.69209799, -9.75617353,  4.43751412]]]
623
624 Best n:
625 0.3
626 Confusion Matrix:
627 [[10  0  0]
628 [ 0 10  0]
629 [ 0  0 10]]
630 Precision:
631 1.0
632 [2018-12-18 09:23:21.126046] training MLP [4, 5] witn n=0
    .3
633 [2018-12-18 09:23:21.127045] iteration 0
634 [2018-12-18 09:23:24.404158] iteration 1

```

```

635 [2018-12-18 09:23:27.279503] iteration 2
636 [2018-12-18 09:23:29.897995] iteration 3
637 [2018-12-18 09:23:32.504495] iteration 4
638 [2018-12-18 09:23:35.184954] training MLP [4, 5] witn n=0
.1
639 [2018-12-18 09:23:35.184954] iteration 0
640 [2018-12-18 09:23:37.977343] iteration 1
641 [2018-12-18 09:23:40.832698] iteration 2
642 [2018-12-18 09:23:43.586114] iteration 3
643 [2018-12-18 09:23:46.332532] iteration 4
644 [2018-12-18 09:23:49.033976] training MLP [4, 5] witn n=0
.03
645 [2018-12-18 09:23:49.033976] iteration 0
646 [2018-12-18 09:23:51.945300] iteration 1
647 [2018-12-18 09:23:54.574788] iteration 2
648 [2018-12-18 09:23:57.220262] iteration 3
649 [2018-12-18 09:23:59.892724] iteration 4
650 [2018-12-18 09:24:02.457249] training MLP [4, 5] witn n=0
.01
651 [2018-12-18 09:24:02.457249] iteration 0
652 [2018-12-18 09:24:05.201667] iteration 1
653 [2018-12-18 09:24:07.780184] iteration 2
654 [2018-12-18 09:24:10.433654] iteration 3
655 [2018-12-18 09:24:13.145093] iteration 4
656 [2018-12-18 09:24:15.797566] training MLP [4, 5] witn n=0
.003
657 [2018-12-18 09:24:15.797566] iteration 0
658 [2018-12-18 09:24:18.507005] iteration 1
659 [2018-12-18 09:24:21.250427] iteration 2
660 [2018-12-18 09:24:23.950872] iteration 3
661 [2018-12-18 09:24:26.607340] iteration 4
662 ##### Iris Experiment - Layers [4, 5]
663
664 Weights:
665 [matrix([[-6.95123556, 1.8285558, -6.98039009, -1.
78010964],
666 [-0.53069456, 1.84524948, -0.54162084, 1.
92378249],
667 [-2.1440496, -0.41726305, -2.10399933, -3.
40790155],
668 [2.26991381, 3.39809031, 2.21195134, 4.
82652341],
669 [1.80370761, 3.58849566, 1.8261548, 5.
13364754],
670 [0.48537395, 1.16770315, 0.5494775, 1.

```

```

670 15335639],
671      [ 0.66532127,  0.65516283,  0.61161704,  0.
69836213],
672      [-1.80007669, -0.54048656, -1.83308958, -2.
62610039],
673      [-1.59919791, -0.38710357, -1.5809046 , -1.
7298799 ],
674      [ 4.04564292,  2.34347159,  4.04347376,  3.
00644777],
675      [ 4.35242762,  1.6505629 ,  4.38559311,  1.
92586942],
676      [ 3.2100808 ,  2.5725633 ,  3.26782217,  3.
38412018],
677      [ 3.55697658,  1.91181027,  3.51826309,  2.
18305098]], matrix([[ 0.08172864,  0.0744341 ,  0.
01452671,  0.08358379,  0.03106311],
678      [-0.11426992,  1.70080247,  0.5000585 , -1.
25109866,  1.3430829 ],
679      [ 0.47713273, -0.68040386,  0.51100585,  3.
62556019, -0.58958092],
680      [-0.14520941,  1.67078606,  0.50419219, -1.
26704679,  1.27687739],
681      [ 0.38860719,  0.67107242,  0.66276309, -2.
64955798,  0.65406274]]), array([[ -8.25265899,  -5.
39656418,   4.12404629],
682      [ -2.82916296,   1.37333899,   0.34441487],
683      [ -3.59828356,   1.37433837,   0.98575751],
684      [ -3.66857045,   0.96381855,   0.68505889],
685      [ 19.13585392,   3.13002456, -15.46505021],
686      [ -3.74440652,   0.89287286,   1.54983879]])]
687
688 Best n:
689 0.3
690 Confusion Matrix:
691 [[10  0  0]
692 [ 0 10  0]
693 [ 0  0 10]]
694 Precision:
695 1.0
696 [2018-12-18 09:24:29.614608] training MLP [4, 6] witn n=0
.3
697 [2018-12-18 09:24:29.614608] iteration 0
698 [2018-12-18 09:24:32.280081] iteration 1
699 [2018-12-18 09:24:35.092454] iteration 2
700 [2018-12-18 09:24:37.862859] iteration 3

```

```
701 [2018-12-18 09:24:40.764189] iteration 4
702 [2018-12-18 09:24:43.786449] training MLP [4, 6] witn n=0
    .1
703 [2018-12-18 09:24:43.786449] iteration 0
704 [2018-12-18 09:24:46.555856] iteration 1
705 [2018-12-18 09:24:49.380227] iteration 2
706 [2018-12-18 09:24:52.107658] iteration 3
707 [2018-12-18 09:24:54.856075] iteration 4
708 [2018-12-18 09:24:57.627479] training MLP [4, 6] witn n=0
    .03
709 [2018-12-18 09:24:57.627479] iteration 0
710 [2018-12-18 09:25:00.492829] iteration 1
711 [2018-12-18 09:25:03.382164] iteration 2
712 [2018-12-18 09:25:06.470387] iteration 3
713 [2018-12-18 09:25:09.504639] iteration 4
714 [2018-12-18 09:25:12.581867] training MLP [4, 6] witn n=0
    .01
715 [2018-12-18 09:25:12.581867] iteration 0
716 [2018-12-18 09:25:15.797016] iteration 1
717 [2018-12-18 09:25:18.701343] iteration 2
718 [2018-12-18 09:25:21.837538] iteration 3
719 [2018-12-18 09:25:25.097661] iteration 4
720 [2018-12-18 09:25:28.136912] training MLP [4, 6] witn n=0
    .003
721 [2018-12-18 09:25:28.136912] iteration 0
722 [2018-12-18 09:25:31.236125] iteration 1
723 [2018-12-18 09:25:34.303360] iteration 2
724 [2018-12-18 09:25:37.514510] iteration 3
725 [2018-12-18 09:25:40.710669] iteration 4
726 ##### Iris Experiment - Layers [4, 6]
727
728 Weights:
729 [matrix([[-1.77766916,  1.36146862, -7.65766923, -1.
    55392386],
730           [ 1.66806801,  1.9034932 , -1.01979975,  0.
    66879788],
731           [-3.04331449, -0.35157281, -3.35655618, -2.
    8449136 ],
732           [ 4.21919645,  3.53085789,  1.95564535,  3.
    03940289],
733           [ 4.61177312,  3.86552359,  2.72727302,  3.
    97669788],
734           [ 1.11684657,  1.1256774 ,  0.1854845 ,  0.
    49770905],
735           [ 0.69900949,  0.63389672,  0.43410068,  0.
```

```

735 32695204],
736      [-2.3010542 , -0.22376226, -2.06231542, -2.
    14555188],
737      [-1.51896856,  0.11577435, -1.28383044, -1.
    41357574],
738      [ 2.95134595,  2.52082343,  3.76265715,  2.
    3545843 ],
739      [ 2.00444667,  1.71860469,  4.11186317,  1.
    91330509],
740      [ 3.21291716,  2.81314144,  4.31842264,  3.
    29706685],
741      [ 2.29700182,  2.0893719 ,  4.4336828 ,  2.
    63790805]], matrix([[ 1.68266005e-02,  2.10986486e-03,
    2.97184776e-02,
742          6.00640242e-02,  1.38616386e-02,  9.74255371e-
    02],
743          [ 1.22665436e+00,  1.04438551e+00,  2.06217478e+
    00,
744          3.62969689e-01,  9.45584068e-01,  1.23093442e+
    00],
745          [-1.66155618e+00, -6.61758550e-01,  1.39785845e+
    00,
746          2.93227295e+00, -9.25587914e-01, -1.57242760e+
    00],
747          [ 1.32201228e-02, -3.74328071e-01,  1.70222158e-
    01,
748          -1.78182872e+00,  2.32110894e-01, -4.85117282e-
    03],
749          [ 9.98834422e-01,  6.36785629e-02,  8.67766197e-
    02,
750          -3.23648224e+00,  8.49592846e-01,  8.68032415e-
    01]]), array([[ -7.56601375, -9.10033684,  5.85528905],
751          [ -2.77023231,  3.23422829,  1.77479127],
752          [ -5.17648054,  2.11880076,  2.91042006],
753          [ 2.73588843,  1.76595348, -5.30982984],
754          [ 16.68121433,  2.3300064 , -17.41409558],
755          [ -2.45106671,  1.62270135,  1.6091633 ],
756          [ -2.54735986,  3.14949282,  1.60976812]]])
757
758 Best n:
759 0.3
760 Confusion Matrix:
761 [[10  0  0]
762  [ 0 10  0]
763  [ 0  0 10]]

```

```
764 Precision:  
765 1.0  
766 [2018-12-18 09:25:44.038755] training MLP [5, 3] witn n=0  
.3  
767 [2018-12-18 09:25:44.038755] iteration 0  
768 [2018-12-18 09:25:47.040025] iteration 1  
769 [2018-12-18 09:25:50.022309] iteration 2  
770 [2018-12-18 09:25:53.048565] iteration 3  
771 [2018-12-18 09:25:56.087817] iteration 4  
772 [2018-12-18 09:25:58.873212] training MLP [5, 3] witn n=0  
.1  
773 [2018-12-18 09:25:58.873212] iteration 0  
774 [2018-12-18 09:26:01.728567] iteration 1  
775 [2018-12-18 09:26:04.142182] iteration 2  
776 [2018-12-18 09:26:06.518810] iteration 3  
777 [2018-12-18 09:26:08.920425] iteration 4  
778 [2018-12-18 09:26:11.294059] training MLP [5, 3] witn n=0  
.03  
779 [2018-12-18 09:26:11.294059] iteration 0  
780 [2018-12-18 09:26:13.733654] iteration 1  
781 [2018-12-18 09:26:16.979785] iteration 2  
782 [2018-12-18 09:26:19.837139] iteration 3  
783 [2018-12-18 09:26:22.807429] iteration 4  
784 [2018-12-18 09:26:25.762728] training MLP [5, 3] witn n=0  
.01  
785 [2018-12-18 09:26:25.762728] iteration 0  
786 [2018-12-18 09:26:28.572112] iteration 1  
787 [2018-12-18 09:26:31.388488] iteration 2  
788 [2018-12-18 09:26:34.340788] iteration 3  
789 [2018-12-18 09:26:37.184151] iteration 4  
790 [2018-12-18 09:26:39.940564] training MLP [5, 3] witn n=0  
.003  
791 [2018-12-18 09:26:39.940564] iteration 0  
792 [2018-12-18 09:26:42.378160] iteration 1  
793 [2018-12-18 09:26:44.837748] iteration 2  
794 [2018-12-18 09:26:47.429253] iteration 3  
795 [2018-12-18 09:26:49.541035] iteration 4  
796 ##### Iris Experiment - Layers [5, 3]  
797  
798 Weights:  
799 [matrix([[ 5.88900706,  2.0550158 , -2.34608132,  2.  
34339108,  2.45051641],  
800      [ 0.37800573,  0.1789596 ,  1.2065968 , -1.  
21453315, -0.82897194],  
801      [ 2.80536222,  0.71150526, -2.86093156,  3.
```

```

801 36117321, 2.93414402],
802 [-1.80914145, -1.01134557, 3.26662367, -3.
     61081704, -2.80485759],
803 [-2.64159929, -1.66533615, 3.37012131, -3.
     59977588, -2.90738568],
804 [-0.4811748 , -0.11978069, 0.95066231, -0.
     70116288, -0.48646217],
805 [-0.51542517, -0.14833705, 0.61796439, -0.
     38905398, -0.20734959],
806 [ 1.74660409, 0.53071658, -2.18731241, 2.
     50226934, 2.13991999],
807 [ 1.19634656, 0.36538229, -1.45302771, 1.
     72951522, 1.52310933],
808 [-2.77608892, -1.62626585, 2.24067091, -2.
     16543969, -1.82456285],
809 [-2.81029883, -1.63485685, 1.51165898, -1.
     19816898, -1.1434682 ],
810 [-3.55308391, -2.14740736, 2.23825125, -2.
     05182682, -1.90111099],
811 [-3.34408021, -2.1796523 , 1.49298546, -1.
     06630446, -1.1563462 ]]), matrix([[ 0.03567346, 0.
     02180073, 0.07555995],
812 [ 2.59015714, 2.66859682, -2.47753554],
813 [ 0.25209156, -0.21041264, -3.41321196],
814 [ 1.22740713, 1.5212748 , 0.68893037],
815 [-1.27219648, -1.1839115 , -2.51943797],
816 [-0.49033513, -0.69871679, -3.01986251]]), array
 ([[10.32641116, -6.61426903, -7.70893822],
817 [-4.84154042, 3.49635218, 1.68461498],
818 [-7.61403757, 4.98537877, 2.73340627],
819 [-7.62615062, -4.54964256, 9.53893253]])]
820
821 Best n:
822 0.3
823 Confusion Matrix:
824 [[10  0  0]
825  [ 0 10  0]
826  [ 0  0 10]]
827 Precision:
828 1.0
829 [2018-12-18 09:26:51.771752] training MLP [5, 4] witn n=0
     .3
830 [2018-12-18 09:26:51.772751] iteration 0
831 [2018-12-18 09:26:53.936518] iteration 1
832 [2018-12-18 09:26:55.849413] iteration 2

```

```

833 [2018-12-18 09:26:57.799282] iteration 3
834 [2018-12-18 09:26:59.719175] iteration 4
835 [2018-12-18 09:27:01.553120] training MLP [5, 4] witn n=0
.1
836 [2018-12-18 09:27:01.553120] iteration 0
837 [2018-12-18 09:27:03.456022] iteration 1
838 [2018-12-18 09:27:05.277975] iteration 2
839 [2018-12-18 09:27:07.103921] iteration 3
840 [2018-12-18 09:27:08.985838] iteration 4
841 [2018-12-18 09:27:11.002679] training MLP [5, 4] witn n=0
.03
842 [2018-12-18 09:27:11.002679] iteration 0
843 [2018-12-18 09:27:13.054498] iteration 1
844 [2018-12-18 09:27:15.095322] iteration 2
845 [2018-12-18 09:27:17.137144] iteration 3
846 [2018-12-18 09:27:19.125003] iteration 4
847 [2018-12-18 09:27:21.216796] training MLP [5, 4] witn n=0
.01
848 [2018-12-18 09:27:21.216796] iteration 0
849 [2018-12-18 09:27:23.239631] iteration 1
850 [2018-12-18 09:27:25.441365] iteration 2
851 [2018-12-18 09:27:27.503295] iteration 3
852 [2018-12-18 09:27:29.476292] iteration 4
853 [2018-12-18 09:27:31.428613] training MLP [5, 4] witn n=0
.003
854 [2018-12-18 09:27:31.428613] iteration 0
855 [2018-12-18 09:27:33.264316] iteration 1
856 [2018-12-18 09:27:35.138526] iteration 2
857 [2018-12-18 09:27:37.009712] iteration 3
858 [2018-12-18 09:27:38.822683] iteration 4
859 ##### Iris Experiment - Layers [5, 4]
860
861 Weights:
862 [matrix([[ 8.82335531,  3.88046687, -7.8446444 , -2.
09806159, -5.93460019],
863      [ 1.95304975,  1.63880067, -1.16303288,  1.
60817715, -1.21427835],
864      [ 4.25660616,  0.75060424, -2.78154781, -4.
06619988, -1.71603061],
865      [ 0.21238802,  3.37645417,  1.8104544 ,  5.
19076445,  2.22560861],
866      [-0.72523601,  4.03622798,  2.29257743,  6.
05439211,  1.37310996],
867      [ 0.48735117,  0.80076386,  0.41517048,  0.
85208419, -0.13522407],
```

```

868      [-0.05751853,  0.48963725,  0.82261246,  0.
869      49396902,  0.35311358],  

870      [ 2.54111321,  0.29017677, -1.85636785, -2.
871      93957304, -1.87320455],  

872      [ 1.49648619,  0.27916421, -1.30295337, -1.
873      88919056, -1.67170132],  

874      [-1.33179683,  2.67628334,  4.05116132,  3.
875      61250138,  3.77189845],  

876      [-1.80340274,  2.39509897,  4.85736958,  2.
877      54141555,  4.34405669],  

878      [-2.05058306,  3.53635674,  4.35372737,  4.
879      40504211,  2.35215039],  

880      [-2.17411842,  3.05381236,  4.80619373,  3.
881      35727504,  2.75465602]], matrix([[ 0.04113733,  0.
882      05231537,  0.02240667,  0.01324486],
883      [-2.82675419, -2.1513822 ,  2.00085265, -3.
884      37040246],
885      [ 1.57225718,  3.27473272,  3.01697554, -3.
886      21652837],
887      [-0.66504444, -0.08846235,  0.37765609, -3.
888      30413854],
889      [-0.05716857, -1.69916061,  1.84399989, -3.
890      4516216 ],
891      [ 0.67787953, -2.16326919,  0.69950762, -3.
892      55716905]], array([-12.21229989, -7.50945581,  11.
893      94112855],
894      [ 16.64449047,   1.82388426, -14.14286456],
895      [ 18.622883 , -0.97166926, -22.9307324 ],
896      [ -1.73483582,   7.12709276, -4.26285594],
897      [ 7.49539504, -4.97340835, -7.97970811]]]  

898  

899 Best n:  

900 0.3  

901 Confusion Matrix:  

902 [[10  0  0]
903  [ 0 10  0]
904  [ 0  0 10]]  

905 Precision:  

906 1.0  

907 [2018-12-18 09:27:40.832526] training MLP [5, 5] witn n=0
908 .3  

909 [2018-12-18 09:27:40.832526] iteration 0  

910 [2018-12-18 09:27:42.768411] iteration 1  

911 [2018-12-18 09:27:44.833222] iteration 2  

912 [2018-12-18 09:27:47.110912] iteration 3

```

```
898 [2018-12-18 09:27:49.415586] iteration 4
899 [2018-12-18 09:27:51.672285] training MLP [5, 5] witn n=0
.1
900 [2018-12-18 09:27:51.672285] iteration 0
901 [2018-12-18 09:27:53.865023] iteration 1
902 [2018-12-18 09:27:55.802906] iteration 2
903 [2018-12-18 09:27:57.750784] iteration 3
904 [2018-12-18 09:27:59.676693] iteration 4
905 [2018-12-18 09:28:01.590586] training MLP [5, 5] witn n=0
.03
906 [2018-12-18 09:28:01.590586] iteration 0
907 [2018-12-18 09:28:03.492478] iteration 1
908 [2018-12-18 09:28:05.376411] iteration 2
909 [2018-12-18 09:28:07.252314] iteration 3
910 [2018-12-18 09:28:09.268153] iteration 4
911 [2018-12-18 09:28:11.360947] training MLP [5, 5] witn n=0
.01
912 [2018-12-18 09:28:11.360947] iteration 0
913 [2018-12-18 09:28:13.471734] iteration 1
914 [2018-12-18 09:28:15.665469] iteration 2
915 [2018-12-18 09:28:17.741275] iteration 3
916 [2018-12-18 09:28:19.673160] iteration 4
917 [2018-12-18 09:28:21.939856] training MLP [5, 5] witn n=0
.003
918 [2018-12-18 09:28:21.939856] iteration 0
919 [2018-12-18 09:28:23.870743] iteration 1
920 [2018-12-18 09:28:25.900574] iteration 2
921 [2018-12-18 09:28:27.851451] iteration 3
922 [2018-12-18 09:28:29.988222] iteration 4
923 ##### Iris Experiment - Layers [5, 5]
924
925 Weights:
926 [matrix([[-6.5158867, -6.40468617, -2.50183788, -6.
66020044, -6.51186087],
927 [-0.5881405, -0.65669948, 1.72232262, -0.
57935834, -0.59078519],
928 [-2.75027776, -2.71903275, -3.381224, -2.
76312944, -2.78100865],
929 [2.00792805, 2.06370801, 4.42988782, 1.
98251556, 2.08863692],
930 [2.40782346, 2.38455944, 4.87139934, 2.
43525593, 2.42553189],
931 [0.23385702, 0.21803181, 1.12267849, 0.
33373399, 0.25956652],
932 [0.40558312, 0.35878605, 0.58216197, 0.
```

```

932 46700999,  0.34414508],
933      [-1.81540871, -1.81945531, -2.50186611, -1.
84417789, -1.90076375],
934      [-1.27740277, -1.25613307, -1.71006413, -1.
22678939, -1.28391615],
935      [ 3.15926408,  3.07465654,  2.86766463,  3.
22777749,  3.16471293],
936      [ 3.23462247,  3.24630329,  1.7096591 ,  3.
26881496,  3.25192148],
937      [ 3.43087923,  3.32297899,  3.1422702 ,  3.
56299112,  3.33810507],
938      [ 3.38473906,  3.30820493,  2.01997047,  3.
46249697,  3.33428913]], matrix([[ 0.09891523,  0.
05345836,  0.09419445,  0.09822652,  0.06994379],
939      [-0.46646829, -0.60379256,  2.84504913, -0.
69974775, -0.60862386],
940      [-0.69032185, -0.47260232,  3.02118563, -0.
68614927, -0.58280659],
941      [-0.87368497,  1.2939148 ,  2.83511017,  1.
57981602,  1.36730306],
942      [-0.17024687, -0.67653581,  2.5985562 , -0.
79723895, -0.65504899],
943      [-0.5905235 , -0.48957548,  3.01479882, -0.
75582249, -0.55363414]]), array([[ -4.74310065, -13.
29721854,  5.5233592 ],
944      [ 19.33525484, -0.11107729, -15.86904856],
945      [  0.53803575,   4.4239372 , -2.52343531],
946      [ -6.39127556,   5.08619368,  1.47216103],
947      [  1.41449659,   5.82009869, -3.22300258],
948      [  0.38196041,   4.65784095, -2.59117509]]]
949
950 Best n:
951 0.3
952 Confusion Matrix:
953 [[10  0  0]
954 [ 0 10  0]
955 [ 0  0 10]]
956 Precision:
957 1.0
958 [2018-12-18 09:28:32.513769] training MLP [5, 6] witn n=0
.3
959 [2018-12-18 09:28:32.513769] iteration 0
960 [2018-12-18 09:28:35.201219] iteration 1
961 [2018-12-18 09:28:38.258459] iteration 2
962 [2018-12-18 09:28:41.991310] iteration 3

```

```
963 [2018-12-18 09:28:44.688755] iteration 4
964 [2018-12-18 09:28:47.074382] training MLP [5, 6] witn n=
0.1
965 [2018-12-18 09:28:47.074382] iteration 0
966 [2018-12-18 09:28:49.536964] iteration 1
967 [2018-12-18 09:28:51.988552] iteration 2
968 [2018-12-18 09:28:54.409159] iteration 3
969 [2018-12-18 09:28:56.585905] iteration 4
970 [2018-12-18 09:28:58.717679] training MLP [5, 6] witn n=
0.03
971 [2018-12-18 09:28:58.717679] iteration 0
972 [2018-12-18 09:29:00.783488] iteration 1
973 [2018-12-18 09:29:02.914264] iteration 2
974 [2018-12-18 09:29:05.011055] iteration 3
975 [2018-12-18 09:29:07.160816] iteration 4
976 [2018-12-18 09:29:09.240618] training MLP [5, 6] witn n=
0.01
977 [2018-12-18 09:29:09.240618] iteration 0
978 [2018-12-18 09:29:11.313425] iteration 1
979 [2018-12-18 09:29:13.346255] iteration 2
980 [2018-12-18 09:29:15.406069] iteration 3
981 [2018-12-18 09:29:17.551832] iteration 4
982 [2018-12-18 09:29:19.653622] training MLP [5, 6] witn n=
0.003
983 [2018-12-18 09:29:19.653622] iteration 0
984 [2018-12-18 09:29:21.825372] iteration 1
985 [2018-12-18 09:29:23.852205] iteration 2
986 [2018-12-18 09:29:25.734134] iteration 3
987 [2018-12-18 09:29:27.669007] iteration 4
988 ##### Iris Experiment - Layers [5, 6]
989
990 Weights:
991 [matrix([[-1.01460569,  1.49962873, -7.05149425, -7.
13117535, -7.34766101],
992           [ 1.51506554,  1.72798984, -0.31558859, -0.
25920756, -0.20858973],
993           [-2.76843559, -0.58671503, -1.95818515, -1.
93890616, -1.96028205],
994           [ 4.1174203 ,  3.13383824,  2.17490685,  2.
12734237,  2.10330686],
995           [ 4.83448562,  3.34093905,  1.63633031,  1.
61421302,  1.58294477],
996           [ 0.89827519,  1.05257385,  0.79380801,  0.
82739535,  0.84085715],
997           [ 0.56389771,  0.68436763,  0.82877996,  0.]])
```

```

997 78885535, 0.82709571],
998 [-2.24419712, -0.64394931, -1.58935054, -1.
55102266, -1.57411791],
999 [-1.52192123, -0.45958647, -1.42936947, -1.
44715113, -1.42029336],
1000 [ 2.69145915, 2.23922981, 3.79921372, 3.
90035243, 3.92078512],
1001 [ 1.75641484, 1.57648148, 4.11404769, 4.
16066413, 4.26509111],
1002 [ 3.21866256, 2.41444659, 2.8971996 , 2.
91883476, 3.0678421 ],
1003 [ 2.32929233, 1.78310936, 3.19561201, 3.
21329991, 3.40120196]], matrix([[ 0.05454081, 0.
0917573 , 0.06275335, 0.04238753, 0.05528294,
1004 0.08700449],
1005 [ 0.39878983, -3.05849889, 0.49041513, -0.
74419171, -0.57478103,
1006 0.2970516 ],
1007 [ 0.21312308, 3.5102625 , 1.03159723, -0.
26682163, -0.49268114,
1008 1.12011615],
1009 [ 1.03100945, -1.12546765, 1.61501063, -0.
12198895, 0.11019762,
1010 -0.25826907],
1011 [ 1.01144795, -1.12734512, 1.55352831, -0.
09133762, 0.06470499,
1012 -0.23833974],
1013 [ 0.87573652, -1.11898394, 1.34708206, -0.
05513969, -0.23103728,
1014 -0.20656972]], array([[ -9.91648717, -3.
64858622, 3.46380916],
1015 [-2.04234213, -0.6446984 , 2.34610979],
1016 [ 18.62149368, -0.13806669, -19.5089732 ],
1017 [-1.5928862 , 2.00054044, -0.96135971],
1018 [-0.94525577, 1.16547403, -0.78782175],
1019 [-0.61623926, 0.60153895, -0.2136931 ],
1020 [-1.71686705, 1.18215222, 1.33729494]])]
1021
1022 Best n:
1023 0.3
1024 Confusion Matrix:
1025 [[10  0  0]
1026 [ 0 10  0]
1027 [ 0  0 10]]
1028 Precision:
```

```
1029 1.0
1030 [2018-12-18 09:29:29.707832] training MLP [6, 3] witn n=
0.3
1031 [2018-12-18 09:29:29.707832] iteration 0
1032 [2018-12-18 09:29:31.669705] iteration 1
1033 [2018-12-18 09:29:33.576605] iteration 2
1034 [2018-12-18 09:29:35.524483] iteration 3
1035 [2018-12-18 09:29:37.385411] iteration 4
1036 [2018-12-18 09:29:39.437231] training MLP [6, 3] witn n=
0.1
1037 [2018-12-18 09:29:39.437231] iteration 0
1038 [2018-12-18 09:29:41.542018] iteration 1
1039 [2018-12-18 09:29:43.543867] iteration 2
1040 [2018-12-18 09:29:45.620672] iteration 3
1041 [2018-12-18 09:29:47.880370] iteration 4
1042 [2018-12-18 09:29:49.915199] training MLP [6, 3] witn n=
0.03
1043 [2018-12-18 09:29:49.915199] iteration 0
1044 [2018-12-18 09:29:51.967016] iteration 1
1045 [2018-12-18 09:29:53.944878] iteration 2
1046 [2018-12-18 09:29:56.016684] iteration 3
1047 [2018-12-18 09:29:58.016532] iteration 4
1048 [2018-12-18 09:29:59.896467] training MLP [6, 3] witn n=
0.01
1049 [2018-12-18 09:29:59.896467] iteration 0
1050 [2018-12-18 09:30:01.738389] iteration 1
1051 [2018-12-18 09:30:03.853174] iteration 2
1052 [2018-12-18 09:30:05.885002] iteration 3
1053 [2018-12-18 09:30:07.888848] iteration 4
1054 [2018-12-18 09:30:09.898689] training MLP [6, 3] witn n=
0.003
1055 [2018-12-18 09:30:09.898689] iteration 0
1056 [2018-12-18 09:30:11.938517] iteration 1
1057 [2018-12-18 09:30:13.913378] iteration 2
1058 [2018-12-18 09:30:15.741325] iteration 3
1059 [2018-12-18 09:30:17.552282] iteration 4
1060 ##### Iris Experiment - Layers [6, 3]
1061
1062 Weights:
1063 matrix([[ 5.3018971 ,  2.99253799, -2.87324291,  2.
83849521,  2.32162542,
1064           4.03684256],
1065           [ 0.82554804, -0.75610979,  1.00442402, -1.
23911712,  0.2291101 ,
1066           0.47698849],
```

```

1067      [ 2.12795165,  3.28355597, -2.80343504,  3.
      50197395,  1.69354448,
1068      2.13982518],
1069      [-1.73488724, -3.0723754 ,  3.17916302, -3.
      64216265, -1.71304818,
1070      -1.71951747],
1071      [-2.39121059, -3.24329229,  3.42969075, -3.
      61805291, -2.07639096,
1072      -2.21224928],
1073      [-0.01398668, -0.42473164,  0.91924264, -0.
      73897077,  0.04922133,
1074      -0.08186918],
1075      [-0.26299497, -0.13870045,  0.59236714, -0.
      2856298 , -0.08810099,
1076      -0.25077092],
1077      [ 1.31723001,  2.43557441, -2.08497173,  2.
      62047154,  1.30611743,
1078      1.47215304],
1079      [ 0.98577572,  1.65837674, -1.43434062,  1.
      79763871,  0.92740792,
1080      1.00509604],
1081      [-3.02088006, -2.06249477,  2.43763525, -2.
      22546455, -1.79838673,
1082      -2.43079174],
1083      [-3.17369326, -1.31072842,  1.66822759, -1.
      26798495, -1.70037863,
1084      -2.4526885 ],
1085      [-3.44396581, -2.11299092,  2.66280459, -2.
      09836147, -2.15279045,
1086      -2.77894788],
1087      [-3.50048214, -1.34925815,  2.00667975, -1.
      13358828, -1.8536613 ,
1088      -2.65117644]], matrix([[ 0.00565668,  0.
      05878744,  0.05095517],
1089      [ 3.21460338, -1.73575238, -1.90961859],
1090      [-1.86141779, -1.74469812, -2.06684186],
1091      [ 1.86822171, -0.07422689, -0.2259719 ],
1092      [-2.62020328, -1.28462834, -1.46142119],
1093      [-0.86038993, -1.89817703, -2.26637737],
1094      [ 2.76666587, -1.56280004, -1.8160271 ]]), array
      ([[ 8.15557979, -8.27631984, -7.02864165],
1095      [-9.73477011, 10.55081705,  3.99841553],
1096      [-7.38213119, -3.30855466,  7.13860208],
1097      [-6.83421018, -4.66399867,  7.14442927]]])
1098

```

```
1099 Best n:  
1100 0.3  
1101 Confusion Matrix:  
1102 [[10  0  0]  
1103 [ 0 10  0]  
1104 [ 0  0 10]]  
1105 Precision:  
1106 1.0  
1107 [2018-12-18 09:30:19.537153] training MLP [6, 4] witn n=  
0.3  
1108 [2018-12-18 09:30:19.537153] iteration 0  
1109 [2018-12-18 09:30:21.432050] iteration 1  
1110 [2018-12-18 09:30:23.334954] iteration 2  
1111 [2018-12-18 09:30:25.161901] iteration 3  
1112 [2018-12-18 09:30:27.006840] iteration 4  
1113 [2018-12-18 09:30:29.166594] training MLP [6, 4] witn n=  
0.1  
1114 [2018-12-18 09:30:29.166594] iteration 0  
1115 [2018-12-18 09:30:31.213418] iteration 1  
1116 [2018-12-18 09:30:33.291222] iteration 2  
1117 [2018-12-18 09:30:35.470964] iteration 3  
1118 [2018-12-18 09:30:37.494800] iteration 4  
1119 [2018-12-18 09:30:39.443677] training MLP [6, 4] witn n=  
0.03  
1120 [2018-12-18 09:30:39.443677] iteration 0  
1121 [2018-12-18 09:30:41.390566] iteration 1  
1122 [2018-12-18 09:30:43.314447] iteration 2  
1123 [2018-12-18 09:30:45.183385] iteration 3  
1124 [2018-12-18 09:30:47.049299] iteration 4  
1125 [2018-12-18 09:30:48.868263] training MLP [6, 4] witn n=  
0.01  
1126 [2018-12-18 09:30:48.868263] iteration 0  
1127 [2018-12-18 09:30:50.728192] iteration 1  
1128 [2018-12-18 09:30:52.771003] iteration 2  
1129 [2018-12-18 09:30:54.920765] iteration 3  
1130 [2018-12-18 09:30:57.097511] iteration 4  
1131 [2018-12-18 09:30:59.233283] training MLP [6, 4] witn n=  
0.003  
1132 [2018-12-18 09:30:59.233283] iteration 0  
1133 [2018-12-18 09:31:01.292096] iteration 1  
1134 [2018-12-18 09:31:03.291946] iteration 2  
1135 [2018-12-18 09:31:05.507670] iteration 3  
1136 [2018-12-18 09:31:07.565485] iteration 4  
1137 ##### Iris Experiment - Layers [6, 4]  
1138
```

```
1139 Weights:  
1140 [matrix([[ -2.15101133, -4.2070467 ,  9.89178992, -2.  
1141      05199191, -3.94953177,  
1142      -2.90323599],  
1143      [ 1.51899171, -0.29103953,  1.9948134 ,  1.  
1144      18264859, -0.60104408,  
1145      -0.46304253],  
1146      [-3.67903832, -2.66364484,  3.98658663, -3.  
1147      12287821, -2.96650036,  
1148      -2.94302942],  
1149      [ 4.61681629,  2.15384649, -2.43710442,  3.  
1150      96786102,  1.94945955,  
1151      2.1430129 ],  
1152      [ 5.2685209 ,  3.09791621, -3.08657079,  4.  
1153      69895242,  2.91586761,  
1154      3.13261563],  
1155      [ 0.81788997,  0.3301968 ,  0.15318703,  0.  
1156      79129506,  0.01848278,  
1157      -0.13214407],  
1158      [ 0.51855195,  0.49869435, -0.47472803,  0.  
1159      49951227,  0.25788874,  
1160      0.09108478],  
1161      [-2.63420502, -1.73637835,  2.61554789, -2.  
1162      25806098, -1.85415025,  
1163      -2.02229361],  
1164      [-1.73049052, -1.13720264,  1.70874931, -1.  
1165      45949983, -1.20925101,  
1166      -1.2353632 ],  
1167      [ 3.08118184,  3.0964151 , -5.77676742,  2.  
1168      96553724,  2.62025838,  
1169      2.52391018],  
1170      [ 2.13713364,  3.18297529, -6.74009896,  2.  
1171      28122924,  2.83059356,  
1172      2.55359922],  
1173      [ 3.75732826,  4.03257401, -5.93366144,  3.  
1174      68099054,  3.66746042,  
1175      3.51889554],  
1176      [ 2.75540131,  3.98593025, -6.41350694,  2.  
1177      95981267,  3.69775575,  
1178      3.43957302]]), matrix([[ 4.99200311e-02,  3.  
1179      93142288e-03,  8.22804531e-02,  
1180      3.66780077e-02],  
1181      [-8.67649436e-01, -4.26073211e+00, -1.55469188e+  
1182      00,  
1183      1.58041320e+00],
```

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```
1169      [-1.96674056e+00, -3.86816651e+00,  2.66314230e-
01,
1170      -1.75913773e-01],
1171      [-1.80999151e+00, -3.89938716e+00,  3.22542893e+
00,
1172      2.39019976e+00],
1173      [-7.87196381e-01, -3.96990482e+00, -1.77527176e+
00,
1174      2.12821696e+00],
1175      [-2.05323534e+00, -3.93802328e+00, -1.03455453e-
01,
1176      -5.41305847e-01],
1177      [-2.11946449e+00, -3.97248172e+00, -1.40369788e+
00,
1178      -2.33185733e-01]]), array([[[-12.24151041, -19.
20415551,  16.51391109],
1179      [ 11.29266863, -9.14247911, -8.45952832],
1180      [  7.24707344, -9.31672691, -6.07198866],
1181      [ 12.54524791,   0.25614105, -15.35884358],
1182      [  4.87333781,  20.53018475, -15.26330348]]])
1183
1184 Best n:
1185 0.3
1186 Confusion Matrix:
1187 [[10  0  0]
1188  [ 0 10  0]
1189  [ 0  0 10]]
1190 Precision:
1191 1.0
1192 [2018-12-18 09:31:09.840174] training MLP [6, 5] witn n=
0.3
1193 [2018-12-18 09:31:09.840174] iteration 0
1194 [2018-12-18 09:31:11.968950] iteration 1
1195 [2018-12-18 09:31:14.160686] iteration 2
1196 [2018-12-18 09:31:16.326439] iteration 3
1197 [2018-12-18 09:31:18.452215] iteration 4
1198 [2018-12-18 09:31:20.551008] training MLP [6, 5] witn n=
0.1
1199 [2018-12-18 09:31:20.551008] iteration 0
1200 [2018-12-18 09:31:22.601825] iteration 1
1201 [2018-12-18 09:31:24.608669] iteration 2
1202 [2018-12-18 09:31:26.601524] iteration 3
1203 [2018-12-18 09:31:28.444461] iteration 4
1204 [2018-12-18 09:31:30.354387] training MLP [6, 5] witn n=
0.03
```

```
1205 [2018-12-18 09:31:30.354387] iteration 0
1206 [2018-12-18 09:31:32.341218] iteration 1
1207 [2018-12-18 09:31:34.205143] iteration 2
1208 [2018-12-18 09:31:36.105062] iteration 3
1209 [2018-12-18 09:31:38.114892] iteration 4
1210 [2018-12-18 09:31:40.161714] training MLP [6, 5] witn n=
0.01
1211 [2018-12-18 09:31:40.161714] iteration 0
1212 [2018-12-18 09:31:42.235521] iteration 1
1213 [2018-12-18 09:31:44.316323] iteration 2
1214 [2018-12-18 09:31:46.387130] iteration 3
1215 [2018-12-18 09:31:48.488921] iteration 4
1216 [2018-12-18 09:31:50.648677] training MLP [6, 5] witn n=
0.003
1217 [2018-12-18 09:31:50.648677] iteration 0
1218 [2018-12-18 09:31:52.771454] iteration 1
1219 [2018-12-18 09:31:54.834265] iteration 2
1220 [2018-12-18 09:31:56.912082] iteration 3
1221 [2018-12-18 09:31:58.754009] iteration 4
1222 ##### Iris Experiment - Layers [6, 5]
1223
1224 Weights:
1225 [matrix([[-5.29800806, -1.88959164, -4.97254293, -5.
13045829, -5.35124388,
1226           -5.34302576],
1227           [-0.40048903,  0.36389684, -0.3588444 , -0.
40496586, -0.45090167,
1228           -0.47674043],
1229           [-2.72694512, -2.27076102, -2.79517122, -2.
78953385, -2.79034732,
1230           -2.74049708],
1231           [ 1.24621079,  2.09613257,  1.28036847,  1.
28287679,  1.27053289,
1232           1.23575308],
1233           [ 2.41150032,  2.9148289 ,  2.39035311,  2.
42522667,  2.50447781,
1234           2.47405605],
1235           [ 0.36639152,  0.34425836,  0.35318384,  0.
38210099,  0.45706355,
1236           0.43001779],
1237           [ 0.5960782 ,  0.30512276,  0.50326479,  0.
56548352,  0.59457446,
1238           0.59635804],
1239           [-1.64510575, -1.67689814, -1.75283291, -1.
6711485 , -1.65436984,
```

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```
1240      -1.64578964],  
1241      [-1.02655554, -1.07561362, -1.01869686, -1.  
0265811 , -1.0538409 ,  
1242      -0.98774521],  
1243      [ 2.18142247,  1.64570062,  1.97426981,  2.  
04960974,  2.17378128,  
1244      2.21079046],  
1245      [ 2.35380272,  1.25139157,  2.08570081,  2.  
23570068,  2.39008001,  
1246      2.41523687],  
1247      [ 3.48286707,  2.55731512,  3.27622266,  3.  
35263453,  3.51606311,  
1248      3.49698708],  
1249      [ 3.48843333,  2.11998564,  3.19213079,  3.  
35346906,  3.48716882,  
1250      3.52751823]]), matrix([[ 0.00932219,  0.  
04636796,  0.07045862,  0.08574306,  0.05222801],  
1251      [-0.73682274, -0.4370495 , -0.55191301, -4.  
26614127, -0.44787065],  
1252      [ 1.02188631,  1.02179966,  0.865117 , -4.  
97816597,  0.86680393],  
1253      [-0.34682466, -0.79205265, -0.43802608, -4.  
49537868, -0.37104996],  
1254      [-0.34758554, -0.78710693, -0.43461702, -4.  
39935868, -0.41746865],  
1255      [-0.52817359, -0.66627379, -0.39357359, -4.  
24174294, -0.4975347 ],  
1256      [-0.64130673, -0.52744475, -0.50314429, -4.  
22672265, -0.47669429]]), array([-9.05348764, -5.  
21285547,  6.17347578],  
1257      [ 2.57534754,  3.26354472, -3.74760516],  
1258      [ 5.38272922,  3.43129089, -6.7946207 ],  
1259      [ 1.84038463,  3.35997988, -3.00520321],  
1260      [11.63317544, -9.43161689, -8.44737391],  
1261      [ 1.43216806,  3.33776713, -2.46807229]])]  
1262  
1263 Best n:  
1264 0.3  
1265 Confusion Matrix:  
1266 [[10  0  0]  
1267 [ 0 10  0]  
1268 [ 0  0 10]]  
1269 Precision:  
1270 1.0  
1271 [2018-12-18 09:32:00.772858] training MLP [6, 6] witn n=
```

```
1271 0.3
1272 [2018-12-18 09:32:00.772858] iteration 0
1273 [2018-12-18 09:32:02.731717] iteration 1
1274 [2018-12-18 09:32:04.600642] iteration 2
1275 [2018-12-18 09:32:06.543521] iteration 3
1276 [2018-12-18 09:32:08.455422] iteration 4
1277 [2018-12-18 09:32:10.336351] training MLP [6, 6] witn n=
0.1
1278 [2018-12-18 09:32:10.336351] iteration 0
1279 [2018-12-18 09:32:12.350179] iteration 1
1280 [2018-12-18 09:32:14.607881] iteration 2
1281 [2018-12-18 09:32:16.609739] iteration 3
1282 [2018-12-18 09:32:18.673537] iteration 4
1283 [2018-12-18 09:32:20.726355] training MLP [6, 6] witn n=
0.03
1284 [2018-12-18 09:32:20.726355] iteration 0
1285 [2018-12-18 09:32:22.607271] iteration 1
1286 [2018-12-18 09:32:24.497185] iteration 2
1287 [2018-12-18 09:32:26.432069] iteration 3
1288 [2018-12-18 09:32:28.319983] iteration 4
1289 [2018-12-18 09:32:30.280855] training MLP [6, 6] witn n=
0.01
1290 [2018-12-18 09:32:30.280855] iteration 0
1291 [2018-12-18 09:32:32.250720] iteration 1
1292 [2018-12-18 09:32:34.156625] iteration 2
1293 [2018-12-18 09:32:36.209441] iteration 3
1294 [2018-12-18 09:32:38.646037] iteration 4
1295 [2018-12-18 09:32:41.132606] training MLP [6, 6] witn n=
0.003
1296 [2018-12-18 09:32:41.132606] iteration 0
1297 [2018-12-18 09:32:43.618174] iteration 1
1298 [2018-12-18 09:32:46.187694] iteration 2
1299 [2018-12-18 09:32:48.293480] iteration 3
1300 [2018-12-18 09:32:50.427254] iteration 4
1301 ##### Iris Experiment - Layers [6, 6]
1302
1303 Weights:
1304 [matrix([[ 1.07251444, -5.89765039, -1.71803275, -6.
    78309568, -6.40872685,
1305             -1.77384672],
1306             [ 1.75392854, -0.50257428,  0.9937585 , -0.
    66083234, -0.64042555,
1307             1.71311753],
1308             [-0.36934557, -2.90364709, -2.07071231, -2.
    95633368, -2.90200173,
```

```
1309      -3.06118399],  
1310      [ 3.04530058,  2.01820301,  3.18005201,  2.  
    05246025,  1.99161455,  
1311      4.35099789],  
1312      [ 3.17545648,  2.5434284 ,  3.86307368,  2.  
    63743447,  2.53071159,  
1313      4.76909278],  
1314      [ 1.00483783,  0.20506079,  0.90423886,  0.  
    21896536,  0.13825915,  
1315      1.20421668],  
1316      [ 0.60823488,  0.38008242,  0.63002239,  0.  
    39953595,  0.37546687,  
1317      0.77996916],  
1318      [-0.34670898, -1.8722607 , -1.57486463, -1.  
    90167329, -1.83500335,  
1319      -2.28620026],  
1320      [-0.22653893, -1.22101734, -1.08821003, -1.  
    23514999, -1.26735154,  
1321      -1.62816061],  
1322      [ 2.05418574,  2.84838986,  2.74612189,  3.  
    22127226,  3.09660251,  
1323      3.00323945],  
1324      [ 1.36277645,  2.85361995,  2.15491384,  3.  
    33487617,  3.17654224,  
1325      2.00414533],  
1326      [ 2.18214943,  3.27834762,  3.36790159,  3.  
    7696744 ,  3.57059166,  
1327      3.37639771],  
1328      [ 1.52817456,  3.19679764,  2.81254332,  3.  
    84539334,  3.60693456,  
1329      2.4291426 ]]), matrix([[ 0.04404442,  0.  
    08489291,  0.0347391 ,  0.07384858,  0.09800173,  
1330      0.01123702],  
1331      [-0.40651339,  3.22571783, -1.07967506,  1.  
    24486635,  1.87316594,  
1332      -0.68935962],  
1333      [-0.6809782 , -0.35797137, -1.63961682,  1.  
    48260634,  1.53215193,  
1334      -0.4890354 ],  
1335      [ 1.00733444, -1.84581507,  2.15836937,  1.  
    1995895 ,  1.05309227,  
1336      1.14774729],  
1337      [-0.78080561, -0.63311583, -1.06289915,  1.  
    26755458,  0.67833705,  
1338      -0.89185217],
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1339 [-0.89668323, -1.00559761, -0.97923117, 1.  
    22051172, 1.01298726,  
1340 -0.85752989],  
1341 [ 0.78525323, -2.17053052, 1.04677278, 1.  
    34584087, 1.52293723,  
1342 1.24001456]], array([[ -6.21188501, -7.  
    2829088 , 3.96547333],  
1343 [-1.26810126, 4.30321495, -1.96101841],  
1344 [ 18.82416616, -1.87095963, -17.04521201],  
1345 [-1.20582801, 6.83856974, -3.42534894],  
1346 [-3.378843 , -0.64405141, 1.62186866],  
1347 [-0.89403414, -0.50958001, 1.01743278],  
1348 [-1.35077262, 4.66968096, -2.11613036]])]  
1349  
1350 Best n:  
1351 0.3  
1352 Confusion Matrix:  
1353 [[10  0  0]  
1354 [ 0 10  0]  
1355 [ 0  0 10]]  
1356 Precision:  
1357 1.0  
1358 [2018-12-18 09:32:52.634981] training MLP [3, 3, 3] with  
n=0.3  
1359 [2018-12-18 09:32:52.634981] iteration 0  
1360 [2018-12-18 09:32:54.991628] iteration 1  
1361 [2018-12-18 09:32:57.199353] iteration 2  
1362 [2018-12-18 09:32:59.450058] iteration 3  
1363 [2018-12-18 09:33:01.937625] iteration 4  
1364 [2018-12-18 09:33:04.661058] training MLP [3, 3, 3] with  
n=0.1  
1365 [2018-12-18 09:33:04.661058] iteration 0  
1366 [2018-12-18 09:33:07.252566] iteration 1  
1367 [2018-12-18 09:33:10.082935] iteration 2  
1368 [2018-12-18 09:33:12.497544] iteration 3  
1369 [2018-12-18 09:33:14.657313] iteration 4  
1370 [2018-12-18 09:33:16.828052] training MLP [3, 3, 3] with  
n=0.03  
1371 [2018-12-18 09:33:16.828052] iteration 0  
1372 [2018-12-18 09:33:19.043776] iteration 1  
1373 [2018-12-18 09:33:21.188539] iteration 2  
1374 [2018-12-18 09:33:23.420256] iteration 3  
1375 [2018-12-18 09:33:25.562021] iteration 4  
1376 [2018-12-18 09:33:28.215495] training MLP [3, 3, 3] with  
n=0.01
```

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1377 [2018-12-18 09:33:28.215495] iteration 0
1378 [2018-12-18 09:33:30.917939] iteration 1
1379 [2018-12-18 09:33:33.742310] iteration 2
1380 [2018-12-18 09:33:36.397784] iteration 3
1381 [2018-12-18 09:33:38.577526] iteration 4
1382 [2018-12-18 09:33:40.843222] training MLP [3, 3, 3] with
    n=0.003
1383 [2018-12-18 09:33:40.843222] iteration 0
1384 [2018-12-18 09:33:43.134902] iteration 1
1385 [2018-12-18 09:33:45.324642] iteration 2
1386 [2018-12-18 09:33:47.542366] iteration 3
1387 [2018-12-18 09:33:49.849038] iteration 4
1388 ##### Iris Experiment - Layers [3, 3, 3]
1389
1390 Weights:
1391 [matrix([[ 0.08228946,  0.05789883,  0.0404294 ],
1392           [ 0.12000902,  0.08144118,  0.07092551],
1393           [-0.00556391,  0.0214124 , -0.00666854],
1394           [ 0.06057096,  0.10848824,  0.09603602],
1395           [ 0.06714284,  0.07252631,  0.10474007],
1396           [ 0.03450057,  0.04076728,  0.06677395],
1397           [ 0.07279353,  0.10333507,  0.03813229],
1398           [ 0.05733315,  0.09114666,  0.07240182],
1399           [ 0.06422169,  0.0239505 ,  0.05105993],
1400           [ 0.10754023,  0.08766055,  0.05578772],
1401           [ 0.09576904,  0.08981759,  0.02027959],
1402           [ 0.08619466,  0.06800658,  0.07835055],
1403           [ 0.03315284,  0.06497544,  0.02160977]]),
1404     matrix([[0.09094604,  0.09833136,  0.04192505],
1405           [0.10099425,  0.07972351,  0.10788121],
1406           [0.03205635,  0.01903082,  0.08457184],
1407           [0.02209748,  0.11556497,  0.0716629 ]]), matrix
1408   ([[ 0.01948762,  0.08684274,  0.04523115],
1409     [-0.33175681, -0.28656301, -0.25233129],
1410     [-0.25951402, -0.32126193, -0.30440057],
1411     [-0.28318801, -0.28764525, -0.2658238 ]]), array
1412   ([[ -0.5676309 , -0.4454731 , -0.36471772],
1413     [-0.07811139, -0.20995993, -0.23730822],
1414     [-0.09266088, -0.21995804, -0.28968913],
1415     [-0.14191455, -0.19221754, -0.29809168]])
1416
1417 Best n:
1418 0.3
1419 Confusion Matrix:
1420 [[ 6  4  0]

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File - iris

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1418 [ 0  8  2]
1419 [ 0  0 10]]
1420 Precision:
1421 0.8
1422 [2018-12-18 09:33:52.488516] training MLP [3, 3, 4] withn
    n=0.3
1423 [2018-12-18 09:33:52.488516] iteration 0
1424 [2018-12-18 09:33:55.470798] iteration 1
1425 [2018-12-18 09:33:58.235207] iteration 2
1426 [2018-12-18 09:34:01.084567] iteration 3
1427 [2018-12-18 09:34:03.789009] iteration 4
1428 [2018-12-18 09:34:06.542426] training MLP [3, 3, 4] withn
    n=0.1
1429 [2018-12-18 09:34:06.542426] iteration 0
1430 [2018-12-18 09:34:09.514714] iteration 1
1431 [2018-12-18 09:34:12.121211] iteration 2
1432 [2018-12-18 09:34:14.349929] iteration 3
1433 [2018-12-18 09:34:16.475705] iteration 4
1434 [2018-12-18 09:34:18.718412] training MLP [3, 3, 4] withn
    n=0.03
1435 [2018-12-18 09:34:18.718412] iteration 0
1436 [2018-12-18 09:34:21.041077] iteration 1
1437 [2018-12-18 09:34:23.352743] iteration 2
1438 [2018-12-18 09:34:25.563471] iteration 3
1439 [2018-12-18 09:34:28.211945] iteration 4
1440 [2018-12-18 09:34:31.006337] training MLP [3, 3, 4] withn
    n=0.01
1441 [2018-12-18 09:34:31.006337] iteration 0
1442 [2018-12-18 09:34:33.729769] iteration 1
1443 [2018-12-18 09:34:36.468193] iteration 2
1444 [2018-12-18 09:34:38.794851] iteration 3
1445 [2018-12-18 09:34:41.234447] iteration 4
1446 [2018-12-18 09:34:43.580101] training MLP [3, 3, 4] withn
    n=0.003
1447 [2018-12-18 09:34:43.580101] iteration 0
1448 [2018-12-18 09:34:45.920750] iteration 1
1449 [2018-12-18 09:34:48.194439] iteration 2
1450 [2018-12-18 09:34:50.467131] iteration 3
1451 [2018-12-18 09:34:53.264523] iteration 4
1452 ##### Iris Experiment - Layers [3, 3, 4]
1453
1454 Weights:
1455 matrix([[ 0.03771384,  0.07339788,  0.04769628],
1456           [ 0.18167435,  0.12186327,  0.1412569 ],
1457           [ 0.03241396,  0.05350714, -0.00291132],
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1458      [ 0.23432513,  0.15129106,  0.1544618 ],
1459      [ 0.16493646,  0.12221745,  0.19276687],
1460      [ 0.10931284,  0.10397324,  0.08714461],
1461      [ 0.05677297,  0.07819665,  0.09450966],
1462      [-0.029939 ,  0.06257162,  0.02639128],
1463      [-0.03975914,  0.02505392,  0.03648893],
1464      [ 0.13893019,  0.11240502,  0.15914419],
1465      [ 0.10825956,  0.13986375,  0.11124682],
1466      [ 0.18516273,  0.11648634,  0.16322881],
1467      [ 0.16046337,  0.10637368,  0.14936317]]),
    matrix([[ 0.08571939,  0.00841668,  0.01041056],
1468      [-0.08286817, -0.04726107, -0.04095493],
1469      [-0.08662073, -0.02519023, -0.03911398],
1470      [-0.09886957, -0.04828993, -0.05657814]]),
    matrix([[ 0.00837214,  0.07004096,  0.03430404,  0.
04437115],
1471      [-0.49600852, -0.46309663, -0.44917758, -0.
48980475],
1472      [-0.42370373, -0.48741367, -0.50385319, -0.
50114848],
1473      [-0.49401559, -0.5232104 , -0.49394185, -0.
50989067]]), array([[-0.21058842, -0.40620308, -0.
70847739],
1474      [-0.35441426, -0.20128136,  0.00158522],
1475      [-0.33532129, -0.17940942, -0.00282223],
1476      [-0.34864666, -0.21458273,  0.01344226],
1477      [-0.37069169, -0.23750306,  0.04398882]])]
1478
1479 Best n:
1480 0.3
1481 Confusion Matrix:
1482 [[10  0  0]
1483 [ 0 10  0]
1484 [ 0  0 10]]
1485 Precision:
1486 1.0
1487 [2018-12-18 09:34:56.376728] training MLP [3, 3, 5] with
n=0.3
1488 [2018-12-18 09:34:56.376728] iteration 0
1489 [2018-12-18 09:34:59.490934] iteration 1
1490 [2018-12-18 09:35:02.103430] iteration 2
1491 [2018-12-18 09:35:04.469071] iteration 3
1492 [2018-12-18 09:35:06.831706] iteration 4
1493 [2018-12-18 09:35:09.151371] training MLP [3, 3, 5] with
n=0.1

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1494 [2018-12-18 09:35:09.151371] iteration 0
1495 [2018-12-18 09:35:11.443051] iteration 1
1496 [2018-12-18 09:35:13.882649] iteration 2
1497 [2018-12-18 09:35:16.380209] iteration 3
1498 [2018-12-18 09:35:19.207581] iteration 4
1499 [2018-12-18 09:35:21.981984] training MLP [3, 3, 5] withn
    n=0.03
1500 [2018-12-18 09:35:21.981984] iteration 0
1501 [2018-12-18 09:35:24.953272] iteration 1
1502 [2018-12-18 09:35:27.351892] iteration 2
1503 [2018-12-18 09:35:29.693547] iteration 3
1504 [2018-12-18 09:35:31.939249] iteration 4
1505 [2018-12-18 09:35:34.262913] training MLP [3, 3, 5] withn
    n=0.01
1506 [2018-12-18 09:35:34.262913] iteration 0
1507 [2018-12-18 09:35:36.509619] iteration 1
1508 [2018-12-18 09:35:38.670375] iteration 2
1509 [2018-12-18 09:35:41.139951] iteration 3
1510 [2018-12-18 09:35:43.799421] iteration 4
1511 [2018-12-18 09:35:46.513857] training MLP [3, 3, 5] withn
    n=0.003
1512 [2018-12-18 09:35:46.513857] iteration 0
1513 [2018-12-18 09:35:49.275268] iteration 1
1514 [2018-12-18 09:35:51.670889] iteration 2
1515 [2018-12-18 09:35:53.863625] iteration 3
1516 [2018-12-18 09:35:56.161304] iteration 4
1517 ##### Iris Experiment - Layers [3, 3, 5]
1518
1519 Weights:
1520 [matrix([[ 0.01051183,  0.04576729,  0.087474 ],
1521           [ 0.08299684,  0.13504899,  0.06981127],
1522           [ 0.05232353,  0.03780273,  0.0082096 ],
1523           [ 0.13080433,  0.11024372,  0.1601367 ],
1524           [ 0.12454397,  0.14566811,  0.13050502],
1525           [ 0.05992895,  0.10677115,  0.0567965 ],
1526           [ 0.05681552,  0.10854376,  0.09838423],
1527           [ 0.00353537,  0.03139698,  0.00250046],
1528           [ 0.02767709, -0.01075621,  0.02741086],
1529           [ 0.12618472,  0.09807242,  0.06569212],
1530           [ 0.06129175,  0.0624263 ,  0.08960244],
1531           [ 0.16589419,  0.13938404,  0.12183523],
1532           [ 0.14395736,  0.07473984,  0.11399036]]),
1533           matrix([[ 0.08545173,  0.02604677,  0.06405565],
1534           [-0.10139532, -0.07531743, -0.16070894],
1534           [-0.10256846, -0.06556647, -0.10391969],
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1535 [-0.15338099, -0.11440733, -0.13369446]]),  
      matrix([[ 0.08557754,  0.07343516,  0.00383541,  0.  
        0475996 ,  0.07510825],  
1536 [-0.64642085, -0.64912972, -0.56620887, -0.  
        64677342, -0.60663804],  
1537 [-0.60677208, -0.63427382, -0.65031833, -0.  
        62193186, -0.62265398],  
1538 [-0.66356203, -0.61969136, -0.62705824, -0.  
        65319571, -0.63395526]]), array([[[-0.26262067, -0.  
        39476251, -0.63363264],  
1539 [-0.31348332, -0.1618646 , -0.02874793],  
1540 [-0.2742974 , -0.19371793, -0.06427301],  
1541 [-0.23725039, -0.1903098 , -0.00702064],  
1542 [-0.290712 , -0.17869022, -0.01463284],  
1543 [-0.25862023, -0.21564353, -0.04277063]]])  
1544  
1545 Best n:  
1546 0.3  
1547 Confusion Matrix:  
1548 [[10  0  0]  
1549 [ 0  2  8]  
1550 [ 0  0 10]]  
1551 Precision:  
1552 0.7333333333333333  
1553 [2018-12-18 09:35:58.544931] training MLP [3, 3, 6] with  
n=0.3  
1554 [2018-12-18 09:35:58.544931] iteration 0  
1555 [2018-12-18 09:36:00.928558] iteration 1  
1556 [2018-12-18 09:36:03.168266] iteration 2  
1557 [2018-12-18 09:36:05.334020] iteration 3  
1558 [2018-12-18 09:36:08.076440] iteration 4  
1559 [2018-12-18 09:36:10.745906] training MLP [3, 3, 6] with  
n=0.1  
1560 [2018-12-18 09:36:10.745906] iteration 0  
1561 [2018-12-18 09:36:13.499317] iteration 1  
1562 [2018-12-18 09:36:16.088826] iteration 2  
1563 [2018-12-18 09:36:18.294557] iteration 3  
1564 [2018-12-18 09:36:20.506283] iteration 4  
1565 [2018-12-18 09:36:22.841938] training MLP [3, 3, 6] with  
n=0.03  
1566 [2018-12-18 09:36:22.841938] iteration 0  
1567 [2018-12-18 09:36:25.334503] iteration 1  
1568 [2018-12-18 09:36:27.844059] iteration 2  
1569 [2018-12-18 09:36:30.361610] iteration 3  
1570 [2018-12-18 09:36:33.409853] iteration 4
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1571 [2018-12-18 09:36:36.564041] training MLP [3, 3, 6] withn
    n=0.01
1572 [2018-12-18 09:36:36.564041] iteration 0
1573 [2018-12-18 09:36:39.666252] iteration 1
1574 [2018-12-18 09:36:42.194794] iteration 2
1575 [2018-12-18 09:36:44.706349] iteration 3
1576 [2018-12-18 09:36:47.314846] iteration 4
1577 [2018-12-18 09:36:50.106240] training MLP [3, 3, 6] withn
    n=0.003
1578 [2018-12-18 09:36:50.106240] iteration 0
1579 [2018-12-18 09:36:52.177046] iteration 1
1580 [2018-12-18 09:36:54.372783] iteration 2
1581 [2018-12-18 09:36:56.961291] iteration 3
1582 [2018-12-18 09:36:59.528817] iteration 4
1583 ##### Iris Experiment - Layers [3, 3, 6]
1584
1585 Weights:
1586 [matrix([[0.1254504 , 0.141233 , 0.09726027],
1587           [0.07218269, 0.06346372, 0.09413938],
1588           [0.07561561, 0.11919375, 0.10268438],
1589           [0.0668922 , 0.12361092, 0.07599269],
1590           [0.06541265, 0.05604684, 0.07313359],
1591           [0.04568275, 0.08254535, 0.09649535],
1592           [0.07385873, 0.08160306, 0.01518315],
1593           [0.01429827, 0.09299583, 0.05557918],
1594           [0.09888988, 0.10265677, 0.01276429],
1595           [0.06729707, 0.10684984, 0.03218226],
1596           [0.02182211, 0.08260501, 0.02551625],
1597           [0.06303867, 0.05276509, 0.11091818],
1598           [0.06231549, 0.0319265 , 0.07056809]]), matrix
1599 (([0.01133327, 0.01085507, 0.04820747],
1600           [0.15861035, 0.18324426, 0.20775636],
1601           [0.23510329, 0.16777693, 0.23342143],
1602           [0.20239451, 0.17935412, 0.19370832])), matrix
1603 (([ 0.01491476, 0.01671947, 0.03637114, 0.0191351 ,
1604             0.03208074,
1605             0.02282465],
1606             [-0.50245911, -0.46789197, -0.44220491, -0.
1607             43018929, -0.49836376,
1608             -0.46123827],
1609             [-0.45430413, -0.49442713, -0.4622621 , -0.
1610             49882178, -0.45905615,
1611             -0.48642643],
1612             [-0.46246939, -0.43773376, -0.50268624, -0.
1613             45081659, -0.48526632,
1614             -0.48526632])

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1608          -0.46652439]]), array([[-0.27174432, -0.
1609          24121193, -0.209763  ],
1610          [-0.06088606, -0.11463444, -0.11629428],
1611          [-0.11500915, -0.08671991, -0.13116686],
1612          [-0.10966509, -0.06747376, -0.14300691],
1613          [-0.07421682, -0.10713655, -0.13191506],
1614          [-0.07758207, -0.10615771, -0.09394083],
1615          [-0.06082139, -0.1160099 , -0.08297596]])]
1615
1616 Best n:
1617 0.3
1618 Confusion Matrix:
1619 [[ 9  1  0]
1620 [ 1  2  7]
1621 [ 0  0 10]]
1622 Precision:
1623 0.7
1624 [2018-12-18 09:37:01.933429] training MLP [3, 4, 3] with
n=0.3
1625 [2018-12-18 09:37:01.933429] iteration 0
1626 [2018-12-18 09:37:04.278077] iteration 1
1627 [2018-12-18 09:37:06.338910] iteration 2
1628 [2018-12-18 09:37:08.361745] iteration 3
1629 [2018-12-18 09:37:10.401554] iteration 4
1630 [2018-12-18 09:37:12.413406] training MLP [3, 4, 3] with
n=0.1
1631 [2018-12-18 09:37:12.413406] iteration 0
1632 [2018-12-18 09:37:14.494196] iteration 1
1633 [2018-12-18 09:37:16.588991] iteration 2
1634 [2018-12-18 09:37:18.662808] iteration 3
1635 [2018-12-18 09:37:20.836544] iteration 4
1636 [2018-12-18 09:37:22.953325] training MLP [3, 4, 3] with
n=0.03
1637 [2018-12-18 09:37:22.953325] iteration 0
1638 [2018-12-18 09:37:25.160055] iteration 1
1639 [2018-12-18 09:37:27.426749] iteration 2
1640 [2018-12-18 09:37:29.588517] iteration 3
1641 [2018-12-18 09:37:31.830215] iteration 4
1642 [2018-12-18 09:37:34.076921] training MLP [3, 4, 3] with
n=0.01
1643 [2018-12-18 09:37:34.076921] iteration 0
1644 [2018-12-18 09:37:36.396585] iteration 1
1645 [2018-12-18 09:37:38.606313] iteration 2
1646 [2018-12-18 09:37:40.822035] iteration 3
1647 [2018-12-18 09:37:42.846870] iteration 4
```

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1648 [2018-12-18 09:37:45.151544] training MLP [3, 4, 3] with
      n=0.003
1649 [2018-12-18 09:37:45.151544] iteration 0
1650 [2018-12-18 09:37:47.468209] iteration 1
1651 [2018-12-18 09:37:49.487047] iteration 2
1652 [2018-12-18 09:37:51.510893] iteration 3
1653 [2018-12-18 09:37:53.654647] iteration 4
1654 ##### Iris Experiment - Layers [3, 4, 3]
1655
1656 Weights:
1657 [matrix([[0.02895375, 0.02811741, 0.07465224],
1658           [0.09316003, 0.02160916, 0.08589463],
1659           [0.00954713, 0.0041115 , 0.0137386 ],
1660           [0.10263143, 0.01371481, 0.05806493],
1661           [0.046907 , 0.08847761, 0.08916877],
1662           [0.07550267, 0.04181849, 0.06756312],
1663           [0.09221894, 0.00814728, 0.05034746],
1664           [0.05002759, 0.06254811, 0.02355865],
1665           [0.03706699, 0.01566068, 0.06417682],
1666           [0.04274362, 0.07566953, 0.06372535],
1667           [0.04405696, 0.05737127, 0.05639879],
1668           [0.01760378, 0.08880843, 0.02220124],
1669           [0.08058282, 0.02839087, 0.03895615]]), matrix
      ([[0.02538929, 0.00076896, 0.07121901, 0.05511341],
1670           [0.06847451, 0.07982767, 0.10249481, 0.07863647
      ],
1671           [0.09345293, 0.02576328, 0.06369219, 0.07087071
      ],
1672           [0.03708852, 0.02043683, 0.09987881, 0.07652025
      ]]), matrix([[ 0.03607271, 0.0909304 , 0.03431191],
1673           [-0.24631941, -0.21126765, -0.25691792],
1674           [-0.1917767 , -0.21704632, -0.20946101],
1675           [-0.23561518, -0.19718724, -0.25035207],
1676           [-0.24891485, -0.26450325, -0.24612918]]), array
      ([[ -0.51639819, -0.45399158, -0.39540837],
1677           [-0.12865903, -0.17105479, -0.28378068],
1678           [-0.16205715, -0.25650915, -0.24436939],
1679           [-0.15609469, -0.17654703, -0.22885623]]])
1680
1681 Best n:
1682 0.3
1683 Confusion Matrix:
1684 [[10  0  0]
1685  [ 0 10  0]
1686  [ 0   2  8]]

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1687 Precision:  
1688 0.9333333333333333  
1689 [2018-12-18 09:37:56.010289] training MLP [3, 4, 4] withn  
    n=0.3  
1690 [2018-12-18 09:37:56.010289] iteration 0  
1691 [2018-12-18 09:37:58.302969] iteration 1  
1692 [2018-12-18 09:38:00.542679] iteration 2  
1693 [2018-12-18 09:38:02.790387] iteration 3  
1694 [2018-12-18 09:38:05.014105] iteration 4  
1695 [2018-12-18 09:38:07.273804] training MLP [3, 4, 4] withn  
    n=0.1  
1696 [2018-12-18 09:38:07.273804] iteration 0  
1697 [2018-12-18 09:38:09.439558] iteration 1  
1698 [2018-12-18 09:38:11.691260] iteration 2  
1699 [2018-12-18 09:38:13.875003] iteration 3  
1700 [2018-12-18 09:38:16.017767] iteration 4  
1701 [2018-12-18 09:38:18.012621] training MLP [3, 4, 4] withn  
    n=0.03  
1702 [2018-12-18 09:38:18.012621] iteration 0  
1703 [2018-12-18 09:38:20.109414] iteration 1  
1704 [2018-12-18 09:38:22.430077] iteration 2  
1705 [2018-12-18 09:38:24.556864] iteration 3  
1706 [2018-12-18 09:38:26.551720] iteration 4  
1707 [2018-12-18 09:38:28.548554] training MLP [3, 4, 4] withn  
    n=0.01  
1708 [2018-12-18 09:38:28.548554] iteration 0  
1709 [2018-12-18 09:38:30.728298] iteration 1  
1710 [2018-12-18 09:38:33.127103] iteration 2  
1711 [2018-12-18 09:38:35.368557] iteration 3  
1712 [2018-12-18 09:38:37.676433] iteration 4  
1713 [2018-12-18 09:38:39.938274] training MLP [3, 4, 4] withn  
    n=0.003  
1714 [2018-12-18 09:38:39.938274] iteration 0  
1715 [2018-12-18 09:38:42.042442] iteration 1  
1716 [2018-12-18 09:38:44.128826] iteration 2  
1717 [2018-12-18 09:38:46.449490] iteration 3  
1718 [2018-12-18 09:38:48.762158] iteration 4  
1719 ##### Iris Experiment - Layers [3, 4, 4]  
1720  
1721 Weights:  
1722 [matrix([[ 0.08117661,  0.08591128,  0.01509026],  
1723           [ 0.14514096,  0.07456158,  0.14332019],  
1724           [ 0.04655111,  0.04889635,  0.00579645],  
1725           [ 0.19195828,  0.14164994,  0.13577527],  
1726           [ 0.13088786,  0.16268726,  0.20728191],
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1727      [ 0.09627539,  0.09718906,  0.10366331],
1728      [ 0.09571119,  0.11341163,  0.08724093],
1729      [-0.02054517, -0.01642898,  0.01299286],
1730      [ 0.01135649, -0.02861836, -0.0035719 ],
1731      [ 0.11685335,  0.17022819,  0.10074261],
1732      [ 0.1505526 ,  0.14458095,  0.0992831 ],
1733      [ 0.16164521,  0.09557625,  0.13711959],
1734      [ 0.17185934,  0.14304643,  0.1477997 ]]),
    matrix([[ 0.02747741,  0.00691345,  0.08651363,  0.
08404081],
1735      [-0.02847845,  0.00822742, -0.02802869, -0.
07730399],
1736      [-0.06573868, -0.03355363, -0.03889424,  0.
02464295],
1737      [-0.00491797, -0.02302341, -0.01736012,  0.
0174579 ]]), matrix([[ 0.09913137,  0.05049514,  0.
05911183,  0.04332489],
1738      [-0.40489775, -0.33677691, -0.38409061, -0.
41225317],
1739      [-0.37495207, -0.31838264, -0.37135571, -0.
32067772],
1740      [-0.40292095, -0.35884589, -0.36918294, -0.
34855571],
1741      [-0.37909884, -0.41272241, -0.33404449, -0.
35459103]]), array([[-0.190446 , -0.43986715, -0.
68595049],
1742      [-0.37669687, -0.19516452,  0.02276581],
1743      [-0.37066316, -0.19985358, -0.01787782],
1744      [-0.34340153, -0.16891019, -0.0069501 ],
1745      [-0.40028859, -0.18682795, -0.01723654]]])
1746
1747 Best n:
1748 0.3
1749 Confusion Matrix:
1750 [[10  0  0]
1751  [ 0  0 10]
1752  [ 0  0 10]]
1753 Precision:
1754 0.6666666666666666
1755 [2018-12-18 09:38:50.938902] training MLP [3, 4, 5] with
n=0.3
1756 [2018-12-18 09:38:50.938902] iteration 0
1757 [2018-12-18 09:38:52.994719] iteration 1
1758 [2018-12-18 09:38:55.263413] iteration 2
1759 [2018-12-18 09:38:57.926882] iteration 3

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1760 [2018-12-18 09:39:00.522385] iteration 4
1761 [2018-12-18 09:39:02.920005] training MLP [3, 4, 5] withn
  n=0.1
1762 [2018-12-18 09:39:02.920005] iteration 0
1763 [2018-12-18 09:39:05.289642] iteration 1
1764 [2018-12-18 09:39:07.474383] iteration 2
1765 [2018-12-18 09:39:09.597163] iteration 3
1766 [2018-12-18 09:39:11.671965] iteration 4
1767 [2018-12-18 09:39:13.825725] training MLP [3, 4, 5] withn
  n=0.03
1768 [2018-12-18 09:39:13.825725] iteration 0
1769 [2018-12-18 09:39:16.011974] iteration 1
1770 [2018-12-18 09:39:18.263676] iteration 2
1771 [2018-12-18 09:39:20.481399] iteration 3
1772 [2018-12-18 09:39:22.731105] iteration 4
1773 [2018-12-18 09:39:24.902855] training MLP [3, 4, 5] withn
  n=0.01
1774 [2018-12-18 09:39:24.902855] iteration 0
1775 [2018-12-18 09:39:27.114581] iteration 1
1776 [2018-12-18 09:39:29.302322] iteration 2
1777 [2018-12-18 09:39:31.328155] iteration 3
1778 [2018-12-18 09:39:33.331999] iteration 4
1779 [2018-12-18 09:39:35.452795] training MLP [3, 4, 5] withn
  n=0.003
1780 [2018-12-18 09:39:35.452795] iteration 0
1781 [2018-12-18 09:39:37.474614] iteration 1
1782 [2018-12-18 09:39:39.490453] iteration 2
1783 [2018-12-18 09:39:41.494299] iteration 3
1784 [2018-12-18 09:39:43.549129] iteration 4
1785 ##### Iris Experiment - Layers [3, 4, 5]
1786
1787 Weights:
1788 [matrix([[ 0.08714548,  0.09400859,  0.03445995],
1789           [ 0.12847911,  0.09018906,  0.13659138],
1790           [ 0.04139381,  0.02771106,  0.03422518],
1791           [ 0.10171372,  0.13487864,  0.12886959],
1792           [ 0.13009801,  0.13467119,  0.13698988],
1793           [ 0.07142483,  0.07660375,  0.13429799],
1794           [ 0.0527157 ,  0.07698238,  0.06324347],
1795           [ 0.04561466, -0.01849784,  0.02416398],
1796           [ 0.06880266,  0.0268903 , -0.01324651],
1797           [ 0.14222439,  0.13502316,  0.094299 ],
1798           [ 0.0576683 ,  0.09419023,  0.13139181],
1799           [ 0.13376948,  0.15644621,  0.16426209],
1800           [ 0.07703669,  0.12172046,  0.07656952]]),

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1800 matrix([[ 0.00260556,  0.05410983,  0.03293036,  0.
00161428],
1801      [-0.09512831, -0.11706654, -0.1327398 , -0.
11656057],
1802      [-0.09656509, -0.09522792, -0.04450689, -0.
12155926],
1803      [-0.12515977, -0.11664338, -0.09622167, -0.
08645038]]), matrix([[ 0.09693834,  0.07896064,  0.
09699231,  0.08290607,  0.07396313],
1804      [-0.50942554, -0.52393066, -0.4658509 , -0.
46025921, -0.47736092],
1805      [-0.47729348, -0.5113406 , -0.52766092, -0.
52162005, -0.50390888],
1806      [-0.48345388, -0.45035299, -0.52655729, -0.
4609784 , -0.44811726],
1807      [-0.52181925, -0.44723302, -0.45772217, -0.
4894572 , -0.49070169]]), array([[-0.23179961, -0.
45640664, -0.55422391],
1808      [-0.28366511, -0.16245487, -0.11408251],
1809      [-0.32189851, -0.2069174 , -0.12111154],
1810      [-0.28446879, -0.16896113, -0.08768746],
1811      [-0.30198824, -0.14313014, -0.07199166],
1812      [-0.3632102 , -0.15166018, -0.11298973]])]
1813
1814 Best n:
1815 0.3
1816 Confusion Matrix:
1817 [[10  0  0]
1818 [ 2  0  8]
1819 [ 0  0 10]]
1820 Precision:
1821 0.6666666666666666
1822 [2018-12-18 09:39:45.866783] training MLP [3, 4, 6] with
n=0.3
1823 [2018-12-18 09:39:45.866783] iteration 0
1824 [2018-12-18 09:39:48.508260] iteration 1
1825 [2018-12-18 09:39:51.087777] iteration 2
1826 [2018-12-18 09:39:53.766234] iteration 3
1827 [2018-12-18 09:39:55.998948] iteration 4
1828 [2018-12-18 09:39:58.237663] training MLP [3, 4, 6] with
n=0.1
1829 [2018-12-18 09:39:58.237663] iteration 0
1830 [2018-12-18 09:40:00.305475] iteration 1
1831 [2018-12-18 09:40:02.353293] iteration 2
1832 [2018-12-18 09:40:04.387123] iteration 3

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1833 [2018-12-18 09:40:06.418952] iteration 4
1834 [2018-12-18 09:40:08.508762] training MLP [3, 4, 6] withn
    n=0.03
1835 [2018-12-18 09:40:08.508762] iteration 0
1836 [2018-12-18 09:40:10.715478] iteration 1
1837 [2018-12-18 09:40:12.979175] iteration 2
1838 [2018-12-18 09:40:15.268858] iteration 3
1839 [2018-12-18 09:40:17.549543] iteration 4
1840 [2018-12-18 09:40:19.838229] training MLP [3, 4, 6] withn
    n=0.01
1841 [2018-12-18 09:40:19.838229] iteration 0
1842 [2018-12-18 09:40:22.129906] iteration 1
1843 [2018-12-18 09:40:24.393604] iteration 2
1844 [2018-12-18 09:40:26.691280] iteration 3
1845 [2018-12-18 09:40:28.990973] iteration 4
1846 [2018-12-18 09:40:31.016787] training MLP [3, 4, 6] withn
    n=0.003
1847 [2018-12-18 09:40:31.016787] iteration 0
1848 [2018-12-18 09:40:33.069619] iteration 1
1849 [2018-12-18 09:40:35.092441] iteration 2
1850 [2018-12-18 09:40:37.112278] iteration 3
1851 [2018-12-18 09:40:39.273034] iteration 4
1852 ##### Iris Experiment - Layers [3, 4, 6]
1853
1854 Weights:
1855 matrix([[ 0.07834035,  0.07589659,  0.02923459],
1856           [ 0.19039176,  0.17912744,  0.18335635],
1857           [ 0.00844032,  0.01295415, -0.02259851],
1858           [ 0.24059582,  0.19432516,  0.23180495],
1859           [ 0.21104398,  0.19563905,  0.23000865],
1860           [ 0.08133045,  0.12519646,  0.14356518],
1861           [ 0.054294 ,  0.1105067 ,  0.08869259],
1862           [-0.02384013, -0.02291725, -0.06727484],
1863           [-0.05469624, -0.04343325,  0.02761399],
1864           [ 0.14147028,  0.16207624,  0.17520739],
1865           [ 0.16885496,  0.17408396,  0.18134836],
1866           [ 0.21657085,  0.17343036,  0.2684907 ],
1867           [ 0.19889486,  0.15817391,  0.20672406]]),
1868           matrix([[ 0.0393423 ,  0.08743233,  0.04234784,  0.
1869             06329692],
1870             [-0.10139969, -0.08731744, -0.15090261, -0.
1871             09347653],
1872             [-0.07939987, -0.05642831, -0.06503852, -0.
1873             14453725],
1874             [-0.09366869, -0.09237163, -0.09005995, -0.
1875             09347653]])

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```
1870 09998659]]), matrix([[ 0.01907917,  0.09456194,  0.  
1871      05661335,  0.08041388,  0.04344985,  
1872      0.06043181],  
1873      [-0.57305955, -0.57354402, -0.52853395, -0.  
1874      55801766, -0.52090596,  
1875      -0.51730133],  
1876      [-0.56274227, -0.54662763, -0.56849723, -0.  
1877      49417722, -0.51805265,  
1878      -0.56671372],  
1879      [-0.47976895, -0.58211593, -0.59041956, -0.  
1880      57924168, -0.53809022,  
1881      -0.51479057],  
1882      [-0.55541803, -0.5454672 , -0.50504417, -0.  
1883      57614906, -0.58788684,  
1884      -0.56260011]]), array([-0.07792066, -0.  
1885      43187264, -0.73477855],  
1886      [-0.37977483, -0.15385302,  0.04678741],  
1887      [-0.3884042 , -0.15567724,  0.03013104],  
1888      [-0.37600667, -0.16558133,  0.03570944],  
1889      [-0.35275107, -0.13552514,  0.02678489],  
1890      [-0.40895642, -0.17662749,  0.01176285],  
1891      [-0.33512107, -0.16069 ,  0.01978967]])]  
1886  
1887 Best n:  
1888 0.3  
1889 Confusion Matrix:  
1890 [[10  0  0]  
1891 [ 0  0 10]  
1892 [ 0  0 10]]  
1893 Precision:  
1894 0.6666666666666666  
1895 [2018-12-18 09:40:41.402807] training MLP [3, 5, 3] with  
n=0.3  
1896 [2018-12-18 09:40:41.402807] iteration 0  
1897 [2018-12-18 09:40:43.447630] iteration 1  
1898 [2018-12-18 09:40:45.662357] iteration 2  
1899 [2018-12-18 09:40:47.911062] iteration 3  
1900 [2018-12-18 09:40:50.105796] iteration 4  
1901 [2018-12-18 09:40:52.362497] training MLP [3, 5, 3] with  
n=0.1  
1902 [2018-12-18 09:40:52.362497] iteration 0  
1903 [2018-12-18 09:40:54.645184] iteration 1  
1904 [2018-12-18 09:40:56.819930] iteration 2  
1905 [2018-12-18 09:40:58.968692] iteration 3  
1906 [2018-12-18 09:41:01.232391] iteration 4
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1907 [2018-12-18 09:41:03.498085] training MLP [3, 5, 3] withn
      n=0.03
1908 [2018-12-18 09:41:03.498085] iteration 0
1909 [2018-12-18 09:41:05.680829] iteration 1
1910 [2018-12-18 09:41:07.856582] iteration 2
1911 [2018-12-18 09:41:09.864424] iteration 3
1912 [2018-12-18 09:41:11.878278] iteration 4
1913 [2018-12-18 09:41:14.004040] training MLP [3, 5, 3] withn
      n=0.01
1914 [2018-12-18 09:41:14.004040] iteration 0
1915 [2018-12-18 09:41:16.025890] iteration 1
1916 [2018-12-18 09:41:18.037731] iteration 2
1917 [2018-12-18 09:41:20.240452] iteration 3
1918 [2018-12-18 09:41:22.435186] iteration 4
1919 [2018-12-18 09:41:24.621927] training MLP [3, 5, 3] withn
      n=0.003
1920 [2018-12-18 09:41:24.621927] iteration 0
1921 [2018-12-18 09:41:26.870634] iteration 1
1922 [2018-12-18 09:41:29.061370] iteration 2
1923 [2018-12-18 09:41:31.280095] iteration 3
1924 [2018-12-18 09:41:33.452841] iteration 4
1925 ##### Iris Experiment - Layers [3, 5, 3]
1926
1927 Weights:
1928 [matrix([[ 0.00971453,  0.00561917,  0.0106      ],
1929           [ 0.08726145,  0.09379449,  0.05552495],
1930           [ 0.08272034,  0.05008106,  0.03673366],
1931           [ 0.02823338,  0.09086083,  0.05233405],
1932           [ 0.08999975,  0.03430602,  0.02443635],
1933           [ 0.08353483,  0.07916157,  0.0221672 ],
1934           [ 0.04174973,  0.01989064,  0.06578013],
1935           [ 0.02409368,  0.05962102,  0.04995051],
1936           [-0.0016112 ,  0.00403872,  0.00073288],
1937           [ 0.0167219 ,  0.02346641,  0.10513696],
1938           [ 0.08220074,  0.01485183,  0.09585356],
1939           [ 0.10853233,  0.05542249,  0.01542426],
1940           [ 0.06351813,  0.08170002,  0.07001634]]),
1941     matrix([[0.04464647, 0.07176847, 0.06799029, 0.06821449
1942       , 0.0583928 ],
1943       [0.02357547, 0.10636261, 0.10199352, 0.09332608
1944       , 0.07491918],
1945       [0.04344911, 0.09288789, 0.10434052, 0.02475654
1946       , 0.10593505],
1947       [0.02251175, 0.01740674, 0.02326011, 0.08861989
1948       , 0.05406019]]), matrix([[ 0.04588995,  0.07052819,  0.

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1943 07637693],
1944 [-0.14235731, -0.17569848, -0.20643023],
1945 [-0.1736247 , -0.1958734 , -0.2317765 ],
1946 [-0.16419522, -0.23244625, -0.19339425],
1947 [-0.19461256, -0.15307603, -0.15688539],
1948 [-0.22953449, -0.22910463, -0.22293444]]), array
    ([[[-0.52327651, -0.46401158, -0.40231239],
1949 [-0.16384618, -0.21031815, -0.27038739],
1950 [-0.13343662, -0.21493365, -0.24773542],
1951 [-0.13691935, -0.16203854, -0.22879291]]]
1952
1953 Best n:
1954 0.3
1955 Confusion Matrix:
1956 [[10  0  0]
1957 [ 0 10  0]
1958 [ 0  2  8]]
1959 Precision:
1960 0.9333333333333333
1961 [2018-12-18 09:41:35.749521] training MLP [3, 5, 4] withn
    n=0.3
1962 [2018-12-18 09:41:35.749521] iteration 0
1963 [2018-12-18 09:41:38.148139] iteration 1
1964 [2018-12-18 09:41:40.254927] iteration 2
1965 [2018-12-18 09:41:42.349719] iteration 3
1966 [2018-12-18 09:41:44.583434] iteration 4
1967 [2018-12-18 09:41:46.930083] training MLP [3, 5, 4] withn
    n=0.1
1968 [2018-12-18 09:41:46.930083] iteration 0
1969 [2018-12-18 09:41:48.972918] iteration 1
1970 [2018-12-18 09:41:51.261589] iteration 2
1971 [2018-12-18 09:41:53.593246] iteration 3
1972 [2018-12-18 09:41:55.762997] iteration 4
1973 [2018-12-18 09:41:58.056676] training MLP [3, 5, 4] withn
    n=0.03
1974 [2018-12-18 09:41:58.056676] iteration 0
1975 [2018-12-18 09:42:00.293387] iteration 1
1976 [2018-12-18 09:42:02.482127] iteration 2
1977 [2018-12-18 09:42:04.628893] iteration 3
1978 [2018-12-18 09:42:06.680708] iteration 4
1979 [2018-12-18 09:42:08.695566] training MLP [3, 5, 4] withn
    n=0.01
1980 [2018-12-18 09:42:08.695566] iteration 0
1981 [2018-12-18 09:42:10.726377] iteration 1
1982 [2018-12-18 09:42:12.757210] iteration 2
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1983 [2018-12-18 09:42:14.782061] iteration 3
1984 [2018-12-18 09:42:16.797881] iteration 4
1985 [2018-12-18 09:42:18.851702] training MLP [3, 5, 4] with
    n=0.003
1986 [2018-12-18 09:42:18.851702] iteration 0
1987 [2018-12-18 09:42:21.111401] iteration 1
1988 [2018-12-18 09:42:23.459048] iteration 2
1989 [2018-12-18 09:42:25.737734] iteration 3
1990 [2018-12-18 09:42:27.990438] iteration 4
1991 ##### Iris Experiment - Layers [3, 5, 4]
1992
1993 Weights:
1994 [matrix([[0.03002151, 0.0948948 , 0.06972734],
1995 [0.07494491, 0.09901983, 0.02431661],
1996 [0.01573418, 0.03795496, 0.0405089 ],
1997 [0.07261311, 0.0720142 , 0.08636972],
1998 [0.08106744, 0.10579156, 0.05710367],
1999 [0.06105954, 0.05264141, 0.08033018],
2000 [0.02840781, 0.05166697, 0.10638639],
2001 [0.09591446, 0.05011656, 0.0680946 ],
2002 [0.03235347, 0.03139193, 0.08441573],
2003 [0.12003911, 0.05373879, 0.05349689],
2004 [0.08474226, 0.07190653, 0.04036174],
2005 [0.10695886, 0.05461578, 0.10621389],
2006 [0.0826697 , 0.04609063, 0.0936884 ]]), matrix
    ([[0.06315609, 0.0606483 , 0.06692261, 0.0201552 , 0.
    03097062],
2007 [0.04601894, 0.02628324, 0.08136886, 0.10049509
    , 0.08957694],
2008 [0.03185202, 0.02150358, 0.10095103, 0.05859564
    , 0.08769469],
2009 [0.09386394, 0.11764446, 0.1093848 , 0.04139345
    , 0.08741198]]), matrix([[ 0.04005062, 0.08106226, 0.
    06469054, 0.03964686],
2010 [-0.25894768, -0.2763034 , -0.23895787, -0.
    21678256],
2011 [-0.21675561, -0.30354053, -0.27021655, -0.
    22001663],
2012 [-0.29001413, -0.28714867, -0.22000348, -0.
    27830857],
2013 [-0.26636394, -0.24043012, -0.24233866, -0.
    29846709],
2014 [-0.24581274, -0.30256006, -0.30503972, -0.
    28479775]]), array([[-0.49251782, -0.44898785, -0.
    29267431],
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File - iris

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2015      [-0.16626231, -0.21137059, -0.2889958 ],
2016      [-0.14617014, -0.16816407, -0.26357165],
2017      [-0.14915995, -0.17171229, -0.30754901],
2018      [-0.13762792, -0.17819327, -0.32474473]]])
2019
2020 Best n:
2021 0.3
2022 Confusion Matrix:
2023 [[10  0  0]
2024 [ 2  0  8]
2025 [ 0  0 10]]
2026 Precision:
2027 0.6666666666666666
2028 [2018-12-18 09:42:30.143217] training MLP [3, 5, 5] with
n=0.3
2029 [2018-12-18 09:42:30.143217] iteration 0
2030 [2018-12-18 09:42:32.345929] iteration 1
2031 [2018-12-18 09:42:34.593637] iteration 2
2032 [2018-12-18 09:42:36.720410] iteration 3
2033 [2018-12-18 09:42:38.834193] iteration 4
2034 [2018-12-18 09:42:40.978958] training MLP [3, 5, 5] with
n=0.1
2035 [2018-12-18 09:42:40.978958] iteration 0
2036 [2018-12-18 09:42:43.218671] iteration 1
2037 [2018-12-18 09:42:45.890132] iteration 2
2038 [2018-12-18 09:42:48.228785] iteration 3
2039 [2018-12-18 09:42:50.440511] iteration 4
2040 [2018-12-18 09:42:52.726194] training MLP [3, 5, 5] with
n=0.03
2041 [2018-12-18 09:42:52.726194] iteration 0
2042 [2018-12-18 09:42:55.094832] iteration 1
2043 [2018-12-18 09:42:57.356529] iteration 2
2044 [2018-12-18 09:42:59.654206] iteration 3
2045 [2018-12-18 09:43:01.953881] iteration 4
2046 [2018-12-18 09:43:04.095646] training MLP [3, 5, 5] with
n=0.01
2047 [2018-12-18 09:43:04.096645] iteration 0
2048 [2018-12-18 09:43:06.143487] iteration 1
2049 [2018-12-18 09:43:08.280251] iteration 2
2050 [2018-12-18 09:43:10.308069] iteration 3
2051 [2018-12-18 09:43:12.343896] iteration 4
2052 [2018-12-18 09:43:14.421719] training MLP [3, 5, 5] with
n=0.003
2053 [2018-12-18 09:43:14.421719] iteration 0
2054 [2018-12-18 09:43:16.448551] iteration 1
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2055 [2018-12-18 09:43:18.575311] iteration 2
2056 [2018-12-18 09:43:20.804041] iteration 3
2057 [2018-12-18 09:43:23.048734] iteration 4
2058 ##### Iris Experiment - Layers [3, 5, 5]
2059
2060 Weights:
2061 [matrix([[ 0.04710284,  0.0726218 ,  0.07100675],
2062           [ 0.13527544,  0.05559722,  0.0768334 ],
2063           [-0.00361545,  0.05980208,  0.04897137],
2064           [ 0.11717054,  0.08361922,  0.09054923],
2065           [ 0.1014251 ,  0.13660739,  0.06844923],
2066           [ 0.06421606,  0.11143803,  0.0597874 ],
2067           [ 0.08316343,  0.10491638,  0.0330906 ],
2068           [ 0.03848696, -0.00490503,  0.01915222],
2069           [ 0.04765791,  0.06745856,  0.08299133],
2070           [ 0.08022501,  0.09756149,  0.1100432 ],
2071           [ 0.12883127,  0.0467977 ,  0.1128321 ],
2072           [ 0.0869146 ,  0.06117266,  0.11740428],
2073           [ 0.15826286,  0.04885696,  0.02513146]]),
2074         matrix([[ 0.07605189,  0.00276964,  0.0879014 ,  0.
2075           05089107,  0.04678288],
2076           [-0.1219586 , -0.08669886, -0.07379677, -0.
2077           11172041, -0.08473879],
2078           [-0.07495473, -0.07924239, -0.07719864, -0.
2079           04971022, -0.10923692],
2080           [-0.09176769, -0.12210406, -0.06916274, -0.
2081           07968583, -0.11930253]]), matrix([[ 0.03248848,  0.
2082           06604794,  0.02838676,  0.06037039,  0.05667676],
2083           [-0.39088948, -0.34640522, -0.37180495, -0.
2084           33456174, -0.37385895],
2085           [-0.39772469, -0.36505323, -0.40263871, -0.
2086           37255955, -0.33492136],
2087           [-0.39583013, -0.37224259, -0.37193592, -0.
2088           37608031, -0.35659391],
2089           [-0.34735968, -0.33294625, -0.34291449, -0.
2090           41561873, -0.39688146],
2091           [-0.30886847, -0.40343701, -0.32600575, -0.
2092           33523664, -0.35737388]]), array([[-0.26356998, -0.
2093           44314171, -0.49388827],
2094           [-0.26809343, -0.15217776, -0.13436626],
2095           [-0.28082054, -0.16700319, -0.13871902],
2096           [-0.22939301, -0.12739457, -0.12793387],
2097           [-0.30491029, -0.18362859, -0.07905062],
2098           [-0.28856431, -0.16263272, -0.14032137]]])
2099

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2088 Best n:  
2089 0.3  
2090 Confusion Matrix:  
2091 [[10  0  0]  
2092 [ 0  0 10]  
2093 [ 0  0 10]]  
2094 Precision:  
2095 0.6666666666666666  
2096 [2018-12-18 09:43:25.459346] training MLP [3, 5, 6] with  
      n=0.3  
2097 [2018-12-18 09:43:25.459346] iteration 0  
2098 [2018-12-18 09:43:27.856964] iteration 1  
2099 [2018-12-18 09:43:29.941766] iteration 2  
2100 [2018-12-18 09:43:31.994600] iteration 3  
2101 [2018-12-18 09:43:34.046402] iteration 4  
2102 [2018-12-18 09:43:36.276118] training MLP [3, 5, 6] with  
      n=0.1  
2103 [2018-12-18 09:43:36.276118] iteration 0  
2104 [2018-12-18 09:43:38.535815] iteration 1  
2105 [2018-12-18 09:43:40.575640] iteration 2  
2106 [2018-12-18 09:43:42.605485] iteration 3  
2107 [2018-12-18 09:43:44.866172] iteration 4  
2108 [2018-12-18 09:43:47.138861] training MLP [3, 5, 6] with  
      n=0.03  
2109 [2018-12-18 09:43:47.138861] iteration 0  
2110 [2018-12-18 09:43:49.429547] iteration 1  
2111 [2018-12-18 09:43:51.673254] iteration 2  
2112 [2018-12-18 09:43:53.919956] iteration 3  
2113 [2018-12-18 09:43:56.236623] iteration 4  
2114 [2018-12-18 09:43:58.499320] training MLP [3, 5, 6] with  
      n=0.01  
2115 [2018-12-18 09:43:58.499320] iteration 0  
2116 [2018-12-18 09:44:00.733035] iteration 1  
2117 [2018-12-18 09:44:02.961750] iteration 2  
2118 [2018-12-18 09:44:05.244435] iteration 3  
2119 [2018-12-18 09:44:07.518140] iteration 4  
2120 [2018-12-18 09:44:09.757836] training MLP [3, 5, 6] with  
      n=0.003  
2121 [2018-12-18 09:44:09.757836] iteration 0  
2122 [2018-12-18 09:44:12.045520] iteration 1  
2123 [2018-12-18 09:44:14.127320] iteration 2  
2124 [2018-12-18 09:44:16.171146] iteration 3  
2125 [2018-12-18 09:44:18.200976] iteration 4  
2126 ##### Iris Experiment - Layers [3, 5, 6]  
2127
```

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2128 Weights:
2129 [matrix([[ 0.07583178,  0.04386138,  0.05882672],
2130      [ 0.08646988,  0.163836 ,  0.16599753],
2131      [ 0.04869603,  0.01118864, -0.02244757],
2132      [ 0.21411931,  0.23458709,  0.18989784],
2133      [ 0.17940999,  0.1933612 ,  0.2031157 ],
2134      [ 0.12753535,  0.14331595,  0.06874432],
2135      [ 0.07927488,  0.14051211,  0.05456874],
2136      [ 0.05123292, -0.0490186 , -0.02500169],
2137      [-0.03059864, -0.03546619,  0.00426998],
2138      [ 0.12195006,  0.15084778,  0.1449524 ],
2139      [ 0.16917058,  0.15451659,  0.14279662],
2140      [ 0.19577272,  0.13490188,  0.11065996],
2141      [ 0.11650839,  0.10019839,  0.16524892]]),
2142      matrix([[ 0.04046221,  0.02256795,  0.01742367,  0.
2143      06836064,  0.04074445],
2144      [-0.13235777, -0.08096625, -0.0782727 , -0.
2145      0813605 , -0.07782699],
2146      [-0.05616822, -0.06330929, -0.097706 , -0.
2147      1324475 , -0.05335946],
2148      [-0.11006731, -0.11029804, -0.05461443, -0.
2149      03504909, -0.04874832]]), matrix([[ 0.03603705,  0.
2150      05547156,  0.00054273,  0.09158442,  0.02085528,
2151      0.05912696],
2152      [-0.42505155, -0.38818371, -0.40948689, -0.
2153      39635399, -0.43475982,
2154      -0.44435882],
2155      [-0.45994099, -0.43400325, -0.38882587, -0.
2156      45927054, -0.42268159,
2157      -0.432746 ],
2158      [-0.40711995, -0.40869631, -0.36858525, -0.
2159      47601619, -0.40995793,
2160      -0.39086081],
2161      [-0.38991104, -0.47034538, -0.45895108, -0.
2162      41603095, -0.43854763,
2163      -0.42844438],
2164      [-0.4115724 , -0.42022041, -0.44651617, -0.
2165      45204101, -0.44010505,
2166      -0.46066354]]), array([[-1.53320559e-01, -3.
2167      97362339e-01, -6.49442538e-01],
2168      [-3.22631724e-01, -2.00696505e-01, -1.52307150e-
2169      03],
2170      [-3.54140834e-01, -1.66471189e-01, -1.66134859e-
2171      02],
2172      [-2.98547967e-01, -1.76941254e-01, -3.59959457e-
2173      01]])

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2158 02],  
2159      [-3.17406667e-01, -1.49513455e-01, -5.31865630e-  
02],  
2160      [-3.22620616e-01, -1.50372811e-01, -4.35396313e-  
03],  
2161      [-2.94680667e-01, -1.77709205e-01,  8.30849593e-  
05]])]  
2162  
2163 Best n:  
2164 0.3  
2165 Confusion Matrix:  
2166 [[10  0  0]  
2167 [ 0  3  7]  
2168 [ 0  0 10]]  
2169 Precision:  
2170 0.7666666666666667  
2171 [2018-12-18 09:44:20.351736] training MLP [3, 6, 3] with  
n=0.3  
2172 [2018-12-18 09:44:20.351736] iteration 0  
2173 [2018-12-18 09:44:22.534498] iteration 1  
2174 [2018-12-18 09:44:24.616280] iteration 2  
2175 [2018-12-18 09:44:26.643114] iteration 3  
2176 [2018-12-18 09:44:28.799871] iteration 4  
2177 [2018-12-18 09:44:30.988612] training MLP [3, 6, 3] with  
n=0.1  
2178 [2018-12-18 09:44:30.988612] iteration 0  
2179 [2018-12-18 09:44:33.239315] iteration 1  
2180 [2018-12-18 09:44:35.446046] iteration 2  
2181 [2018-12-18 09:44:37.763711] iteration 3  
2182 [2018-12-18 09:44:40.382712] iteration 4  
2183 [2018-12-18 09:44:42.581446] training MLP [3, 6, 3] with  
n=0.03  
2184 [2018-12-18 09:44:42.582445] iteration 0  
2185 [2018-12-18 09:44:44.661260] iteration 1  
2186 [2018-12-18 09:44:46.754054] iteration 2  
2187 [2018-12-18 09:44:48.777891] iteration 3  
2188 [2018-12-18 09:44:50.807709] iteration 4  
2189 [2018-12-18 09:44:53.160354] training MLP [3, 6, 3] with  
n=0.01  
2190 [2018-12-18 09:44:53.160354] iteration 0  
2191 [2018-12-18 09:44:55.304118] iteration 1  
2192 [2018-12-18 09:44:57.309981] iteration 2  
2193 [2018-12-18 09:44:59.305815] iteration 3  
2194 [2018-12-18 09:45:01.305724] iteration 4  
2195 [2018-12-18 09:45:03.326543] training MLP [3, 6, 3] with
```

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2195 n=0.003
2196 [2018-12-18 09:45:03.326543] iteration 0
2197 [2018-12-18 09:45:05.431333] iteration 1
2198 [2018-12-18 09:45:07.491145] iteration 2
2199 [2018-12-18 09:45:09.564968] iteration 3
2200 [2018-12-18 09:45:11.613790] iteration 4
2201 ##### Iris Experiment - Layers [3, 6, 3]
2202
2203 Weights:
2204 [matrix([[0.0123967 , 0.02112322, 0.07759037],
2205 [0.17162435, 0.09563954, 0.08894635],
2206 [0.03969492, 0.07123246, 0.01859945],
2207 [0.15128793, 0.15788122, 0.07093649],
2208 [0.17592276, 0.09639616, 0.17047568],
2209 [0.13991683, 0.06268416, 0.11088125],
2210 [0.13355876, 0.02684385, 0.08276614],
2211 [0.05370911, 0.08191319, 0.01265054],
2212 [0.02508131, 0.06302838, 0.02340478],
2213 [0.16630098, 0.12502718, 0.08496516],
2214 [0.10527791, 0.1203491 , 0.10718772],
2215 [0.14139871, 0.14408322, 0.1591476 ],
2216 [0.1465181 , 0.09999015, 0.10604386]]), matrix
([[-0.02208526, 0.08661986, 0.08020693, 0.01766987,
0.03936499,
2217 0.06431465],
2218 [-0.00028779, -0.00816627, 0.02739472, -0.
02741646, 0.02854882,
2219 0.00855743],
2220 [-0.00953541, -0.00248532, -0.03330104, -0.
00096339, 0.01751814,
2221 0.00896588],
2222 [-0.03534134, 0.02026337, 0.01040691, 0.
03217397, -0.0535414 ,
2223 -0.01283372]]), matrix([[0.03954658, 0.
03892369, 0.01105553],
2224 [-0.12153421, -0.17305926, -0.16078284],
2225 [-0.11347845, -0.17882051, -0.19130357],
2226 [-0.1509471 , -0.1919614 , -0.19054592],
2227 [-0.15632262, -0.12765999, -0.10422032],
2228 [-0.16220901, -0.1712645 , -0.16182387],
2229 [-0.14372249, -0.15338 , -0.14163721]]), array
([[-0.24233305, -0.38939712, -0.68885529],
2230 [-0.38875297, -0.26727656, -0.04664578],
2231 [-0.37406949, -0.26677648, 0.04984472],
2232 [-0.39313314, -0.24448407, -0.01214071]]])

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2233
2234 Best n:
2235 0.3
2236 Confusion Matrix:
2237 [[10  0  0]
2238 [ 2  0  8]
2239 [ 0  0 10]]
2240 Precision:
2241 0.6666666666666666
2242 [2018-12-18 09:45:13.728588] training MLP [3, 6, 4] withn
    n=0.3
2243 [2018-12-18 09:45:13.728588] iteration 0
2244 [2018-12-18 09:45:15.814369] iteration 1
2245 [2018-12-18 09:45:17.841202] iteration 2
2246 [2018-12-18 09:45:19.863038] iteration 3
2247 [2018-12-18 09:45:21.889871] iteration 4
2248 [2018-12-18 09:45:23.914718] training MLP [3, 6, 4] withn
    n=0.1
2249 [2018-12-18 09:45:23.914718] iteration 0
2250 [2018-12-18 09:45:25.921564] iteration 1
2251 [2018-12-18 09:45:27.951382] iteration 2
2252 [2018-12-18 09:45:30.020191] iteration 3
2253 [2018-12-18 09:45:32.115984] iteration 4
2254 [2018-12-18 09:45:34.197784] training MLP [3, 6, 4] withn
    n=0.03
2255 [2018-12-18 09:45:34.197784] iteration 0
2256 [2018-12-18 09:45:36.337554] iteration 1
2257 [2018-12-18 09:45:38.438360] iteration 2
2258 [2018-12-18 09:45:40.516158] iteration 3
2259 [2018-12-18 09:45:42.656914] iteration 4
2260 [2018-12-18 09:45:44.695755] training MLP [3, 6, 4] withn
    n=0.01
2261 [2018-12-18 09:45:44.695755] iteration 0
2262 [2018-12-18 09:45:46.881492] iteration 1
2263 [2018-12-18 09:45:48.885339] iteration 2
2264 [2018-12-18 09:45:50.896186] iteration 3
2265 [2018-12-18 09:45:52.945990] iteration 4
2266 [2018-12-18 09:45:55.080793] training MLP [3, 6, 4] withn
    n=0.003
2267 [2018-12-18 09:45:55.080793] iteration 0
2268 [2018-12-18 09:45:57.151601] iteration 1
2269 [2018-12-18 09:45:59.207416] iteration 2
2270 [2018-12-18 09:46:01.300211] iteration 3
2271 [2018-12-18 09:46:03.431985] iteration 4
2272 ##### Iris Experiment - Layers [3, 6, 4]
```

```
2273
2274 Weights:
2275 [matrix([[0.0066781 , 0.02669437, 0.07250107],
2276           [0.07637478, 0.05356954, 0.09265985],
2277           [0.09349605, 0.01418566, 0.01660912],
2278           [0.10754844, 0.12488365, 0.05813021],
2279           [0.07697135, 0.09920338, 0.06058416],
2280           [0.07933245, 0.08400316, 0.02403872],
2281           [0.08878064, 0.0844516 , 0.02861265],
2282           [0.07642581, 0.00667499, 0.01758153],
2283           [0.06630639, 0.07287413, 0.07801955],
2284           [0.0249692 , 0.03413128, 0.1246979 ],
2285           [0.0272762 , 0.05718614, 0.10238427],
2286           [0.10482313, 0.03444409 , 0.08900578],
2287           [0.1003231 , 0.02468766, 0.0962348 ]]), matrix
2288   ([[0.00339712, 0.09478179, 0.02962151, 0.00322673, 0.
2289   09096551,
2290   0.00130249],
2291   [0.04021146, 0.0615127 , 0.10072667, 0.01958869
2292   , 0.09275046,
2293   0.03230467],
2294   [0.07198222, 0.078873 , 0.10409349, 0.03136047
2295   , 0.10466263,
2296   0.05998438],
2297   [0.03954168, 0.06958668, 0.11307441, 0.11195894
2298   , 0.11148174,
2299   0.04100636]], matrix([[ 0.05457236,  0.
2300   00262613,  0.02054854,  0.08234392],
2301   [-0.22325827, -0.18034157, -0.25514165, -0.
2302   20714831],
2303   [-0.20604614, -0.23003868, -0.25300803, -0.
2304   22495347],
2305   [-0.23314951, -0.20642346, -0.17995777, -0.
2306   24709264],
2307   [-0.25618957, -0.23338877, -0.20045159, -0.
2308   25743688],
2309   [-0.19804788, -0.24199048, -0.23890806, -0.
2310   22296238],
2311   [-0.18187924, -0.20929145, -0.17662132, -0.
2312   21166388]]), array([[-0.48500353, -0.40795851, -0.
2313   28916523],
2314   [-0.16695592, -0.16444206, -0.30850023],
2315   [-0.17241107, -0.20860792, -0.29131199],
2316   [-0.14835631, -0.22038708, -0.2653892 ],
2317   [-0.1191339 , -0.24140306, -0.31999898]]])]
```

```
2305
2306 Best n:
2307 0.3
2308 Confusion Matrix:
2309 [[10  0  0]
2310 [ 2  6  2]
2311 [ 0  0 10]]
2312 Precision:
2313 0.8666666666666667
2314 [2018-12-18 09:46:05.895565] training MLP [3, 6, 5] withn
    n=0.3
2315 [2018-12-18 09:46:05.895565] iteration 0
2316 [2018-12-18 09:46:07.953392] iteration 1
2317 [2018-12-18 09:46:09.997220] iteration 2
2318 [2018-12-18 09:46:12.020051] iteration 3
2319 [2018-12-18 09:46:14.100841] iteration 4
2320 [2018-12-18 09:46:16.465480] training MLP [3, 6, 5] withn
    n=0.1
2321 [2018-12-18 09:46:16.466480] iteration 0
2322 [2018-12-18 09:46:18.618240] iteration 1
2323 [2018-12-18 09:46:20.695043] iteration 2
2324 [2018-12-18 09:46:22.806834] iteration 3
2325 [2018-12-18 09:46:24.920618] iteration 4
2326 [2018-12-18 09:46:27.005430] training MLP [3, 6, 5] withn
    n=0.03
2327 [2018-12-18 09:46:27.005430] iteration 0
2328 [2018-12-18 09:46:29.033261] iteration 1
2329 [2018-12-18 09:46:31.042110] iteration 2
2330 [2018-12-18 09:46:33.152878] iteration 3
2331 [2018-12-18 09:46:35.178709] iteration 4
2332 [2018-12-18 09:46:37.195562] training MLP [3, 6, 5] withn
    n=0.01
2333 [2018-12-18 09:46:37.195562] iteration 0
2334 [2018-12-18 09:46:39.210388] iteration 1
2335 [2018-12-18 09:46:41.229226] iteration 2
2336 [2018-12-18 09:46:43.323020] iteration 3
2337 [2018-12-18 09:46:45.434804] iteration 4
2338 [2018-12-18 09:46:47.548589] training MLP [3, 6, 5] withn
    n=0.003
2339 [2018-12-18 09:46:47.548589] iteration 0
2340 [2018-12-18 09:46:49.610400] iteration 1
2341 [2018-12-18 09:46:51.841117] iteration 2
2342 [2018-12-18 09:46:54.016864] iteration 3
2343 [2018-12-18 09:46:56.382501] iteration 4
2344 ##### Iris Experiment - Layers [3, 6, 5]
```

```

2345
2346 Weights:
2347 [matrix([[ 0.03584752,  0.01742372,  0.00172494],
2348      [ 0.11461621,  0.1146749 ,  0.17593142],
2349      [ 0.01598003,  0.02081869, -0.00691197],
2350      [ 0.18240043,  0.18647039,  0.13677013],
2351      [ 0.16831166,  0.20668398,  0.18651368],
2352      [ 0.14088782,  0.09804038,  0.11428685],
2353      [ 0.03726959,  0.13090952,  0.13344683],
2354      [ 0.03185327, -0.02390851, -0.0119226 ],
2355      [-0.00449509,  0.04877196, -0.01359065],
2356      [ 0.13554464,  0.12630934,  0.18242266],
2357      [ 0.06924073,  0.17268867,  0.14901217],
2358      [ 0.18515649,  0.11816268,  0.19308327],
2359      [ 0.15226607,  0.12932886,  0.1567988 ]]),
2360      matrix([[ 0.09120029,  0.03978639,  0.09508149,  0.
2361      00590566,  0.04724514,
2362      0.08053871],
2363      [-0.07706347, -0.06463445,  0.00765862,  0.
2364      00231903, -0.03229616,
2365      -0.06452106],
2366      [-0.06634808, -0.06512914,  0.0156464 ,  0.
2367      02878785, -0.0409114 ,
2368      -0.03702998],
2369      [-0.06422219,  0.00968635, -0.02135076, -0.
2370      01725106, -0.07194806,
2371      -0.03234405]]), matrix([[ 0.08855392,  0.
2372      00788967,  0.02110319,  0.06340385,  0.08291144],
2373      [-0.2799311 , -0.29079313, -0.35699816, -0.
2374      3024012 , -0.35260582],
2375      [-0.3237327 , -0.29758751, -0.28937987, -0.
2376      31123843, -0.2918714 ],
2377      [-0.27394782, -0.32147312, -0.27761205, -0.
2378      30635436, -0.28971402],
2379      [-0.27882707, -0.33047276, -0.27752933, -0.
2380      32699544, -0.29939057],
2381      [-0.33834058, -0.30760682, -0.28320111, -0.
2382      27444549, -0.29709128],
2383      [-0.34422686, -0.25964866, -0.26739834, -0.
2384      33138031, -0.30658235]]), array([[ -0.14971032, -0.
2385      35352755, -0.67475038],
2386      [-0.37230847, -0.23937676,  0.01054513],
2387      [-0.33949751, -0.20663318, -0.05451336],
2388      [-0.37228793, -0.23274962, -0.02197378],
2389      [-0.33533904, -0.21663362, -0.03188902],
2390      [-0.37228793, -0.23274962, -0.02197378],
2391      [-0.33949751, -0.20663318, -0.05451336],
2392      [-0.14971032, -0.67475038], 0.]])

```

```
2377 [-0.40096047, -0.24101313,  0.03782534]]])  
2378  
2379 Best n:  
2380 0.3  
2381 Confusion Matrix:  
2382 [[10  0  0]  
2383 [ 0  0 10]  
2384 [ 0  0 10]]  
2385 Precision:  
2386 0.6666666666666666  
2387 [2018-12-18 09:46:58.560246] training MLP [3, 6, 6] with  
n=0.3  
2388 [2018-12-18 09:46:58.561245] iteration 0  
2389 [2018-12-18 09:47:00.614081] iteration 1  
2390 [2018-12-18 09:47:02.627917] iteration 2  
2391 [2018-12-18 09:47:04.636760] iteration 3  
2392 [2018-12-18 09:47:06.665597] iteration 4  
2393 [2018-12-18 09:47:08.748381] training MLP [3, 6, 6] with  
n=0.1  
2394 [2018-12-18 09:47:08.748381] iteration 0  
2395 [2018-12-18 09:47:10.831182] iteration 1  
2396 [2018-12-18 09:47:12.935968] iteration 2  
2397 [2018-12-18 09:47:15.044754] iteration 3  
2398 [2018-12-18 09:47:17.266491] iteration 4  
2399 [2018-12-18 09:47:19.285312] training MLP [3, 6, 6] with  
n=0.03  
2400 [2018-12-18 09:47:19.285312] iteration 0  
2401 [2018-12-18 09:47:21.332133] iteration 1  
2402 [2018-12-18 09:47:23.503885] iteration 2  
2403 [2018-12-18 09:47:25.523733] iteration 3  
2404 [2018-12-18 09:47:27.554567] iteration 4  
2405 [2018-12-18 09:47:29.597387] training MLP [3, 6, 6] with  
n=0.01  
2406 [2018-12-18 09:47:29.597387] iteration 0  
2407 [2018-12-18 09:47:31.617224] iteration 1  
2408 [2018-12-18 09:47:33.669030] iteration 2  
2409 [2018-12-18 09:47:35.816793] iteration 3  
2410 [2018-12-18 09:47:37.892599] iteration 4  
2411 [2018-12-18 09:47:39.981408] training MLP [3, 6, 6] with  
n=0.003  
2412 [2018-12-18 09:47:39.981408] iteration 0  
2413 [2018-12-18 09:47:42.016236] iteration 1  
2414 [2018-12-18 09:47:44.039071] iteration 2  
2415 [2018-12-18 09:47:46.372716] iteration 3  
2416 [2018-12-18 09:47:48.745350] iteration 4
```

```
2417 ##### Iris Experiment - Layers [3, 6, 6]
2418
2419 Weights:
2420 [matrix([[ 0.09440656,  0.10666551,  0.06959906],
2421           [ 0.07554119,  0.07516777,  0.09923856],
2422           [ 0.07440423, -0.00684116,  0.00585045],
2423           [ 0.10066304,  0.1274966 ,  0.17439362],
2424           [ 0.14653535,  0.10768766,  0.17317359],
2425           [ 0.08036293,  0.11673815,  0.09934986],
2426           [ 0.10298247,  0.09995852,  0.07074111],
2427           [ 0.00211889,  0.01456351,  0.06196563],
2428           [-0.01122538, -0.00033645,  0.04039127],
2429           [ 0.15626507,  0.119459 ,  0.10444034],
2430           [ 0.08518959,  0.07760412,  0.10311723],
2431           [ 0.15414271,  0.14164342,  0.18354579],
2432           [ 0.12945367,  0.17031132,  0.09108496]]),
2433         matrix([[0.09158277, 0.03334784, 0.0782713 , 0.04115946
2434           , 0.08718174,
2435           0.08646544],
2436           [0.04164017, 0.06450047, 0.06212735, 0.13127347
2437           , 0.09748229,
2438           0.04441292],
2439           [0.07863348, 0.13396295, 0.05139456, 0.06394528
2440           , 0.11500233,
2441           0.07440283],
2442           [0.09027525, 0.12589965, 0.03801449, 0.08481564
2443           , 0.03272604,
2444           0.11743927]]), matrix([[ 0.04387121,  0.063879
2445           , 0.06258735,  0.0579607 ,  0.00383286,
2446           0.05684757],
2447           [-0.31128814, -0.35179948, -0.29126677, -0.
2448           34275034, -0.25527119,
2449           -0.29865261],
2450           [-0.28554727, -0.30120307, -0.31832404, -0.
2451           28728521, -0.29352773,
2452           -0.33343641],
2453           [-0.30331134, -0.27723111, -0.32921742, -0.
2454           28022646, -0.33298755,
2455           -0.28047791],
2456           [-0.29224162, -0.28156703, -0.27517231, -0.
2457           34881612, -0.33226632,
2458           -0.31047112],
2459           [-0.27169019, -0.30759016, -0.28598018, -0.
2460           32027841, -0.2841921 ,
2461           -0.26937725],
```

```
2451 [-0.32916493, -0.30063946, -0.33691855, -0.
30189847, -0.26917525,
2452     -0.32780708]], array([-0.62168798, -0.
48172601, -0.18043655],
2453     [-0.08520381, -0.10507043, -0.3018199 ],
2454     [-0.02268704, -0.15028163, -0.30199338],
2455     [-0.02379758, -0.15101785, -0.31352692],
2456     [-0.06138404, -0.09887769, -0.31394074],
2457     [-0.03641092, -0.14972528, -0.27624389],
2458     [-0.01192191, -0.09493472, -0.32087264]]]
2459
2460 Best n:
2461 0.3
2462 Confusion Matrix:
2463 [[10  0  0]
2464 [ 0  0 10]
2465 [ 0  0 10]]
2466 Precision:
2467 0.6666666666666666
2468 [2018-12-18 09:47:51.183957] training MLP [4, 3, 3] with
n=0.3
2469 [2018-12-18 09:47:51.183957] iteration 0
2470 [2018-12-18 09:47:53.175810] iteration 1
2471 [2018-12-18 09:47:55.163670] iteration 2
2472 [2018-12-18 09:47:57.209473] iteration 3
2473 [2018-12-18 09:47:59.249301] iteration 4
2474 [2018-12-18 09:48:01.381072] training MLP [4, 3, 3] with
n=0.1
2475 [2018-12-18 09:48:01.382071] iteration 0
2476 [2018-12-18 09:48:03.392914] iteration 1
2477 [2018-12-18 09:48:05.412750] iteration 2
2478 [2018-12-18 09:48:07.404617] iteration 3
2479 [2018-12-18 09:48:09.373483] iteration 4
2480 [2018-12-18 09:48:11.348350] training MLP [4, 3, 3] with
n=0.03
2481 [2018-12-18 09:48:11.348350] iteration 0
2482 [2018-12-18 09:48:13.408160] iteration 1
2483 [2018-12-18 09:48:15.406009] iteration 2
2484 [2018-12-18 09:48:17.403846] iteration 3
2485 [2018-12-18 09:48:19.392700] iteration 4
2486 [2018-12-18 09:48:21.386554] training MLP [4, 3, 3] with
n=0.01
2487 [2018-12-18 09:48:21.386554] iteration 0
2488 [2018-12-18 09:48:23.476350] iteration 1
2489 [2018-12-18 09:48:25.538175] iteration 2
```

```
2490 [2018-12-18 09:48:27.596976] iteration 3
2491 [2018-12-18 09:48:29.609819] iteration 4
2492 [2018-12-18 09:48:31.653642] training MLP [4, 3, 3] with
    n=0.003
2493 [2018-12-18 09:48:31.653642] iteration 0
2494 [2018-12-18 09:48:33.674489] iteration 1
2495 [2018-12-18 09:48:35.713317] iteration 2
2496 [2018-12-18 09:48:37.781112] iteration 3
2497 [2018-12-18 09:48:39.838927] iteration 4
2498 ##### Iris Experiment - Layers [4, 3, 3]
2499
2500 Weights:
2501 [matrix([[0.04459976, 0.05712651, 0.07648217, 0.06979652
    ],
2502             [0.08102865, 0.07568335, 0.03264441, 0.04957598
    ],
2503             [0.03773098, 0.02768701, 0.02985574, 0.08232475
    ],
2504             [0.08514727, 0.0267282 , 0.09583934, 0.04314446
    ],
2505             [0.06919937, 0.06632798, 0.03447687, 0.05579759
    ],
2506             [0.08180427, 0.0683582 , 0.024419 , 0.07436382
    ],
2507             [0.07100521, 0.08231638, 0.04249575, 0.05181926
    ],
2508             [0.026885 , 0.07857477, 0.07717015, 0.06873486
    ],
2509             [0.09598427, 0.05126776, 0.00256257, 0.02480519
    ],
2510             [0.02855165, 0.08679797, 0.03756593, 0.05175616
    ],
2511             [0.06970362, 0.02137641, 0.03339441, 0.04727645
    ],
2512             [0.09672763, 0.0949544 , 0.06796469, 0.01222331
    ],
2513             [0.00020842, 0.02997684, 0.05665685, 0.05749627
    ]]), matrix([[0.04729275, 0.08983664, 0.0804442 ],
2514             [0.08851032, 0.04018157, 0.02803032],
2515             [0.05779302, 0.09189461, 0.02989359],
2516             [0.00764083, 0.04911161, 0.03919546],
2517             [0.00732899, 0.00871914, 0.06570742]]), matrix
    ([[0.0612237 , 0.00651009, 0.03222805],
2518             [0.0569118 , 0.03294742, 0.0580873 ],
2519             [0.0390691 , 0.01863077, 0.00750792],
```

```
2520 [0.0845464 , 0.06202046, 0.09688067]]), array
      ([[[-0.38323325, -0.40596645, -0.42400407],
2521 [-0.20803758, -0.14568299, -0.16295026],
2522 [-0.14789041, -0.23357931, -0.17419331],
2523 [-0.22676952, -0.16377569, -0.17009089]]])
2524
2525 Best n:
2526 0.003
2527 Confusion Matrix:
2528 [[10  0  0]
2529 [ 2  8  0]
2530 [ 0  1  9]]
2531 Precision:
2532 0.9
2533 [2018-12-18 09:48:41.955708] training MLP [4, 3, 4] with
      n=0.3
2534 [2018-12-18 09:48:41.955708] iteration 0
2535 [2018-12-18 09:48:44.077487] iteration 1
2536 [2018-12-18 09:48:46.130304] iteration 2
2537 [2018-12-18 09:48:48.168130] iteration 3
2538 [2018-12-18 09:48:50.295905] iteration 4
2539 [2018-12-18 09:48:52.293755] training MLP [4, 3, 4] with
      n=0.1
2540 [2018-12-18 09:48:52.293755] iteration 0
2541 [2018-12-18 09:48:54.567447] iteration 1
2542 [2018-12-18 09:48:56.596291] iteration 2
2543 [2018-12-18 09:48:58.580135] iteration 3
2544 [2018-12-18 09:49:00.563993] iteration 4
2545 [2018-12-18 09:49:02.557858] training MLP [4, 3, 4] with
      n=0.03
2546 [2018-12-18 09:49:02.557858] iteration 0
2547 [2018-12-18 09:49:04.553708] iteration 1
2548 [2018-12-18 09:49:06.560542] iteration 2
2549 [2018-12-18 09:49:08.629350] iteration 3
2550 [2018-12-18 09:49:10.669187] iteration 4
2551 [2018-12-18 09:49:12.803945] training MLP [4, 3, 4] with
      n=0.01
2552 [2018-12-18 09:49:12.803945] iteration 0
2553 [2018-12-18 09:49:14.903737] iteration 1
2554 [2018-12-18 09:49:16.909598] iteration 2
2555 [2018-12-18 09:49:18.895454] iteration 3
2556 [2018-12-18 09:49:20.891301] iteration 4
2557 [2018-12-18 09:49:22.861166] training MLP [4, 3, 4] with
      n=0.003
2558 [2018-12-18 09:49:22.861166] iteration 0
```

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2559 [2018-12-18 09:49:25.099868] iteration 1
2560 [2018-12-18 09:49:27.294601] iteration 2
2561 [2018-12-18 09:49:29.477343] iteration 3
2562 [2018-12-18 09:49:31.610115] iteration 4
2563 ##### Iris Experiment - Layers [4, 3, 4]
2564
2565 Weights:
2566 [matrix([[ 0.01423572,  0.02723007,  0.01804204,  0.
2567   05348053],
2568   [ 0.10905107,  0.08012981,  0.06634691,  0.
2569   05322004],
2570   [ 0.0122298 ,  0.02093303,  0.0207028 ,  0.
2571   04294404],
2572   [ 0.11741298,  0.17872262,  0.09637506,  0.
2573   11191668],
2574   [ 0.19594156,  0.16268195,  0.18078679,  0.
2575   16251429],
2576   [ 0.05375847,  0.09569066,  0.10658018,  0.
2577   12384779],
2578   [ 0.13173979,  0.11580314,  0.06546302,  0.
2579   12212142],
2580   [-0.00480362,  0.02245347, -0.00931384,  0.
2581   06158099],
2582   [ 0.04547093,  0.02493191,  0.00359379, -0.
2583   02155721],
2584   [ 0.10064555,  0.07250557,  0.12406604,  0.
2585   11793081],
2586   [ 0.15931384,  0.05735029,  0.12773119,  0.
2587   07350107],
2588   [ 0.10127    ,  0.125003    ,  0.16000165,  0.
2589   09278441],
2590   [ 0.08813847,  0.10598056,  0.1073071 ,  0.
2591   13300105]]), matrix([[ 0.06207338,  0.07981373,  0.
2592   00231432],
2593   [ 0.00227624, -0.05853805, -0.06410645],
2594   [-0.01849315, -0.0949581 , -0.1017797 ],
2595   [-0.0858643 , -0.06737718, -0.07850386],
2596   [-0.05316458, -0.06893682, -0.07561271]]),
2597   matrix([[ 0.09407589,  0.00622678,  0.08087045,  0.
2598   04711411],
2599   [-0.50599434, -0.48611225, -0.49393089, -0.
2600   51402088],
2601   [-0.49236094, -0.51212012, -0.48368995, -0.
2602   50446731],
2603   [-0.50891316, -0.47360104, -0.51624401, -0.
```

```
2585 50357854]]), array([[-0.21915189, -0.41203346, -0.
   65969101],
2586      [-0.33747822, -0.195429 , -0.00755573],
2587      [-0.29456662, -0.17410217, -0.03100652],
2588      [-0.39310465, -0.22937054, -0.00121997],
2589      [-0.34081131, -0.20245782, -0.04098031]]])
2590
2591 Best n:
2592 0.3
2593 Confusion Matrix:
2594 [[10  0  0]
2595 [ 0  8  2]
2596 [ 0  0 10]]
2597 Precision:
2598 0.9333333333333333
2599 [2018-12-18 09:49:33.903794] training MLP [4, 3, 5] withn
   n=0.3
2600 [2018-12-18 09:49:33.903794] iteration 0
2601 [2018-12-18 09:49:36.152501] iteration 1
2602 [2018-12-18 09:49:38.356231] iteration 2
2603 [2018-12-18 09:49:40.644915] iteration 3
2604 [2018-12-18 09:49:42.871631] iteration 4
2605 [2018-12-18 09:49:45.149321] training MLP [4, 3, 5] withn
   n=0.1
2606 [2018-12-18 09:49:45.149321] iteration 0
2607 [2018-12-18 09:49:47.381034] iteration 1
2608 [2018-12-18 09:49:49.569776] iteration 2
2609 [2018-12-18 09:49:51.840467] iteration 3
2610 [2018-12-18 09:49:54.089171] iteration 4
2611 [2018-12-18 09:49:56.398844] training MLP [4, 3, 5] withn
   n=0.03
2612 [2018-12-18 09:49:56.398844] iteration 0
2613 [2018-12-18 09:49:58.625563] iteration 1
2614 [2018-12-18 09:50:00.845283] iteration 2
2615 [2018-12-18 09:50:03.109977] iteration 3
2616 [2018-12-18 09:50:05.369678] iteration 4
2617 [2018-12-18 09:50:07.587400] training MLP [4, 3, 5] withn
   n=0.01
2618 [2018-12-18 09:50:07.587400] iteration 0
2619 [2018-12-18 09:50:09.804124] iteration 1
2620 [2018-12-18 09:50:12.000859] iteration 2
2621 [2018-12-18 09:50:14.513412] iteration 3
2622 [2018-12-18 09:50:16.770112] iteration 4
2623 [2018-12-18 09:50:19.016818] training MLP [4, 3, 5] withn
   n=0.003
```

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2624 [2018-12-18 09:50:19.016818] iteration 0
2625 [2018-12-18 09:50:21.236538] iteration 1
2626 [2018-12-18 09:50:23.553205] iteration 2
2627 [2018-12-18 09:50:25.858877] iteration 3
2628 [2018-12-18 09:50:28.079600] iteration 4
2629 ##### Iris Experiment - Layers [4, 3, 5]
2630
2631 Weights:
2632 matrix([[ 0.06595792,  0.02525912,  0.06217993,  0.
2633           0337906 ],
2634           [ 0.11216648,  0.18396333,  0.08070477,  0.
2635           12535027],
2636           [ 0.04474066, -0.03772645, -0.04594788, -0.
2637           00344865],
2638           [ 0.19374078,  0.21458662,  0.22224254,  0.
2639           20711745],
2640           [ 0.14437651,  0.18886464,  0.16373109,  0.
2641           2098178 ],
2642           [ 0.06066577,  0.13818738,  0.10226599,  0.
2643           1450413 ],
2644           [ 0.1281937 ,  0.13844191,  0.12322139,  0.
2645           14465903],
2646           [-0.04142256,  0.02862236,  0.02701121, -0.
2647           00791307],
2648           [ 0.03939963,  0.01688283,  0.04242215, -0.
2649           01334225],
2650           [ 0.19928988,  0.20719561,  0.16455246,  0.
2651           16012632],
2652           [ 0.0789113 ,  0.11954441,  0.11834216,  0.
2653           16036973],
2654           [ 0.18648776,  0.17151787,  0.19951317,  0.
2655           22030153],
2656           [ 0.15208933,  0.14971657,  0.18279243,  0.
2657           19632121]], matrix([[ 0.09158483,  0.09995727,  0.
2658           06664368],
2659           [-0.06827614, -0.05829997, -0.01886537],
2660           [-0.02150659, -0.08975925, -0.03657805],
2661           [-0.04804296, -0.12050551, -0.0314193 ],
2662           [-0.03602301, -0.0700826 , -0.07585028]]),
2663           matrix([[ 0.09928873,  0.04994794,  0.06074376,  0.
2664           06608201,  0.08447319],
2665           [-0.66830136, -0.59077012, -0.59873573, -0.
2666           65068541, -0.66104022],
2667           [-0.66679966, -0.65252405, -0.67768864, -0.
2668           64176493, -0.60383472],
```

```
2651      [-0.62391468, -0.63257484, -0.62619539, -0.
       60824171, -0.64601263]]), array([[[-0.07648616, -0.
       44261358, -0.70749732],
2652      [-0.42505483, -0.13239914,  0.04551686],
2653      [-0.41418843, -0.19264768,  0.02821183],
2654      [-0.42285169, -0.19185238,  0.01445675],
2655      [-0.42262218, -0.18937588,  0.00348942],
2656      [-0.38701283, -0.13424102, -0.03277648]])]
2657
2658 Best n:
2659 0.3
2660 Confusion Matrix:
2661 [[10  0  0]
2662 [ 0  0 10]
2663 [ 0  0 10]]
2664 Precision:
2665 0.6666666666666666
2666 [2018-12-18 09:50:30.435244] training MLP [4, 3, 6] with
     n=0.3
2667 [2018-12-18 09:50:30.435244] iteration 0
2668 [2018-12-18 09:50:32.715929] iteration 1
2669 [2018-12-18 09:50:35.057582] iteration 2
2670 [2018-12-18 09:50:37.232330] iteration 3
2671 [2018-12-18 09:50:39.713901] iteration 4
2672 [2018-12-18 09:50:42.118515] training MLP [4, 3, 6] with
     n=0.1
2673 [2018-12-18 09:50:42.118515] iteration 0
2674 [2018-12-18 09:50:44.828955] iteration 1
2675 [2018-12-18 09:50:47.643333] iteration 2
2676 [2018-12-18 09:50:50.499689] iteration 3
2677 [2018-12-18 09:50:53.302077] iteration 4
2678 [2018-12-18 09:50:55.964542] training MLP [4, 3, 6] with
     n=0.03
2679 [2018-12-18 09:50:55.964542] iteration 0
2680 [2018-12-18 09:50:58.548056] iteration 1
2681 [2018-12-18 09:51:01.144559] iteration 2
2682 [2018-12-18 09:51:03.674104] iteration 3
2683 [2018-12-18 09:51:06.258615] iteration 4
2684 [2018-12-18 09:51:08.497328] training MLP [4, 3, 6] with
     n=0.01
2685 [2018-12-18 09:51:08.497328] iteration 0
2686 [2018-12-18 09:51:10.756028] iteration 1
2687 [2018-12-18 09:51:13.024718] iteration 2
2688 [2018-12-18 09:51:15.241442] iteration 3
2689 [2018-12-18 09:51:17.443176] iteration 4
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2690 [2018-12-18 09:51:19.754845] training MLP [4, 3, 6] with
    n=0.003
2691 [2018-12-18 09:51:19.754845] iteration 0
2692 [2018-12-18 09:51:22.016541] iteration 1
2693 [2018-12-18 09:51:24.238261] iteration 2
2694 [2018-12-18 09:51:26.524945] iteration 3
2695 [2018-12-18 09:51:28.812627] iteration 4
2696 ##### Iris Experiment - Layers [4, 3, 6]
2697
2698 Weights:
2699 [matrix([[ 8.09382072,  5.85177658,  1.20506206,  1.
    10654961],
2700      [ 2.64781433,  2.02884732, -1.10339363, -1.
    05722415],
2701      [ 3.34418227,  2.16425803,  3.71144416,  3.
    40528145],
2702      [ 0.4222478 , -0.80329322, -4.68158502, -4.
    7807821 ],
2703      [-0.12620285, -0.99208658, -5.52124854, -5.
    70192702],
2704      [ 0.59454526, -0.02318545, -0.40893021, -0.
    46759857],
2705      [-0.33201876, -1.03934121, -0.16338658, -0.
    40683211],
2706      [ 1.9121619 ,  2.42844867,  2.82347012,  2.
    69732867],
2707      [ 1.1139449 ,  2.00148163,  1.89258248,  1.
    73423268],
2708      [-2.66715337, -4.05981487, -2.94821908, -3.
    21379172],
2709      [-4.07408851, -6.19451446, -2.14122916, -2.
    56350484],
2710      [-2.6384827 , -3.43353019, -3.67583835, -4.
    06553138],
2711      [-3.3204983 , -4.94835508, -2.72050635, -3.
    14988511]]), matrix([[ 3.32053032e-03,  8.85103652e-02
    ,  7.05884435e-03],
2712      [ 1.21756067e+00, -3.72860005e-02,  5.75083482e+
    00],
2713      [-5.22585466e+00,  2.65464934e+00,  1.08637773e+
    00],
2714      [-2.72817761e+00, -1.79222640e+00, -1.22005046e+
    00],
2715      [-3.10555766e+00, -1.62854462e+00, -1.57377367e+
    00]]), matrix([[ 0.07166505,  0.04970011,  0.05562499
    ]])

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2715 , 0.04060412,
2716 0.01399458, 0.08957154],
2717 [-6.73139241, -5.56018664, -12.13747318, -13.
97317753,
2718 -6.87086579, -6.18203056],
2719 [-1.66008074, -2.13410533, -1.79491467, -0.
59252177,
2720 0.2885928 , -2.00580478],
2721 [-5.09069768, -3.97219003, -0.4030353 , -0.
2537402 ,
2722 -4.70087478, -4.60499449]], array([[[-14.
91260772, -0.67307298, 3.07439847],
2723 [ 6.63019261, -7.1144031 , -6.41841133],
2724 [ 6.45731126, -2.58863282, -7.63754914],
2725 [ 23.26868836, -0.59848037, -24.04922002],
2726 [ 34.15729208, 0.63116066, -28.89596432],
2727 [ 10.06649389, -3.90823577, -15.02482959],
2728 [ 6.52499662, -5.31413277, -6.86189201]]])
2729
2730 Best n:
2731 0.3
2732 Confusion Matrix:
2733 [[10 0 0]
2734 [ 0 10 0]
2735 [ 0 0 10]]
2736 Precision:
2737 1.0
2738 [2018-12-18 09:51:31.141287] training MLP [4, 4, 3] with
n=0.3
2739 [2018-12-18 09:51:31.141287] iteration 0
2740 [2018-12-18 09:51:33.459950] iteration 1
2741 [2018-12-18 09:51:35.983497] iteration 2
2742 [2018-12-18 09:51:38.817866] iteration 3
2743 [2018-12-18 09:51:41.523307] iteration 4
2744 [2018-12-18 09:51:44.149796] training MLP [4, 4, 3] with
n=0.1
2745 [2018-12-18 09:51:44.149796] iteration 0
2746 [2018-12-18 09:51:46.736307] iteration 1
2747 [2018-12-18 09:51:49.060967] iteration 2
2748 [2018-12-18 09:51:51.330661] iteration 3
2749 [2018-12-18 09:51:53.523398] iteration 4
2750 [2018-12-18 09:51:55.942006] training MLP [4, 4, 3] with
n=0.03
2751 [2018-12-18 09:51:55.942006] iteration 0
2752 [2018-12-18 09:51:58.192722] iteration 1

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2753 [2018-12-18 09:52:00.467401] iteration 2
2754 [2018-12-18 09:52:02.743102] iteration 3
2755 [2018-12-18 09:52:05.035768] iteration 4
2756 [2018-12-18 09:52:07.286473] training MLP [4, 4, 3] withn
    n=0.01
2757 [2018-12-18 09:52:07.286473] iteration 0
2758 [2018-12-18 09:52:09.461220] iteration 1
2759 [2018-12-18 09:52:11.718921] iteration 2
2760 [2018-12-18 09:52:13.959630] iteration 3
2761 [2018-12-18 09:52:16.087407] iteration 4
2762 [2018-12-18 09:52:18.288151] training MLP [4, 4, 3] withn
    n=0.003
2763 [2018-12-18 09:52:18.288151] iteration 0
2764 [2018-12-18 09:52:20.479877] iteration 1
2765 [2018-12-18 09:52:22.767560] iteration 2
2766 [2018-12-18 09:52:25.050244] iteration 3
2767 [2018-12-18 09:52:27.292952] iteration 4
2768 ##### Iris Experiment - Layers [4, 4, 3]
2769
2770 Weights:
2771 [matrix([[0.09912431, 0.08976677, 0.08849746, 0.08705055
    ],
2772             [0.10248542, 0.07226192, 0.02491609, 0.09640675
    ],
2773             [0.01553002, 0.05961155, 0.04391679, 0.01168748
    ],
2774             [0.05330251, 0.06783131, 0.06837122, 0.09772946
    ],
2775             [0.04433679, 0.06721699, 0.0617632 , 0.0607066
    ],
2776             [0.04907728, 0.0689826 , 0.08639028, 0.00862819
    ],
2777             [0.08426262, 0.05087283, 0.05829163, 0.07679286
    ],
2778             [0.06806509, 0.0700908 , 0.09227328, 0.09341467
    ],
2779             [0.02921314, 0.02912259, 0.00400866, 0.07232466
    ],
2780             [0.08949512, 0.07359458, 0.04911979, 0.07039316
    ],
2781             [0.02108942, 0.02739632, 0.09679858, 0.0224628
    ],
2782             [0.10565456, 0.09205804, 0.09708434, 0.03963839
    ],
2783             [0.06027997, 0.08411177, 0.05226986, 0.07957862
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2783 ]]), matrix([[0.07697132, 0.06783729, 0.06571586, 0.
   06773821],
2784      [0.0907921 , 0.03766821, 0.09016404, 0.10204706
   ],
2785      [0.05678996, 0.08700687, 0.01761705, 0.05591689
   ],
2786      [0.02187914, 0.08911909, 0.09055145, 0.0983106
   ],
2787      [0.09600353, 0.06744652, 0.02871752, 0.08878716
   ]]), matrix([[ 0.05859582, 0.01548192, 0.01739653],
2788      [-0.23795434, -0.17510848, -0.21262824],
2789      [-0.24225416, -0.19977428, -0.19176756],
2790      [-0.19626118, -0.2340983 , -0.24484422],
2791      [-0.18915375, -0.17261194, -0.24607138]]), array
   ([[[-0.54493406, -0.47364456, -0.40547582],
2792      [-0.11807189, -0.19924019, -0.22192417],
2793      [-0.11874274, -0.2220908 , -0.26906745],
2794      [-0.13646897, -0.13158869, -0.23816954]]])
2795
2796 Best n:
2797 0.3
2798 Confusion Matrix:
2799 [[ 9  1  0]
2800 [ 0 10  0]
2801 [ 0  7  3]]
2802 Precision:
2803 0.7333333333333333
2804 [2018-12-18 09:52:29.633606] training MLP [4, 4, 4] with
   n=0.3
2805 [2018-12-18 09:52:29.633606] iteration 0
2806 [2018-12-18 09:52:31.919288] iteration 1
2807 [2018-12-18 09:52:34.189982] iteration 2
2808 [2018-12-18 09:52:36.739513] iteration 3
2809 [2018-12-18 09:52:39.569882] iteration 4
2810 [2018-12-18 09:52:42.219357] training MLP [4, 4, 4] with
   n=0.1
2811 [2018-12-18 09:52:42.219357] iteration 0
2812 [2018-12-18 09:52:44.811865] iteration 1
2813 [2018-12-18 09:52:47.389380] iteration 2
2814 [2018-12-18 09:52:49.625095] iteration 3
2815 [2018-12-18 09:52:51.864804] iteration 4
2816 [2018-12-18 09:52:54.174474] training MLP [4, 4, 4] with
   n=0.03
2817 [2018-12-18 09:52:54.174474] iteration 0
2818 [2018-12-18 09:52:56.395195] iteration 1
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2819 [2018-12-18 09:52:58.592929] iteration 2
2820 [2018-12-18 09:53:00.838638] iteration 3
2821 [2018-12-18 09:53:03.069351] iteration 4
2822 [2018-12-18 09:53:05.257093] training MLP [4, 4, 4] withn
    n=0.01
2823 [2018-12-18 09:53:05.257093] iteration 0
2824 [2018-12-18 09:53:07.485810] iteration 1
2825 [2018-12-18 09:53:09.733515] iteration 2
2826 [2018-12-18 09:53:11.999211] iteration 3
2827 [2018-12-18 09:53:14.189949] iteration 4
2828 [2018-12-18 09:53:16.453644] training MLP [4, 4, 4] withn
    n=0.003
2829 [2018-12-18 09:53:16.453644] iteration 0
2830 [2018-12-18 09:53:18.572424] iteration 1
2831 [2018-12-18 09:53:20.810136] iteration 2
2832 [2018-12-18 09:53:23.030871] iteration 3
2833 [2018-12-18 09:53:25.332532] iteration 4
2834 ##### Iris Experiment - Layers [4, 4, 4]
2835
2836 Weights:
2837 [matrix([[ 0.08579407,  0.0620362 ,  0.05215949,  0.
    07266365],
2838      [ 0.12734074,  0.11626174,  0.12193273,  0.
    10387145],
2839      [ 0.03228788,  0.02172267,  0.01371955,  0.
    05369103],
2840      [ 0.13995163,  0.09321801,  0.14548015,  0.
    08780447],
2841      [ 0.12326637,  0.14933663,  0.14432227,  0.
    14172685],
2842      [ 0.09111963,  0.07545048,  0.06685905,  0.
    0805392 ],
2843      [ 0.10994796,  0.07570612,  0.09027175,  0.
    03554303],
2844      [ 0.04489199,  0.04030045, -0.01138307,  0.
    03317788],
2845      [ 0.05390224,  0.04809571,  0.06588319, -0.
    00114693],
2846      [ 0.10948048,  0.09471682,  0.13232503,  0.
    10618827],
2847      [ 0.15583627,  0.15479719,  0.14306493,  0.
    06812492],
2848      [ 0.16080769,  0.15168538,  0.18932875,  0.
    12992178],
2849      [ 0.14602633,  0.17763471,  0.102077 ,  0.]])

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File - iris

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2849 08749199]]), matrix([[0.02222381, 0.0870665 , 0.0207653
   , 0.07838907],
2850      [0.02460135, 0.07475643, 0.06412493, 0.01598218
   ],
2851      [0.08331261, 0.04452935, 0.04386143, 0.01764097
   ],
2852      [0.03371918, 0.03173074, 0.07005867, 0.0948021
   ],
2853      [0.05100212, 0.03040989, 0.06885252, 0.03629434
   ]]), matrix([[ 0.09740517, 0.03699555, 0.00895557, 0.
00512742],
2854      [-0.29967038, -0.32361317, -0.32399744, -0.
25757389],
2855      [-0.28652525, -0.26544271, -0.25525428, -0.
34015897],
2856      [-0.32277908, -0.26526477, -0.27368132, -0.
30275262],
2857      [-0.31096646, -0.33266549, -0.34564439, -0.
3173724 ]]), array([[-0.64645478, -0.44904695, -0.
11266932],
2858      [-0.03769315, -0.20285733, -0.42841864],
2859      [-0.00876765, -0.19211931, -0.44365967],
2860      [-0.0397768 , -0.15285874, -0.38718343],
2861      [-0.03679527, -0.13464846, -0.38438674]])]
2862
2863 Best n:
2864 0.3
2865 Confusion Matrix:
2866 [[ 9  1  0]
2867 [ 0  8  2]
2868 [ 0  0 10]]
2869 Precision:
2870 0.9
2871 [2018-12-18 09:53:27.716161] training MLP [4, 4, 5] with
n=0.3
2872 [2018-12-18 09:53:27.716161] iteration 0
2873 [2018-12-18 09:53:30.034824] iteration 1
2874 [2018-12-18 09:53:32.300519] iteration 2
2875 [2018-12-18 09:53:34.587202] iteration 3
2876 [2018-12-18 09:53:36.823916] iteration 4
2877 [2018-12-18 09:53:39.211540] training MLP [4, 4, 5] with
n=0.1
2878 [2018-12-18 09:53:39.211540] iteration 0
2879 [2018-12-18 09:53:41.523210] iteration 1
2880 [2018-12-18 09:53:43.772913] iteration 2
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2881 [2018-12-18 09:53:46.052601] iteration 3
2882 [2018-12-18 09:53:48.266327] iteration 4
2883 [2018-12-18 09:53:50.574997] training MLP [4, 4, 5] withn
    n=0.03
2884 [2018-12-18 09:53:50.574997] iteration 0
2885 [2018-12-18 09:53:52.862679] iteration 1
2886 [2018-12-18 09:53:55.087400] iteration 2
2887 [2018-12-18 09:53:57.375083] iteration 3
2888 [2018-12-18 09:53:59.647771] iteration 4
2889 [2018-12-18 09:54:01.847505] training MLP [4, 4, 5] withn
    n=0.01
2890 [2018-12-18 09:54:01.847505] iteration 0
2891 [2018-12-18 09:54:04.188159] iteration 1
2892 [2018-12-18 09:54:06.462848] iteration 2
2893 [2018-12-18 09:54:08.748531] iteration 3
2894 [2018-12-18 09:54:11.015227] iteration 4
2895 [2018-12-18 09:54:13.884573] training MLP [4, 4, 5] withn
    n=0.003
2896 [2018-12-18 09:54:13.884573] iteration 0
2897 [2018-12-18 09:54:16.693957] iteration 1
2898 [2018-12-18 09:54:19.382408] iteration 2
2899 [2018-12-18 09:54:22.110837] iteration 3
2900 [2018-12-18 09:54:24.780302] iteration 4
2901 ##### Iris Experiment - Layers [4, 4, 5]
2902
2903 Weights:
2904 [matrix([[ 0.04468259,  0.06315706,  0.01833418,  0.
2905   07427132],
2906   [ 0.14293031,  0.14619456,  0.16442619,  0.
2907   1228837 ],
2908   [ 0.03337246,  0.04592893,  0.02192261,  0.
2909   04242746],
2910   [ 0.16505791,  0.1264516 ,  0.20642086,  0.
2911   15491478],
2912   [ 0.17122376,  0.10010405,  0.20920332,  0.
2913   18080903],
2914   [ 0.07833158,  0.07736918,  0.10213824,  0.
2915   08752348],
2916   [ 0.09723616,  0.12014803,  0.07020864,  0.
2917   10161747],
2918   [-0.00516852,  0.06216236,  0.01412298, -0.
2919   00209083],
2920   [ 0.02497707,  0.03474667,  0.02883087, -0.
2921   04519412],
2922   [ 0.18912928,  0.16362664,  0.15791675,  0.
```

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2913 16250843],
2914      [ 0.11356214,  0.11429443,  0.14480465,  0.
    10342644],
2915      [ 0.11871461,  0.14435546,  0.16489616,  0.
    15087421],
2916      [ 0.09473587,  0.09341611,  0.17298816,  0.
    17518365]], matrix([[ 0.00616855,  0.0941639 ,  0.
    09618594,  0.00395853],
2917      [-0.10858799, -0.08476704, -0.05688329, -0.
    07335308],
2918      [-0.12541803, -0.09315502, -0.06357646, -0.
    04989868],
2919      [-0.08674328, -0.08427801, -0.11110223, -0.
    10200642],
2920      [-0.07595101, -0.08514623, -0.07542826, -0.
    12161567]], matrix([[ 0.00062377,  0.01694805,  0.
    08026254,  0.00317228,  0.01205091],
2921      [-0.44913275, -0.49680861, -0.44785911, -0.
    4661187 , -0.49718978],
2922      [-0.42196015, -0.44819508, -0.51203055, -0.
    48725327, -0.46054447],
2923      [-0.46871985, -0.44554587, -0.44280813, -0.
    459947 , -0.46464345],
2924      [-0.46576299, -0.44380183, -0.49266166, -0.
    40741682, -0.42756643]], array([[ -0.13859524, -0.
    49954124, -0.6572798 ],
2925      [-0.37107801, -0.11903638, -0.0572488 ],
2926      [-0.34926443, -0.14664939, -0.00585442],
2927      [-0.41240219, -0.17642381, -0.04344217],
2928      [-0.33569363, -0.10135083, -0.05161444],
2929      [-0.39123552, -0.14446411, -0.00213903]]]
2930
2931 Best n:
2932 0.3
2933 Confusion Matrix:
2934 [[10  0  0]
2935 [ 2  0  8]
2936 [ 0  0 10]]
2937 Precision:
2938 0.6666666666666666
2939 [2018-12-18 09:54:27.647649] training MLP [4, 4, 6] with
    n=0.3
2940 [2018-12-18 09:54:27.647649] iteration 0
2941 [2018-12-18 09:54:30.632930] iteration 1
2942 [2018-12-18 09:54:33.455305] iteration 2

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2943 [2018-12-18 09:54:36.205722] iteration 3
2944 [2018-12-18 09:54:39.647741] iteration 4
2945 [2018-12-18 09:54:42.383164] training MLP [4, 4, 6] withn
    n=0.1
2946 [2018-12-18 09:54:42.383164] iteration 0
2947 [2018-12-18 09:54:45.120589] iteration 1
2948 [2018-12-18 09:54:47.898988] iteration 2
2949 [2018-12-18 09:54:50.340583] iteration 3
2950 [2018-12-18 09:54:52.546313] iteration 4
2951 [2018-12-18 09:54:54.812009] training MLP [4, 4, 6] withn
    n=0.03
2952 [2018-12-18 09:54:54.812009] iteration 0
2953 [2018-12-18 09:54:56.996750] iteration 1
2954 [2018-12-18 09:54:59.295427] iteration 2
2955 [2018-12-18 09:55:01.562120] iteration 3
2956 [2018-12-18 09:55:03.811823] iteration 4
2957 [2018-12-18 09:55:06.032547] training MLP [4, 4, 6] withn
    n=0.01
2958 [2018-12-18 09:55:06.032547] iteration 0
2959 [2018-12-18 09:55:08.262262] iteration 1
2960 [2018-12-18 09:55:10.489981] iteration 2
2961 [2018-12-18 09:55:12.762672] iteration 3
2962 [2018-12-18 09:55:15.020384] iteration 4
2963 [2018-12-18 09:55:17.261081] training MLP [4, 4, 6] withn
    n=0.003
2964 [2018-12-18 09:55:17.261081] iteration 0
2965 [2018-12-18 09:55:19.534773] iteration 1
2966 [2018-12-18 09:55:21.891415] iteration 2
2967 [2018-12-18 09:55:24.322014] iteration 3
2968 [2018-12-18 09:55:26.572718] iteration 4
2969 ##### Iris Experiment - Layers [4, 4, 6]
2970
2971 Weights:
2972 [matrix([[ 0.06464776,  0.04525006,  0.00639798,  0.
2973           0.3227394],
2974           [ 0.14407209,  0.1083064 ,  0.12327066,  0.
2975           17049369],
2976           [-0.06040608,  0.01667833, -0.03413407, -0.
2977           03759683],
2978           [ 0.21052896,  0.16141219,  0.19075261,  0.
2979           26412993],
2980           [ 0.25828811,  0.21820037,  0.20206862,  0.
2981           24213856],
2982           [ 0.15716687,  0.15374186,  0.12636754,  0.
2983           09943476],
```

```

2978      [ 0.14941999,  0.07240772,  0.06915334,  0.
14561009],
2979      [-0.02159925, -0.0519546 , -0.00716596, -0.
08034879],
2980      [ 0.02134717,  0.02982131,  0.01746005, -0.
011031 ],
2981      [ 0.18380901,  0.19712468,  0.16611006,  0.
16632861],
2982      [ 0.13320104,  0.17044521,  0.11708873,  0.
1502773 ],
2983      [ 0.19722989,  0.17569406,  0.16072544,  0.
2007742 ],
2984      [ 0.14340614,  0.1696195 ,  0.09923211,  0.
17898794]], matrix([[ 0.02796828,  0.08369461,  0.
08260438,  0.05075349],
2985      [-0.02467015, -0.0655267 , -0.05211209, -0.
11369007],
2986      [-0.04978261, -0.03149672, -0.11472536, -0.
09152219],
2987      [-0.03133056, -0.04749444, -0.05957466, -0.
05892075],
2988      [-0.0721483 , -0.10561128, -0.08987592, -0.
08981504]], matrix([[ 0.02182953,  0.04462512,  0.
03717947,  0.03901318,  0.08732211,
2989      0.05248901],
2990      [-0.55102107, -0.5285006 , -0.51420986, -0.
56107477, -0.54403724,
2991      -0.53655107],
2992      [-0.52845238, -0.57360231, -0.51697622, -0.
47884597, -0.57787059,
2993      -0.51002554],
2994      [-0.49685133, -0.53334256, -0.5569032 , -0.
5690226 , -0.54904251,
2995      -0.57606658],
2996      [-0.54909575, -0.50724188, -0.5202372 , -0.
5645943 , -0.5442958 ,
2997      -0.57942157]]), array([[ -0.10809462, -0.
53458798, -0.78403234],
2998      [-0.31970112, -0.09378126,  0.06681827],
2999      [-0.34200117, -0.12429747,  0.04261248],
3000      [-0.34237937, -0.07787949,  0.03224121],
3001      [-0.38495449, -0.08941941,  0.03205136],
3002      [-0.34959477, -0.09658307,  0.07919042],
3003      [-0.40246707, -0.0953812 ,  0.09731521]])]
3004

```

```
3005 Best n:  
3006 0.3  
3007 Confusion Matrix:  
3008 [[10  0  0]  
3009 [ 0  0 10]  
3010 [ 0  0 10]]  
3011 Precision:  
3012 0.6666666666666666  
3013 [2018-12-18 09:55:29.868833] training MLP [4, 5, 3] with  
n=0.3  
3014 [2018-12-18 09:55:29.868833] iteration 0  
3015 [2018-12-18 09:55:32.051565] iteration 1  
3016 [2018-12-18 09:55:34.289277] iteration 2  
3017 [2018-12-18 09:55:36.387083] iteration 3  
3018 [2018-12-18 09:55:38.399925] iteration 4  
3019 [2018-12-18 09:55:40.396775] training MLP [4, 5, 3] with  
n=0.1  
3020 [2018-12-18 09:55:40.396775] iteration 0  
3021 [2018-12-18 09:55:42.401620] iteration 1  
3022 [2018-12-18 09:55:44.420454] iteration 2  
3023 [2018-12-18 09:55:46.442296] iteration 3  
3024 [2018-12-18 09:55:48.461128] iteration 4  
3025 [2018-12-18 09:55:50.465973] training MLP [4, 5, 3] with  
n=0.03  
3026 [2018-12-18 09:55:50.465973] iteration 0  
3027 [2018-12-18 09:55:52.557757] iteration 1  
3028 [2018-12-18 09:55:54.702520] iteration 2  
3029 [2018-12-18 09:55:56.724357] iteration 3  
3030 [2018-12-18 09:55:58.761185] iteration 4  
3031 [2018-12-18 09:56:00.819000] training MLP [4, 5, 3] with  
n=0.01  
3032 [2018-12-18 09:56:00.819000] iteration 0  
3033 [2018-12-18 09:56:02.965764] iteration 1  
3034 [2018-12-18 09:56:04.985600] iteration 2  
3035 [2018-12-18 09:56:07.084391] iteration 3  
3036 [2018-12-18 09:56:09.237151] iteration 4  
3037 [2018-12-18 09:56:11.511854] training MLP [4, 5, 3] with  
n=0.003  
3038 [2018-12-18 09:56:11.511854] iteration 0  
3039 [2018-12-18 09:56:13.622638] iteration 1  
3040 [2018-12-18 09:56:15.637482] iteration 2  
3041 [2018-12-18 09:56:17.632334] iteration 3  
3042 [2018-12-18 09:56:19.646170] iteration 4  
3043 ##### Iris Experiment - Layers [4, 5, 3]  
3044
```

```
3045 Weights:  
3046 [matrix([[0.08023168, 0.00728093, 0.01801179, 0.02630925  
],  
3047 [0.07967059, 0.09562324, 0.10587097, 0.05548582  
],  
3048 [0.02251031, 0.02465545, 0.0852077 , 0.03534767  
],  
3049 [0.08509436, 0.08731318, 0.03158433, 0.10845245  
],  
3050 [0.016342 , 0.05553183, 0.06698524, 0.04784357  
],  
3051 [0.0431747 , 0.0532583 , 0.00790636, 0.00733741  
],  
3052 [0.05708808, 0.08383307, 0.07769012, 0.00643531  
],  
3053 [0.04917362, 0.0599343 , 0.01071397, 0.00348056  
],  
3054 [0.09034525, 0.08727366, 0.01880015, 0.02895715  
],  
3055 [0.10478815, 0.04049242, 0.01386414, 0.0872825  
],  
3056 [0.02458777, 0.08064014, 0.02582834, 0.08565154  
],  
3057 [0.06264744, 0.09627538, 0.10526839, 0.02408261  
],  
3058 [0.0372188 , 0.03522928, 0.10527694, 0.07954138  
]), matrix([[0.00130271, 0.0435416 , 0.0494585 , 0.  
08976146, 0.03035442],  
3059 [0.10563881, 0.0175037 , 0.03308317, 0.06256527  
, 0.043906 ],  
3060 [0.02171135, 0.05846769, 0.00742486, 0.07687441  
, 0.01700253],  
3061 [0.07496759, 0.01901792, 0.07408658, 0.06925119  
, 0.08745515],  
3062 [0.05535326, 0.02970817, 0.01018996, 0.10081469  
, 0.07982405]), matrix([[ 0.07724466, 0.09520728, 0.  
03142822],  
3063 [-0.19859124, -0.19497426, -0.16686416],  
3064 [-0.16766632, -0.19244405, -0.20096442],  
3065 [-0.17409426, -0.17419554, -0.23298764],  
3066 [-0.18083973, -0.22237024, -0.19944898],  
3067 [-0.21560421, -0.22114007, -0.19273159]]), array  
([[-0.53751297, -0.46418953, -0.39364899],  
3068 [-0.16482491, -0.21186004, -0.29299344],  
3069 [-0.11804879, -0.22085334, -0.24238258],
```

```
3070      [-0.11398688, -0.15290492, -0.23305847]]])  
3071  
3072 Best n:  
3073 0.3  
3074 Confusion Matrix:  
3075 [[ 9  1  0]  
3076 [ 0 10  0]  
3077 [ 0  1  9]]  
3078 Precision:  
3079 0.9333333333333333  
3080 [2018-12-18 09:56:21.770946] training MLP [4, 5, 4] with  
n=0.3  
3081 [2018-12-18 09:56:21.770946] iteration 0  
3082 [2018-12-18 09:56:23.864745] iteration 1  
3083 [2018-12-18 09:56:25.913561] iteration 2  
3084 [2018-12-18 09:56:27.986367] iteration 3  
3085 [2018-12-18 09:56:30.198082] iteration 4  
3086 [2018-12-18 09:56:32.654825] training MLP [4, 5, 4] with  
n=0.1  
3087 [2018-12-18 09:56:32.654825] iteration 0  
3088 [2018-12-18 09:56:34.697158] iteration 1  
3089 [2018-12-18 09:56:36.720607] iteration 2  
3090 [2018-12-18 09:56:38.724587] iteration 3  
3091 [2018-12-18 09:56:40.731591] iteration 4  
3092 [2018-12-18 09:56:42.751831] training MLP [4, 5, 4] with  
n=0.03  
3093 [2018-12-18 09:56:42.751831] iteration 0  
3094 [2018-12-18 09:56:44.764557] iteration 1  
3095 [2018-12-18 09:56:46.768553] iteration 2  
3096 [2018-12-18 09:56:48.776753] iteration 3  
3097 [2018-12-18 09:56:50.794874] iteration 4  
3098 [2018-12-18 09:56:52.884765] training MLP [4, 5, 4] with  
n=0.01  
3099 [2018-12-18 09:56:52.885753] iteration 0  
3100 [2018-12-18 09:56:54.920538] iteration 1  
3101 [2018-12-18 09:56:56.961379] iteration 2  
3102 [2018-12-18 09:56:59.012205] iteration 3  
3103 [2018-12-18 09:57:01.051047] iteration 4  
3104 [2018-12-18 09:57:03.057886] training MLP [4, 5, 4] with  
n=0.003  
3105 [2018-12-18 09:57:03.057886] iteration 0  
3106 [2018-12-18 09:57:05.066730] iteration 1  
3107 [2018-12-18 09:57:07.072575] iteration 2  
3108 [2018-12-18 09:57:09.087414] iteration 3  
3109 [2018-12-18 09:57:11.094259] iteration 4
```

```
3110 ##### Iris Experiment - Layers [4, 5, 4]
3111
3112 Weights:
3113 [matrix([[ 2.70719082e-02,   4.99176439e-02,   4.73309691e
-02,
3114           8.14192932e-02],
3115           [ 6.68729809e-02,   1.24240222e-01,   1.29607205e-
01,
3116           8.02486792e-02],
3117           [ 4.79595230e-02,   6.67672098e-02,   2.18670725e-
02,
3118           2.31071527e-02],
3119           [ 1.14197711e-01,   8.95174222e-02,   1.00083921e-
01,
3120           9.08101578e-02],
3121           [ 1.57389215e-01,   1.55001649e-01,   1.49942249e-
01,
3122           1.15863199e-01],
3123           [ 1.10727956e-01,   6.17606176e-02,   9.65009840e-
02,
3124           8.36923003e-02],
3125           [ 1.36407436e-01,   4.76422487e-02,   4.34675150e-
02,
3126           4.47844150e-02],
3127           [-1.73723700e-02,   7.08532748e-02,   8.02208343e-
02,
3128           -2.49942430e-02],
3129           [-4.52880776e-03, -1.79550096e-04,   7.44542208e-
02,
3130           1.08825677e-03],
3131           [ 1.45815063e-01,   1.69515069e-01,   1.05028419e-
01,
3132           1.15636386e-01],
3133           [ 1.50097013e-01,   7.64565537e-02,   1.00449699e-
01,
3134           8.96639229e-02],
3135           [ 1.93500187e-01,   1.60010586e-01,   1.46242784e-
01,
3136           1.39914328e-01],
3137           [ 1.55854181e-01,   1.69130772e-01,   6.52804646e-
02,
3138           9.30390457e-02]]), matrix([[ 0.06390245,   0.
05879714,   0.05642503,   0.00252319,   0.09136198],
3139           [-0.03398331, -0.04503942,   0.03225649,   0.
02499191,   0.00663307],
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3140      [-0.04294763, -0.02995475,  0.01123851,  0.
04453117, -0.02236831],
3141      [-0.00522995,  0.01277076,  0.01059926, -0.
03599458, -0.01532688],
3142      [-0.00387455, -0.0124285 ,  0.00750822,  0.
00388152,  0.06140099]], matrix([[ 0.04280609,  0.
00034294,  0.07953078,  0.01459296],
3143      [-0.2701878 , -0.27705261, -0.29061691, -0.
30235606],
3144      [-0.29745727, -0.23587169, -0.32611177, -0.
32170847],
3145      [-0.26136029, -0.29190753, -0.30773694, -0.
29704587],
3146      [-0.31356501, -0.32428188, -0.29840754, -0.
27305655],
3147      [-0.29910845, -0.23409009, -0.2725783 , -0.
22387062]], array([-0.20253359, -0.35608768, -0.
68266737],
3148      [-0.33497025, -0.27526369,  0.01175489],
3149      [-0.34942936, -0.25918294, -0.04869497],
3150      [-0.39473633, -0.26226973, -0.0171577 ],
3151      [-0.39739259, -0.21715935,  0.02307537]]])
3152
3153 Best n:
3154 0.3
3155 Confusion Matrix:
3156 [[10  0  0]
3157 [ 2  0  8]
3158 [ 0  0 10]]
3159 Precision:
3160 0.6666666666666666
3161 [2018-12-18 09:57:13.242027] training MLP [4, 5, 5] with
n=0.3
3162 [2018-12-18 09:57:13.242027] iteration 0
3163 [2018-12-18 09:57:15.277854] iteration 1
3164 [2018-12-18 09:57:17.322661] iteration 2
3165 [2018-12-18 09:57:19.362486] iteration 3
3166 [2018-12-18 09:57:21.385320] iteration 4
3167 [2018-12-18 09:57:23.417152] training MLP [4, 5, 5] with
n=0.1
3168 [2018-12-18 09:57:23.417152] iteration 0
3169 [2018-12-18 09:57:25.646867] iteration 1
3170 [2018-12-18 09:57:27.877601] iteration 2
3171 [2018-12-18 09:57:29.906426] iteration 3
3172 [2018-12-18 09:57:31.928251] iteration 4
```

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3173 [2018-12-18 09:57:33.946086] training MLP [4, 5, 5] withn  
      n=0.03  
3174 [2018-12-18 09:57:33.946086] iteration 0  
3175 [2018-12-18 09:57:36.100860] iteration 1  
3176 [2018-12-18 09:57:38.134675] iteration 2  
3177 [2018-12-18 09:57:40.168517] iteration 3  
3178 [2018-12-18 09:57:42.391226] iteration 4  
3179 [2018-12-18 09:57:44.796841] training MLP [4, 5, 5] withn  
      n=0.01  
3180 [2018-12-18 09:57:44.796841] iteration 0  
3181 [2018-12-18 09:57:47.017562] iteration 1  
3182 [2018-12-18 09:57:49.221292] iteration 2  
3183 [2018-12-18 09:57:51.329097] iteration 3  
3184 [2018-12-18 09:57:53.581782] iteration 4  
3185 [2018-12-18 09:57:55.938425] training MLP [4, 5, 5] withn  
      n=0.003  
3186 [2018-12-18 09:57:55.938425] iteration 0  
3187 [2018-12-18 09:57:58.289071] iteration 1  
3188 [2018-12-18 09:58:00.564758] iteration 2  
3189 [2018-12-18 09:58:02.632568] iteration 3  
3190 [2018-12-18 09:58:04.664411] iteration 4  
3191 ##### Iris Experiment - Layers [4, 5, 5]  
3192  
3193 Weights:  
3194 [matrix([[ 0.08711602,  0.07536946,  0.04511622,  0.  
      03097713],  
3195      [ 0.11930163,  0.05191667,  0.06507486,  0.  
      09504146],  
3196      [ 0.0193229 ,  0.08660185,  0.06859729,  0.  
      0555699 ],  
3197      [ 0.08191088,  0.08745773,  0.09637204,  0.  
      07540676],  
3198      [ 0.10989457,  0.12491707,  0.12297428,  0.  
      10490963],  
3199      [ 0.12967994,  0.11249101,  0.10468055,  0.  
      12720445],  
3200      [ 0.07672058,  0.03040436,  0.10248128,  0.  
      07090912],  
3201      [ 0.08203676,  0.05122687,  0.08930447,  0.  
      02912895],  
3202      [ 0.082177 ,  0.01866698, -0.00148597,  0.  
      04421099],  
3203      [ 0.10597614,  0.06354822,  0.06629851,  0.  
      08451922],  
3204      [ 0.0670479 ,  0.07723012,  0.0913046 ,  0.]
```

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3204 13927908],
3205      [ 0.10644638,  0.06909375,  0.14703592,  0.
3206      08747001],
3207      [ 0.13800948,  0.07242576,  0.08352065,  0.
3208      0871422 ]]), matrix([[0.09066619, 0.03550405, 0.02668469
3209      , 0.0201911 , 0.0211266 ],
3210      [0.09646304, 0.12700758, 0.1319762 , 0.13763132
3211      , 0.10437948],
3212      [0.06559916, 0.05976339, 0.08063061, 0.15164888
3213      , 0.04928032],
3214      [0.07240829, 0.12880996, 0.07674091, 0.05844711
3215      , 0.04332352],
3216      [0.10953051, 0.11489691, 0.11380309, 0.06766942
3217      , 0.13254553]]), matrix([[ 0.05072874,  0.06150735,  0.
3218      03397262,  0.09689681,  0.02846029],
3219      [-0.28398135, -0.29361732, -0.27865252, -0.
3220      29708165, -0.31008681],
3221      [-0.2853641 , -0.29334082, -0.31869932, -0.
3222      33907707, -0.32271014],
3223      [-0.34699453, -0.27687038, -0.31272613, -0.
3224      34376408, -0.31090245],
3225      [-0.36247564, -0.34086295, -0.32206863, -0.
3226      33455585 , -0.34787403],
3227      [-0.26762946, -0.34381757, -0.3230742 , -0.
3228      30996259, -0.27446619]]), array([-0.6013765 , -0.
3229      49505186, -0.23992725],
3230      [-0.05841096, -0.10917712, -0.33669199],
3231      [-0.03279569, -0.12743005, -0.28504641],
3232      [-0.0418356 , -0.15704973, -0.28786404],
3233      [-0.08021204, -0.08859511, -0.28737512],
3234      [-0.07281284, -0.15896694, -0.27958533]])]
3221
3222 Best n:
3223 0.3
3224 Confusion Matrix:
3225 [[10  0  0]
3226 [ 2  0  8]
3227 [ 0  0 10]]
3228 Precision:
3229 0.6666666666666666
3230 [2018-12-18 09:58:06.854140] training MLP [4, 5, 6] with
3231      n=0.3
3232 [2018-12-18 09:58:06.854140] iteration 0
3233 [2018-12-18 09:58:09.106842] iteration 1
3234 [2018-12-18 09:58:11.312571] iteration 2

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File - iris

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3234 [2018-12-18 09:58:13.508307] iteration 3
3235 [2018-12-18 09:58:15.669063] iteration 4
3236 [2018-12-18 09:58:17.884788] training MLP [4, 5, 6] withn
    n=0.1
3237 [2018-12-18 09:58:17.884788] iteration 0
3238 [2018-12-18 09:58:20.231448] iteration 1
3239 [2018-12-18 09:58:22.567103] iteration 2
3240 [2018-12-18 09:58:24.678875] iteration 3
3241 [2018-12-18 09:58:26.829648] iteration 4
3242 [2018-12-18 09:58:29.071343] training MLP [4, 5, 6] withn
    n=0.03
3243 [2018-12-18 09:58:29.071343] iteration 0
3244 [2018-12-18 09:58:31.164153] iteration 1
3245 [2018-12-18 09:58:33.374880] iteration 2
3246 [2018-12-18 09:58:35.474670] iteration 3
3247 [2018-12-18 09:58:37.520492] iteration 4
3248 [2018-12-18 09:58:39.562305] training MLP [4, 5, 6] withn
    n=0.01
3249 [2018-12-18 09:58:39.562305] iteration 0
3250 [2018-12-18 09:58:41.794018] iteration 1
3251 [2018-12-18 09:58:43.938783] iteration 2
3252 [2018-12-18 09:58:46.082550] iteration 3
3253 [2018-12-18 09:58:48.223318] iteration 4
3254 [2018-12-18 09:58:50.392087] training MLP [4, 5, 6] withn
    n=0.003
3255 [2018-12-18 09:58:50.392087] iteration 0
3256 [2018-12-18 09:58:52.419912] iteration 1
3257 [2018-12-18 09:58:54.498721] iteration 2
3258 [2018-12-18 09:58:56.524535] iteration 3
3259 [2018-12-18 09:58:58.552370] iteration 4
3260 ##### Iris Experiment - Layers [4, 5, 6]
3261
3262 Weights:
3263 matrix([[ 8.74144164e-02,   4.68972575e-02,   7.33457286e
3264             -03,
3265                 3.20964060e-02],
3266             [ 7.74050175e-02,   8.03804691e-02,   1.52874557e-
3267             01,
3268                 9.59265770e-02],
3269             [-2.74729776e-02,  -4.19000824e-02,   2.70010869e-
3270             02,
3271                 8.73061897e-03],
3272             [ 1.96227910e-01,   2.10438225e-01,   2.21550250e-
3273             01,
3274                 1.73717080e-01],
```

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3271      [ 1.97264346e-01,  1.36708522e-01,  1.83885425e-
01,
3272      1.79867511e-01],
3273      [ 6.65798169e-02,  1.50533223e-01,  1.28909391e-
01,
3274      8.30989277e-02],
3275      [ 7.59779854e-02,  1.04020044e-01,  9.16872353e-
02,
3276      9.94140830e-02],
3277      [ 1.03762847e-04,  3.41205738e-02,  1.16503839e-
02,
3278      2.04457290e-02],
3279      [-1.59486064e-02, -1.60045254e-02,  4.96597139e-
02,
3280      -4.64533924e-02],
3281      [ 1.87701432e-01,  1.86004518e-01,  1.22827787e-
01,
3282      1.97850060e-01],
3283      [ 1.44433941e-01,  8.92656304e-02,  1.23491805e-
01,
3284      1.49775017e-01],
3285      [ 1.64767892e-01,  1.68431512e-01,  1.82615055e-
01,
3286      1.78484741e-01],
3287      [ 1.36142411e-01,  1.07493345e-01,  1.60685908e-
01,
3288      2.05850747e-01]], matrix([[ 0.03322992,  0.
01832238,  0.00994836,  0.07175997,  0.01674999],
3289      [-0.07442816, -0.07841919, -0.12294174, -0.
08799569, -0.14017127],
3290      [-0.03084439, -0.10574815, -0.12321837, -0.
04621562, -0.07917078],
3291      [-0.07458536, -0.0833578 , -0.11675529, -0.
07551697, -0.13624893],
3292      [-0.04199413, -0.07969304, -0.08722363, -0.
05892963, -0.1178582 ]]), matrix([[ 0.02932031,  0.
05767247,  0.07307766,  0.01965498,  0.02419981,
3293      0.04163375],
3294      [-0.46762175, -0.45661906, -0.44470477, -0.
44108415, -0.40613347,
3295      -0.4090087 ],
3296      [-0.45631009, -0.45593845, -0.44363719, -0.
40966276, -0.41574438,
3297      -0.40758482],
3298      [-0.42118579, -0.4430613 , -0.45334877, -0.

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3298 46089755, -0.4335755 ,  
3299           -0.46241289],  
3300           [-0.41357705, -0.41985138, -0.425376 , -0.  
40760586, -0.45437823,  
3301           -0.46855974],  
3302           [-0.43014825, -0.43403961, -0.49556735, -0.  
46550119, -0.44079404,  
3303           -0.45517685]], array([[[-0.10982051, -0.4839337  
, -0.6410092 ],  
3304           [-0.37939292, -0.11826925, -0.03145997],  
3305           [-0.33313798, -0.10919553, -0.07944652],  
3306           [-0.38005111, -0.15373442, -0.00647375],  
3307           [-0.34645601, -0.16787066, -0.0153011 ],  
3308           [-0.39456593, -0.15753488, -0.06488997],  
3309           [-0.33937282, -0.13904 , -0.06142746]])]  
3310  
3311 Best n:  
3312 0.3  
3313 Confusion Matrix:  
3314 [[10  0  0]  
3315 [ 2  0  8]  
3316 [ 0  0 10]]  
3317 Precision:  
3318 0.6666666666666666  
3319 [2018-12-18 09:59:00.683143] training MLP [4, 6, 3] with  
n=0.3  
3320 [2018-12-18 09:59:00.683143] iteration 0  
3321 [2018-12-18 09:59:02.756960] iteration 1  
3322 [2018-12-18 09:59:04.819760] iteration 2  
3323 [2018-12-18 09:59:06.932545] iteration 3  
3324 [2018-12-18 09:59:09.100295] iteration 4  
3325 [2018-12-18 09:59:11.301029] training MLP [4, 6, 3] with  
n=0.1  
3326 [2018-12-18 09:59:11.301029] iteration 0  
3327 [2018-12-18 09:59:13.493766] iteration 1  
3328 [2018-12-18 09:59:15.828422] iteration 2  
3329 [2018-12-18 09:59:18.158080] iteration 3  
3330 [2018-12-18 09:59:20.305855] iteration 4  
3331 [2018-12-18 09:59:22.337692] training MLP [4, 6, 3] with  
n=0.03  
3332 [2018-12-18 09:59:22.337692] iteration 0  
3333 [2018-12-18 09:59:24.368521] iteration 1  
3334 [2018-12-18 09:59:26.405349] iteration 2  
3335 [2018-12-18 09:59:28.443169] iteration 3  
3336 [2018-12-18 09:59:30.502970] iteration 4
```

```
3337 [2018-12-18 09:59:32.658731] training MLP [4, 6, 3] withn  
    n=0.01  
3338 [2018-12-18 09:59:32.658731] iteration 0  
3339 [2018-12-18 09:59:34.756522] iteration 1  
3340 [2018-12-18 09:59:36.895291] iteration 2  
3341 [2018-12-18 09:59:38.990084] iteration 3  
3342 [2018-12-18 09:59:41.060904] iteration 4  
3343 [2018-12-18 09:59:43.081741] training MLP [4, 6, 3] withn  
    n=0.003  
3344 [2018-12-18 09:59:43.081741] iteration 0  
3345 [2018-12-18 09:59:45.113575] iteration 1  
3346 [2018-12-18 09:59:47.140412] iteration 2  
3347 [2018-12-18 09:59:49.172239] iteration 3  
3348 [2018-12-18 09:59:51.201071] iteration 4  
3349 ##### Iris Experiment - Layers [4, 6, 3]  
3350  
3351 Weights:  
3352 [matrix([[ 0.05161486,  0.04535853,  0.00816164,  0.  
    08708977],  
3353      [ 0.07521572,  0.04234726,  0.08421538,  0.  
    09331882],  
3354      [ 0.01690452, -0.01699462,  0.07890136,  0.  
    02590102],  
3355      [ 0.10818416,  0.09134677,  0.10379809,  0.  
    10685608],  
3356      [ 0.14345809,  0.14360682,  0.0933251 ,  0.  
    06298447],  
3357      [ 0.05575314,  0.11008603,  0.12264376,  0.  
    11079298],  
3358      [ 0.1203238 ,  0.11372371,  0.02817636,  0.  
    1071579 ],  
3359      [ 0.05882201,  0.0057128 , -0.01708847,  0.  
    00194658],  
3360      [-0.01619815,  0.01349103,  0.04838687,  0.  
    05639675],  
3361      [ 0.09208059,  0.11188125,  0.05916835,  0.  
    0771783 ],  
3362      [ 0.11261132,  0.04761144,  0.1092614 ,  0.  
    08925016],  
3363      [ 0.07765056,  0.12145376,  0.09871663,  0.  
    05468712],  
3364      [ 0.07107445,  0.14337938,  0.11709074,  0.  
    06912368]]), matrix([[ 0.09520906,  0.06129956,  0.  
    04569663,  0.06808174,  0.00534994,  
3365      0.04651276],
```

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3366      [-0.00600241, -0.05348488, -0.07445525, -0.
           11058449, -0.0193694 ,
3367      -0.02693623],
3368      [-0.03735917, -0.03885204, -0.06098594, -0.
           08039237, -0.10385417,
3369      -0.04062861],
3370      [-0.06842174, -0.03592237, -0.06764191,  0.
           00702209, -0.03014169,
3371      -0.04258831],
3372      [-0.10023521, -0.06512802, -0.04691589, -0.
           04909956, -0.11498217,
3373      -0.04245798]]), matrix([[ 0.06387485,  0.
           05375418,  0.07188997],
3374      [-0.15048627, -0.16607661, -0.13290084],
3375      [-0.13982602, -0.14826671, -0.12681597],
3376      [-0.12403587, -0.15969837, -0.21546742],
3377      [-0.19077113, -0.17526105, -0.13619496],
3378      [-0.15025654, -0.13923886, -0.17797145],
3379      [-0.17483107, -0.12455807, -0.15891356]]), array
           ([[[-0.27797398, -0.43518473, -0.64578582],
3380      [-0.30959836, -0.18246904, -0.0562282 ],
3381      [-0.3201965 , -0.2288627 , -0.02573358],
3382      [-0.39396669, -0.22410322, -0.03266393]]])
3383
3384 Best n:
3385 0.3
3386 Confusion Matrix:
3387 [[10  0  0]
3388 [ 0  0 10]
3389 [ 0  0 10]]
3390 Precision:
3391 0.6666666666666666
3392 [2018-12-18 09:59:53.335825] training MLP [4, 6, 4] withn
           n=0.3
3393 [2018-12-18 09:59:53.335825] iteration 0
3394 [2018-12-18 09:59:55.423622] iteration 1
3395 [2018-12-18 09:59:57.558394] iteration 2
3396 [2018-12-18 09:59:59.666190] iteration 3
3397 [2018-12-18 10:00:01.828932] iteration 4
3398 [2018-12-18 10:00:03.997684] training MLP [4, 6, 4] withn
           n=0.1
3399 [2018-12-18 10:00:03.997684] iteration 0
3400 [2018-12-18 10:00:06.149457] iteration 1
3401 [2018-12-18 10:00:08.179288] iteration 2
3402 [2018-12-18 10:00:10.209120] iteration 3

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3403 [2018-12-18 10:00:12.230955] iteration 4
3404 [2018-12-18 10:00:14.530620] training MLP [4, 6, 4] withn
    n=0.03
3405 [2018-12-18 10:00:14.531619] iteration 0
3406 [2018-12-18 10:00:16.874270] iteration 1
3407 [2018-12-18 10:00:19.219919] iteration 2
3408 [2018-12-18 10:00:21.386670] iteration 3
3409 [2018-12-18 10:00:23.502454] iteration 4
3410 [2018-12-18 10:00:25.628228] training MLP [4, 6, 4] withn
    n=0.01
3411 [2018-12-18 10:00:25.628228] iteration 0
3412 [2018-12-18 10:00:27.899921] iteration 1
3413 [2018-12-18 10:00:30.145627] iteration 2
3414 [2018-12-18 10:00:32.280410] iteration 3
3415 [2018-12-18 10:00:34.481132] iteration 4
3416 [2018-12-18 10:00:36.673868] training MLP [4, 6, 4] withn
    n=0.003
3417 [2018-12-18 10:00:36.673868] iteration 0
3418 [2018-12-18 10:00:38.786651] iteration 1
3419 [2018-12-18 10:00:40.893450] iteration 2
3420 [2018-12-18 10:00:42.934275] iteration 3
3421 [2018-12-18 10:00:44.976099] iteration 4
3422 ##### Iris Experiment - Layers [4, 6, 4]
3423
3424 Weights:
3425 [matrix([[0.01290971, 0.04403123, 0.04955588, 0.06823794
   ],
3426           [0.07143719, 0.02034436, 0.11261544, 0.05843373
   ],
3427           [0.02209981, 0.05967608, 0.08091548, 0.06370941
   ],
3428           [0.04334625, 0.11238478, 0.07226143, 0.04697428
   ],
3429           [0.05864715, 0.06044306, 0.09919012, 0.03358275
   ],
3430           [0.06302332, 0.04196232, 0.09862385, 0.01614566
   ],
3431           [0.01831777, 0.08781585, 0.08407877, 0.06626572
   ],
3432           [0.05221605, 0.02745646, 0.07620504, 0.06620721
   ],
3433           [0.0397359 , 0.0489877 , 0.00945906, 0.0126698
   ],
3434           [0.10711172, 0.0821091 , 0.03108139, 0.10525831
   ],
```

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3435      [0.06588955, 0.0703994 , 0.08413317, 0.10447054
    ],
3436      [0.07206888, 0.07770566, 0.11334272, 0.03059977
    ],
3437      [0.06281112, 0.02063321, 0.11093282, 0.06833943
    ]]), matrix([[0.07798763, 0.09995273, 0.0231      , 0.
    09015474, 0.00954882,
3438      0.06106099],
3439      [0.0884754 , 0.06126183, 0.08899242, 0.04890534
    , 0.10412915,
3440      0.07747495],
3441      [0.02829674, 0.05853956, 0.09018942, 0.03072627
    , 0.10688535,
3442      0.02509199],
3443      [0.09616631, 0.08169075, 0.07180458, 0.09226083
    , 0.04350779,
3444      0.02391443],
3445      [0.03401702, 0.06542386, 0.09155984, 0.1136733
    , 0.04203714,
3446      0.0890536 ]]), matrix([[ 0.0272894 , 0.
    02497111, 0.07677697, 0.03486505],
3447      [-0.25389865, -0.22986833, -0.23351197, -0.
    19804063],
3448      [-0.23987249, -0.24222541, -0.19081435, -0.
    2551415 ],
3449      [-0.22660114, -0.18540892, -0.24861361, -0.
    26082081],
3450      [-0.23885594, -0.20322406, -0.21923617, -0.
    21755524],
3451      [-0.22168192, -0.23616978, -0.25802017, -0.
    17697735],
3452      [-0.1687299 , -0.17752447, -0.21001842, -0.
    22146839]]), array([[-0.55443823, -0.44983292, -0.
    36011673],
3453      [-0.06955315, -0.14557657, -0.26339231],
3454      [-0.10527775, -0.19595615, -0.25698255],
3455      [-0.09871366, -0.2294914 , -0.22416751],
3456      [-0.13395666, -0.14911579, -0.24754462]]])
3457
3458 Best n:
3459 0.3
3460 Confusion Matrix:
3461 [[ 9  1  0]
3462  [ 0 10  0]
3463  [ 0  1  9]]

```

```
3464 Precision:  
3465 0.9333333333333333  
3466 [2018-12-18 10:00:47.108871] training MLP [4, 6, 5] with  
n=0.3  
3467 [2018-12-18 10:00:47.108871] iteration 0  
3468 [2018-12-18 10:00:49.246647] iteration 1  
3469 [2018-12-18 10:00:51.317452] iteration 2  
3470 [2018-12-18 10:00:53.383265] iteration 3  
3471 [2018-12-18 10:00:55.480040] iteration 4  
3472 [2018-12-18 10:00:57.892650] training MLP [4, 6, 5] with  
n=0.1  
3473 [2018-12-18 10:00:57.892650] iteration 0  
3474 [2018-12-18 10:01:00.137358] iteration 1  
3475 [2018-12-18 10:01:02.344099] iteration 2  
3476 [2018-12-18 10:01:04.506842] iteration 3  
3477 [2018-12-18 10:01:06.581665] iteration 4  
3478 [2018-12-18 10:01:08.632464] training MLP [4, 6, 5] with  
n=0.03  
3479 [2018-12-18 10:01:08.633463] iteration 0  
3480 [2018-12-18 10:01:10.675288] iteration 1  
3481 [2018-12-18 10:01:12.762089] iteration 2  
3482 [2018-12-18 10:01:14.807909] iteration 3  
3483 [2018-12-18 10:01:16.858741] iteration 4  
3484 [2018-12-18 10:01:18.909560] training MLP [4, 6, 5] with  
n=0.01  
3485 [2018-12-18 10:01:18.909560] iteration 0  
3486 [2018-12-18 10:01:21.017335] iteration 1  
3487 [2018-12-18 10:01:23.385968] iteration 2  
3488 [2018-12-18 10:01:25.633674] iteration 3  
3489 [2018-12-18 10:01:27.887376] iteration 4  
3490 [2018-12-18 10:01:30.021149] training MLP [4, 6, 5] with  
n=0.003  
3491 [2018-12-18 10:01:30.021149] iteration 0  
3492 [2018-12-18 10:01:32.116943] iteration 1  
3493 [2018-12-18 10:01:34.453597] iteration 2  
3494 [2018-12-18 10:01:36.811240] iteration 3  
3495 [2018-12-18 10:01:39.020965] iteration 4  
3496 ##### Iris Experiment - Layers [4, 6, 5]  
3497  
3498 Weights:  
3499 matrix([[ 0.04150183,  0.09539112,  0.05464033,  0.  
02448264],  
3500      [ 0.11375193,  0.03352054,  0.14122154,  0.  
07541095],  
3501      [ 0.02422359,  0.07680653,  0.06139393,  0.
```

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3501 05580144],
3502      [ 0.08427608,  0.10971125,  0.0919254 ,  0.
12545486],
3503      [ 0.13562658,  0.04433336,  0.08730407,  0.
07276063],
3504      [ 0.08477423,  0.06928625,  0.06561811,  0.
03816572],
3505      [ 0.1166567 ,  0.05690213,  0.0528131 ,  0.
10630004],
3506      [ 0.05574724,  0.06255368,  0.07293691,  0.
04238078],
3507      [ 0.00637495,  0.06754604, -0.00556859,  0.
00810363],
3508      [ 0.11614948,  0.07693201,  0.09068856,  0.
06231889],
3509      [ 0.05697602,  0.09403753,  0.05303928,  0.
08324774],
3510      [ 0.09522317,  0.12297502,  0.10704618,  0.
12343381],
3511      [ 0.1007596 ,  0.04149439,  0.14598838,  0.
11837408]], matrix([[ 0.01928191,  0.06222664,  0.
0895896 ,  0.07153791,  0.04616789,
3512          0.06632597],
3513      [-0.08719465, -0.10745466, -0.02016169, -0.
03857926, -0.05494109,
3514          -0.11869645],
3515      [-0.05335962, -0.02634021, -0.06852583, -0.
03179868, -0.09397999,
3516          -0.09130003],
3517      [-0.11655333, -0.06759742, -0.05613962, -0.
07512296, -0.06889516,
3518          -0.07608623],
3519      [-0.01963248, -0.08709395, -0.09305677, -0.
05082897, -0.04326566,
3520          -0.0666822 ]]), matrix([[ 0.03342421,  0.
08644304,  0.09141848,  0.09733817,  0.01974564],
3521      [-0.28533207, -0.31004167, -0.27691912, -0.
33273357, -0.29463444],
3522      [-0.33413189, -0.3197265 , -0.29044942, -0.
28913021, -0.30299755],
3523      [-0.28515311, -0.27688751, -0.31603207, -0.
3115066 , -0.2857434 ],
3524      [-0.3083926 , -0.35499784, -0.36123766, -0.
34528957, -0.31069262],
3525      [-0.30117934, -0.34590807, -0.33030752, -0.

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3525 33490886, -0.27037437],  
3526 [-0.29184746, -0.31147465, -0.35163778, -0.  
31475162, -0.34857143]]), array([[[-0.23550007, -0.  
40180269, -0.51981709],  
3527 [-0.28144148, -0.15468384, -0.11677648],  
3528 [-0.27690451, -0.19321183, -0.11089932],  
3529 [-0.28328389, -0.20786019, -0.09144997],  
3530 [-0.30689285, -0.16249561, -0.1309362 ],  
3531 [-0.34303045, -0.22889487, -0.10437298]]])  
3532  
3533 Best n:  
3534 0.3  
3535 Confusion Matrix:  
3536 [[10  0  0]  
3537 [ 0  0 10]  
3538 [ 0  0 10]]  
3539 Precision:  
3540 0.6666666666666666  
3541 [2018-12-18 10:01:41.156749] training MLP [4, 6, 6] with  
n=0.3  
3542 [2018-12-18 10:01:41.156749] iteration 0  
3543 [2018-12-18 10:01:43.237556] iteration 1  
3544 [2018-12-18 10:01:45.347325] iteration 2  
3545 [2018-12-18 10:01:47.546059] iteration 3  
3546 [2018-12-18 10:01:49.753409] iteration 4  
3547 [2018-12-18 10:01:51.965980] training MLP [4, 6, 6] with  
n=0.1  
3548 [2018-12-18 10:01:51.965980] iteration 0  
3549 [2018-12-18 10:01:54.131382] iteration 1  
3550 [2018-12-18 10:01:56.300679] iteration 2  
3551 [2018-12-18 10:01:58.534633] iteration 3  
3552 [2018-12-18 10:02:00.752995] iteration 4  
3553 [2018-12-18 10:02:02.882769] training MLP [4, 6, 6] with  
n=0.03  
3554 [2018-12-18 10:02:02.882769] iteration 0  
3555 [2018-12-18 10:02:05.098493] iteration 1  
3556 [2018-12-18 10:02:07.264246] iteration 2  
3557 [2018-12-18 10:02:09.445991] iteration 3  
3558 [2018-12-18 10:02:11.648735] iteration 4  
3559 [2018-12-18 10:02:13.937405] training MLP [4, 6, 6] with  
n=0.01  
3560 [2018-12-18 10:02:13.937405] iteration 0  
3561 [2018-12-18 10:02:16.164134] iteration 1  
3562 [2018-12-18 10:02:18.399834] iteration 2  
3563 [2018-12-18 10:02:20.624554] iteration 3
```

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3564 [2018-12-18 10:02:22.868263] iteration 4
3565 [2018-12-18 10:02:25.097990] training MLP [4, 6, 6] with
n=0.003
3566 [2018-12-18 10:02:25.097990] iteration 0
3567 [2018-12-18 10:02:27.154792] iteration 1
3568 [2018-12-18 10:02:29.223614] iteration 2
3569 [2018-12-18 10:02:31.298407] iteration 3
3570 [2018-12-18 10:02:33.329237] iteration 4
3571 ##### Iris Experiment - Layers [4, 6, 6]
3572
3573 Weights:
3574 matrix([[ 0.08114158,  0.08580438,  0.04910547,  0.
06450688],
3575      [ 0.08073632,  0.07109777,  0.08639307,  0.
12365684],
3576      [ 0.02469283, -0.01300644,  0.03771984,  0.
0235739 ],
3577      [ 0.15908283,  0.1613149 ,  0.07623678,  0.
18807419],
3578      [ 0.1195942 ,  0.18582078,  0.16576451,  0.
12346155],
3579      [ 0.11308845,  0.10317489,  0.08905868,  0.
05683257],
3580      [ 0.11744319,  0.06037285,  0.0342639 ,  0.
03896635],
3581      [ 0.02354775,  0.01648208,  0.03603493, -0.
01632572],
3582      [-0.01511924,  0.05101956,  0.02636714,  0.
04005751],
3583      [ 0.06519347,  0.10459065,  0.1427901 ,  0.
11977109],
3584      [ 0.10299174,  0.08137051,  0.11320305,  0.
13264607],
3585      [ 0.13747534,  0.11545519,  0.12294792,  0.
10194299],
3586      [ 0.09178291,  0.13157878,  0.1269778 ,  0.
14985467]]), matrix([[ 0.06594404,  0.08872163,  0.
01554498,  0.04309852,  0.07704452,
3587      0.00407638],
3588      [-0.09276777, -0.07655763, -0.07848102, -0.
09559777, -0.05582919,
3589      -0.08828749],
3590      [-0.09360027, -0.1270066 , -0.07350935, -0.
04873295, -0.05323825,
3591      -0.11417288],
```

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3592      [-0.09487083, -0.09555538, -0.0649608 , -0.
3593      06280166, -0.08203938,
3593      -0.05328182],
3594      [-0.06812601, -0.09241064, -0.04155955, -0.
3594      02646065, -0.08735546,
3595      -0.08315226]], matrix([[ 0.06516679,  0.
3595      03304014,  0.02200335,  0.05798063,  0.06941223,
3596      0.02017026],
3597      [-0.33073976, -0.36633694, -0.36238834, -0.
3597      40781837, -0.36213712,
3598      -0.38896711],
3599      [-0.41135982, -0.33216214, -0.33767883, -0.
3599      32677909, -0.39811237,
3600      -0.40021023],
3601      [-0.40532122, -0.35098104, -0.3804774 , -0.
3601      38732985, -0.3659863 ,
3602      -0.35595553],
3603      [-0.33936492, -0.33332189, -0.32123382, -0.
3603      37917602, -0.32063528,
3604      -0.32786593],
3605      [-0.31991364, -0.38475723, -0.3387989 , -0.
3605      33092366, -0.35269216,
3606      -0.33675458],
3607      [-0.38491769, -0.35883205, -0.34014475, -0.
3607      34788135, -0.39281843,
3608      -0.3323854 ]]), array([-0.21358757, -0.
3608      36970506, -0.56661707],
3609      [-0.26427357, -0.19748881, -0.05486562],
3610      [-0.24883453, -0.17304264, -0.08998013],
3611      [-0.2682017 , -0.20613205, -0.08437871],
3612      [-0.309558 , -0.17028541, -0.07788197],
3613      [-0.30424055, -0.17681763, -0.03786098],
3614      [-0.27688054, -0.18140642, -0.05293393]])]
3615
3616 Best n:
3617 0.3
3618 Confusion Matrix:
3619 [[10  0  0]
3620 [ 0 10  0]
3621 [ 0  0 10]]
3622 Precision:
3623 1.0
3624 [2018-12-18 10:02:35.455013] training MLP [5, 3, 3] with
3624 n=0.3
3625 [2018-12-18 10:02:35.455013] iteration 0

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3626 [2018-12-18 10:02:37.515825] iteration 1
3627 [2018-12-18 10:02:39.596629] iteration 2
3628 [2018-12-18 10:02:41.685427] iteration 3
3629 [2018-12-18 10:02:43.895153] iteration 4
3630 [2018-12-18 10:02:46.174843] training MLP [5, 3, 3] withn
    n=0.1
3631 [2018-12-18 10:02:46.174843] iteration 0
3632 [2018-12-18 10:02:48.518492] iteration 1
3633 [2018-12-18 10:02:50.540340] iteration 2
3634 [2018-12-18 10:02:52.671113] iteration 3
3635 [2018-12-18 10:02:54.937807] iteration 4
3636 [2018-12-18 10:02:57.009603] training MLP [5, 3, 3] withn
    n=0.03
3637 [2018-12-18 10:02:57.009603] iteration 0
3638 [2018-12-18 10:02:59.014449] iteration 1
3639 [2018-12-18 10:03:01.019306] iteration 2
3640 [2018-12-18 10:03:03.161059] iteration 3
3641 [2018-12-18 10:03:05.279841] iteration 4
3642 [2018-12-18 10:03:07.397620] training MLP [5, 3, 3] withn
    n=0.01
3643 [2018-12-18 10:03:07.397620] iteration 0
3644 [2018-12-18 10:03:09.564385] iteration 1
3645 [2018-12-18 10:03:11.675158] iteration 2
3646 [2018-12-18 10:03:13.765953] iteration 3
3647 [2018-12-18 10:03:15.788800] iteration 4
3648 [2018-12-18 10:03:17.858596] training MLP [5, 3, 3] withn
    n=0.003
3649 [2018-12-18 10:03:17.858596] iteration 0
3650 [2018-12-18 10:03:19.894424] iteration 1
3651 [2018-12-18 10:03:21.985219] iteration 2
3652 [2018-12-18 10:03:24.117993] iteration 3
3653 [2018-12-18 10:03:26.205789] iteration 4
3654 ##### Iris Experiment - Layers [5, 3, 3]
3655
3656 Weights:
3657 matrix([[ 0.01138419,  0.06653816,  0.02008091,  0.
            02123417,  0.08838359],
3658           [ 0.08628049,  0.04771755,  0.09513215,  0.
            06271608,  0.04867654],
3659           [ 0.01797128,  0.00102841,  0.06515713,  0.
            00711346,  0.00653155],
3660           [ 0.02239123,  0.12148964,  0.0731545 ,  0.
            0724494 ,  0.04643797],
3661           [ 0.07417684,  0.03952973,  0.06309699,  0.
            03549155,  0.09795099],
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3662      [ 0.04496645,  0.05227199,  0.0150618 ,  0.
            0986084 ,  0.0849222 ],
3663      [ 0.02283045,  0.02311965,  0.00838292,  0.
            02679184,  0.07201806],
3664      [-0.00371955,  0.05227428,  0.04891897,  0.
            06898254,  0.07885879],
3665      [ 0.03208244,  0.09035818,  0.056491 ,  0.
            00899423,  0.08134511],
3666      [ 0.02610769,  0.05228093,  0.04762296,  0.
            0457948 ,  0.06421864],
3667      [ 0.06842083,  0.07116897,  0.03489703,  0.
            08422354,  0.05921695],
3668      [ 0.11279525,  0.05720195,  0.02234215,  0.
            02555127,  0.10969596],
3669      [ 0.06623379,  0.09965763,  0.0744044 ,  0.
            07659694,  0.04930365]]), matrix([[0.03029608, 0.
            03067368,  0.08693938],
3670      [0.03999762,  0.1117107 ,  0.03824098],
3671      [0.11900115,  0.10490109,  0.10308674],
3672      [0.10913897,  0.10392446,  0.03680045],
3673      [0.11548366,  0.04825332,  0.06059008],
3674      [0.05757776,  0.07531907,  0.10556878]]), matrix
            ([[ 0.06235076,  0.03695503,  0.05801341],
3675      [-0.29586444,  -0.2668128 ,  -0.289582 ],
3676      [-0.26764279,  -0.24878253,  -0.29228042],
3677      [-0.28038213,  -0.30897529,  -0.26300778]]), array
            ([[ -0.57471506,  -0.4668961 ,  -0.36668179],
3678      [-0.12559071,  -0.17249789,  -0.30937112],
3679      [-0.09501429,  -0.21099204,  -0.25353939],
3680      [-0.07228844,  -0.18211051,  -0.25581778]]]
3681
3682 Best n:
3683 0.3
3684 Confusion Matrix:
3685 [[10  0  0]
3686 [ 0  5  5]
3687 [ 0  0 10]]
3688 Precision:
3689 0.8333333333333334
3690 [2018-12-18 10:03:28.445503] training MLP [5, 3, 4] with
            n=0.3
3691 [2018-12-18 10:03:28.445503] iteration 0
3692 [2018-12-18 10:03:30.629243] iteration 1
3693 [2018-12-18 10:03:32.685059] iteration 2
3694 [2018-12-18 10:03:34.832835] iteration 3

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3695 [2018-12-18 10:03:36.829684] iteration 4
3696 [2018-12-18 10:03:38.815544] training MLP [5, 3, 4] withn
    n=0.1
3697 [2018-12-18 10:03:38.815544] iteration 0
3698 [2018-12-18 10:03:40.813395] iteration 1
3699 [2018-12-18 10:03:42.803233] iteration 2
3700 [2018-12-18 10:03:44.795102] iteration 3
3701 [2018-12-18 10:03:46.782956] iteration 4
3702 [2018-12-18 10:03:48.781802] training MLP [5, 3, 4] withn
    n=0.03
3703 [2018-12-18 10:03:48.781802] iteration 0
3704 [2018-12-18 10:03:50.976527] iteration 1
3705 [2018-12-18 10:03:53.105302] iteration 2
3706 [2018-12-18 10:03:55.260061] iteration 3
3707 [2018-12-18 10:03:57.307880] iteration 4
3708 [2018-12-18 10:03:59.451658] training MLP [5, 3, 4] withn
    n=0.01
3709 [2018-12-18 10:03:59.452662] iteration 0
3710 [2018-12-18 10:04:01.500482] iteration 1
3711 [2018-12-18 10:04:03.487335] iteration 2
3712 [2018-12-18 10:04:05.473191] iteration 3
3713 [2018-12-18 10:04:07.456049] iteration 4
3714 [2018-12-18 10:04:09.436909] training MLP [5, 3, 4] withn
    n=0.003
3715 [2018-12-18 10:04:09.436909] iteration 0
3716 [2018-12-18 10:04:11.419768] iteration 1
3717 [2018-12-18 10:04:13.409621] iteration 2
3718 [2018-12-18 10:04:15.491409] iteration 3
3719 [2018-12-18 10:04:17.530236] iteration 4
3720 ##### Iris Experiment - Layers [5, 3, 4]
3721
3722 Weights:
3723 [matrix([[-0.000542 , 0.05698931, 0.00593589, 0.
    08348316, 0.03244258],
3724      [ 0.1131049 , 0.06404032, 0.08013142, 0.
    13751983, 0.16785459],
3725      [-0.03053059, 0.04970422, -0.0144238 , -0.
    00164585, -0.03047791],
3726      [ 0.19419267, 0.14530916, 0.18438589, 0.
    16509146, 0.22047063],
3727      [ 0.1966961 , 0.1407962 , 0.17957136, 0.
    12813008, 0.15816085],
3728      [ 0.13118433, 0.10435173, 0.10100017, 0.
    07445479, 0.12105811],
3729      [ 0.14731413, 0.09513405, 0.09541755, 0.
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3729 10824708,  0.09858018],
3730      [-0.02511686,  0.02809679,  0.02104707,  0.
00701887, -0.026895 ],
3731      [-0.03290762,  0.02624826, -0.037121 ,  0.
05479897, -0.02592197],
3732      [ 0.17579337,  0.09783872,  0.17566317,  0.
14191174,  0.12196763],
3733      [ 0.17410976,  0.11479939,  0.08782282,  0.
15434226,  0.15600823],
3734      [ 0.16662139,  0.06738546,  0.13462057,  0.
19364866,  0.14295991],
3735      [ 0.13725011,  0.13730629,  0.1869237 ,  0.
12660123,  0.17270131]], matrix([[ 0.01706545,  0.
0516222 ,  0.0495894 ],
3736      [-0.02223926, -0.02246329,  0.02221728],
3737      [-0.06105629, -0.02331796, -0.01439253],
3738      [-0.05493191, -0.02394885,  0.02886201],
3739      [-0.06463459, -0.03607479, -0.05410429],
3740      [-0.02865986, -0.06940865, -0.04599388]]),
matrix([[ 0.04470509,  0.00062379,  0.05130012,  0.
01580133],
3741      [-0.5140856 , -0.4787947 , -0.53053379, -0.
48322506],
3742      [-0.50340222, -0.51817221, -0.47429671, -0.
52314785],
3743      [-0.46248562, -0.50276334, -0.50590834, -0.
48360667]], array([[-0.14049119, -0.44312984, -0.
77525395],
3744      [-0.41383859, -0.21889023,  0.0748887 ],
3745      [-0.37411892, -0.18516469,  0.04792772],
3746      [-0.48799198, -0.17599745,  0.06827167],
3747      [-0.38123577, -0.1655932 ,  0.06348981]]])
3748
3749 Best n:
3750 0.3
3751 Confusion Matrix:
3752 [[10  0  0]
3753 [ 0  0 10]
3754 [ 0  0 10]]
3755 Precision:
3756 0.6666666666666666
3757 [2018-12-18 10:04:19.747960] training MLP [5, 3, 5] with
n=0.3
3758 [2018-12-18 10:04:19.747960] iteration 0
3759 [2018-12-18 10:04:21.944693] iteration 1

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3760 [2018-12-18 10:04:24.085462] iteration 2
3761 [2018-12-18 10:04:26.453098] iteration 3
3762 [2018-12-18 10:04:28.569891] iteration 4
3763 [2018-12-18 10:04:30.782605] training MLP [5, 3, 5] withn
    n=0.1
3764 [2018-12-18 10:04:30.782605] iteration 0
3765 [2018-12-18 10:04:33.152241] iteration 1
3766 [2018-12-18 10:04:35.518878] iteration 2
3767 [2018-12-18 10:04:37.820564] iteration 3
3768 [2018-12-18 10:04:39.935334] iteration 4
3769 [2018-12-18 10:04:42.078101] training MLP [5, 3, 5] withn
    n=0.03
3770 [2018-12-18 10:04:42.078101] iteration 0
3771 [2018-12-18 10:04:44.189885] iteration 1
3772 [2018-12-18 10:04:46.279681] iteration 2
3773 [2018-12-18 10:04:48.430443] iteration 3
3774 [2018-12-18 10:04:50.510254] iteration 4
3775 [2018-12-18 10:04:52.555068] training MLP [5, 3, 5] withn
    n=0.01
3776 [2018-12-18 10:04:52.555068] iteration 0
3777 [2018-12-18 10:04:54.650862] iteration 1
3778 [2018-12-18 10:04:56.731663] iteration 2
3779 [2018-12-18 10:04:58.799484] iteration 3
3780 [2018-12-18 10:05:00.794336] iteration 4
3781 [2018-12-18 10:05:02.792187] training MLP [5, 3, 5] withn
    n=0.003
3782 [2018-12-18 10:05:02.792187] iteration 0
3783 [2018-12-18 10:05:04.922946] iteration 1
3784 [2018-12-18 10:05:07.019739] iteration 2
3785 [2018-12-18 10:05:09.103551] iteration 3
3786 [2018-12-18 10:05:11.109396] iteration 4
3787 ##### Iris Experiment - Layers [5, 3, 5]
3788
3789 Weights:
3790 [matrix([[-0.00359135,  0.07035181,  0.01534829,  0.
            08777953,  0.06386666],
3791           [ 0.10519409,  0.16048801,  0.101212 ,  0.
            09289404,  0.09668761],
3792           [ 0.05072515,  0.05432948,  0.04114938,  0.
            06252113,  0.09105131],
3793           [ 0.16254197,  0.08664424,  0.19574691,  0.
            11510214,  0.10020281],
3794           [ 0.12038642,  0.17379757,  0.1174083 ,  0.
            16958074,  0.15148034],
3795           [ 0.13112542,  0.07798655,  0.12060772,  0.
```

File - iris

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3795 07272821,  0.11147229],  
3796      [ 0.09031985,  0.11927192,  0.11697538,  0.  
     08736005,  0.12295789],  
3797      [ 0.01587753,  0.07425543, -0.03313998,  0.  
     0322223 ,  0.03896991],  
3798      [ 0.08063563,  0.0567302 , -0.01663858,  0.  
     04013805,  0.07741134],  
3799      [ 0.06675628,  0.19770673,  0.08119962,  0.  
     10643841,  0.12988059],  
3800      [ 0.12717903,  0.10785516,  0.124347 ,  0.  
     1272172 ,  0.15156267],  
3801      [ 0.16780873,  0.20578056,  0.13009427,  0.  
     15949354,  0.18373352],  
3802      [ 0.15670753,  0.23549332,  0.15241812,  0.  
     14560345,  0.17848616]], matrix([[ 0.04664808,  0.  
     03556694,  0.09310075],  
3803      [-0.00934948, -0.00433083,  0.05020917],  
3804      [-0.03294675, -0.01404738, -0.04654616],  
3805      [ 0.01961442,  0.02540454,  0.02688406],  
3806      [-0.02654547,  0.00155979, -0.02748355],  
3807      [-0.04878802, -0.03587675,  0.0226966 ]]),  
matrix([[ 0.0284313 ,  0.02285427,  0.09850784,  0.  
     08783407,  0.08500291],  
3808      [-0.5953482 , -0.66551391, -0.64730228, -0.  
     64339425, -0.64666694],  
3809      [-0.66848049, -0.59844959, -0.67424894, -0.  
     65077195, -0.62729268],  
3810      [-0.61596489, -0.63461898, -0.68024581, -0.  
     66184065, -0.68242706]], array([-0.25014892, -0.  
     33214232, -0.85303328],  
3811      [-0.28024261, -0.24627113,  0.08833497],  
3812      [-0.32649405, -0.2501395 ,  0.11195779],  
3813      [-0.33870699, -0.24494048,  0.12293642],  
3814      [-0.30674167, -0.24600919,  0.12559087],  
3815      [-0.30439408, -0.28035136,  0.11428088]]])  
3816  
3817 Best n:  
3818 0.3  
3819 Confusion Matrix:  
3820 [[ 8  2  0]  
3821 [ 0  4  6]  
3822 [ 0  0 10]]  
3823 Precision:  
3824 0.7333333333333333  
3825 [2018-12-18 10:05:13.209193] training MLP [5, 3, 6] with
```

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3825 n=0.3
3826 [2018-12-18 10:05:13.210191] iteration 0
3827 [2018-12-18 10:05:15.324956] iteration 1
3828 [2018-12-18 10:05:17.417751] iteration 2
3829 [2018-12-18 10:05:19.508548] iteration 3
3830 [2018-12-18 10:05:21.592349] iteration 4
3831 [2018-12-18 10:05:23.641166] training MLP [5, 3, 6] withn
    n=0.1
3832 [2018-12-18 10:05:23.641166] iteration 0
3833 [2018-12-18 10:05:25.668019] iteration 1
3834 [2018-12-18 10:05:27.691848] iteration 2
3835 [2018-12-18 10:05:29.715687] iteration 3
3836 [2018-12-18 10:05:31.868431] iteration 4
3837 [2018-12-18 10:05:34.235068] training MLP [5, 3, 6] withn
    n=0.03
3838 [2018-12-18 10:05:34.235068] iteration 0
3839 [2018-12-18 10:05:36.377832] iteration 1
3840 [2018-12-18 10:05:38.396670] iteration 2
3841 [2018-12-18 10:05:40.549431] iteration 3
3842 [2018-12-18 10:05:42.655219] iteration 4
3843 [2018-12-18 10:05:44.866946] training MLP [5, 3, 6] withn
    n=0.01
3844 [2018-12-18 10:05:44.866946] iteration 0
3845 [2018-12-18 10:05:46.932755] iteration 1
3846 [2018-12-18 10:05:49.040558] iteration 2
3847 [2018-12-18 10:05:51.054395] iteration 3
3848 [2018-12-18 10:05:53.166167] iteration 4
3849 [2018-12-18 10:05:55.537801] training MLP [5, 3, 6] withn
    n=0.003
3850 [2018-12-18 10:05:55.537801] iteration 0
3851 [2018-12-18 10:05:57.907436] iteration 1
3852 [2018-12-18 10:06:00.013236] iteration 2
3853 [2018-12-18 10:06:02.029075] iteration 3
3854 [2018-12-18 10:06:04.065889] iteration 4
3855 ##### Iris Experiment - Layers [5, 3, 6]
3856
3857 Weights:
3858 [matrix([[ 2.12264577e+00,   1.50626954e+00,   1.16648810e
+00,
3859             1.09035005e+00,   2.44319507e+00],
3860             [ 7.20592793e-01,   5.25805510e-01,   2.18533873e-
01,
3861             -1.51502882e-03,   6.76397738e-01],
3862             [ 2.46729337e+00,   2.21699446e+00,   2.00767017e+
00,

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3863          1.99196313e+00,  2.64131931e+00],
3864          [-1.24655941e+00, -1.35928242e+00, -1.58604238e+
00,
3865          -1.84876831e+00, -1.19637610e+00],
3866          [-2.34448202e+00, -2.43560666e+00, -2.56147243e+
00,
3867          -2.68252803e+00, -2.27893747e+00],
3868          [ 1.73523228e-01,  1.33229449e-01,  6.57952135e-
02,
3869          -1.27715268e-01,  1.15691409e-01],
3870          [-2.27039342e-01, -1.31827712e-01, -1.67560176e-
01,
3871          -2.36941082e-01, -2.88209622e-01],
3872          [ 1.72122157e+00,  1.54192508e+00,  1.42742443e+
00,
3873          1.50184124e+00,  1.77459964e+00],
3874          [ 1.09398744e+00,  1.00937340e+00,  9.32289266e-
01,
3875          9.96991873e-01,  1.10504368e+00],
3876          [-1.51037536e+00, -1.51111134e+00, -1.56748477e+
00,
3877          -1.71418293e+00, -1.47732316e+00],
3878          [-1.66959767e+00, -1.59265781e+00, -1.58271640e+
00,
3879          -1.56525338e+00, -1.71890629e+00],
3880          [-2.45243300e+00, -2.47190593e+00, -2.47229417e+
00,
3881          -2.54484022e+00, -2.41975861e+00],
3882          [-2.37637489e+00, -2.32600983e+00, -2.33189567e+
00,
3883          -2.20155284e+00, -2.31666908e+00]], matrix([[[
6.16595257e-02,  6.94895820e-02,  8.48988080e-02],
3884          [-1.60907386e+00,  4.63182659e-01, -2.94529675e+
00],
3885          [-1.56509289e+00,  1.05115462e-03, -2.79706712e+
00],
3886          [-1.47305130e+00, -6.89724467e-01, -2.62178874e+
00],
3887          [-1.35480215e+00, -1.34475416e+00, -2.39617760e+
00],
3888          [-1.63217878e+00,  6.48201930e-01, -2.98520805e+
00]]), matrix([[ 0.04119359,  0.07864866,  0.04433693,
0.06877837,  0.02648654,
3889          0.03803527],
3890          [-1.13111085, -4.13562576, -1.12021625, -5.
```

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3890 92379831, -1.04363092,
3891           -2.12779289],
3892           [-0.29484219, -3.76521555, -0.3019993 , -5.
3893           11974272, -0.29081493,
3894           -1.80938724],
3895           [-2.13373423, -3.56516357, -2.16352072, -5.
3896           36443719, -2.17865812,
3897           -2.07267477]], array([[[-8.1893674 , -3.
3898           38096784,  4.73990089],
3899           [ 3.94091099,  3.13977528, -5.99891062],
3900           [ 5.21924276, -3.87711297, -6.13039316],
3901           [ 3.96594812,  3.03217527, -6.05623173],
3902           [ 5.74171497, -8.36409907, -5.52877332],
3903           [ 3.83092944,  3.16471001, -5.9451014 ],
3904           [ 4.60445355, -0.14018675, -6.57928342]])]
3905 Best n:
3906 0.3
3907 Confusion Matrix:
3908 [[10  0  0]
3909 [ 0 10  0]
3910 [ 0  0 10]]
3911 Precision:
3912 1.0
3913 [2018-12-18 10:06:06.235641] training MLP [5, 4, 3] with
3914 n=0.3
3915 [2018-12-18 10:06:06.235641] iteration 0
3916 [2018-12-18 10:06:08.341427] iteration 1
3917 [2018-12-18 10:06:10.396269] iteration 2
3918 [2018-12-18 10:06:12.459057] iteration 3
3919 [2018-12-18 10:06:14.580834] iteration 4
3920 [2018-12-18 10:06:16.627657] training MLP [5, 4, 3] with
3921 n=0.1
3922 [2018-12-18 10:06:16.627657] iteration 0
3923 [2018-12-18 10:06:18.703460] iteration 1
3924 [2018-12-18 10:06:20.886204] iteration 2
3925 [2018-12-18 10:06:22.943021] iteration 3
3926 [2018-12-18 10:06:25.228704] iteration 4
3927 [2018-12-18 10:06:27.512401] training MLP [5, 4, 3] with
3928 n=0.03
3929 [2018-12-18 10:06:27.512401] iteration 0
3930 [2018-12-18 10:06:29.517246] iteration 1
3931 [2018-12-18 10:06:31.522092] iteration 2
3932 [2018-12-18 10:06:33.792773] iteration 3
3933 [2018-12-18 10:06:36.156412] iteration 4
```

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3929 [2018-12-18 10:06:38.520051] training MLP [5, 4, 3] withn  
    n=0.01  
3930 [2018-12-18 10:06:38.520051] iteration 0  
3931 [2018-12-18 10:06:40.648826] iteration 1  
3932 [2018-12-18 10:06:42.722630] iteration 2  
3933 [2018-12-18 10:06:44.798453] iteration 3  
3934 [2018-12-18 10:06:46.890231] iteration 4  
3935 [2018-12-18 10:06:48.917076] training MLP [5, 4, 3] withn  
    n=0.003  
3936 [2018-12-18 10:06:48.917076] iteration 0  
3937 [2018-12-18 10:06:50.916924] iteration 1  
3938 [2018-12-18 10:06:52.922769] iteration 2  
3939 [2018-12-18 10:06:54.922604] iteration 3  
3940 [2018-12-18 10:06:56.921453] iteration 4  
3941 ##### Iris Experiment - Layers [5, 4, 3]  
3942  
3943 Weights:  
3944 [matrix([[ 0.06392111,  0.0119329 ,  0.10095416,  0.  
        01297456,  0.03083588],  
3945      [ 0.03576914,  0.02435267,  0.05346149,  0.  
        09611849,  0.06212427],  
3946      [-0.00446086,  0.01133383, -0.00479556,  0.  
        07393957,  0.0436573 ],  
3947      [ 0.11054215,  0.0499569 ,  0.05483542,  0.  
        05933783,  0.10938884],  
3948      [ 0.067797 ,  0.02397828,  0.02770211,  0.  
        09589136,  0.10433326],  
3949      [ 0.07938558,  0.09722242,  0.07115953,  0.  
        02057924,  0.03861326],  
3950      [ 0.03015172,  0.04941576,  0.05563133,  0.  
        04208081,  0.04028391],  
3951      [ 0.09274081,  0.07249043,  0.05381068,  0.  
        02364036, -0.00610374],  
3952      [ 0.06775753,  0.0375894 , -0.00033377, -0.  
        00233407,  0.08757656],  
3953      [ 0.0783069 ,  0.04651135,  0.03450467,  0.  
        10944788,  0.07950128],  
3954      [ 0.02263164,  0.07503955,  0.04867892,  0.  
        03507849,  0.08895389],  
3955      [ 0.02632591,  0.05119329,  0.07335051,  0.  
        09605417,  0.05524751],  
3956      [ 0.08005157,  0.09709918,  0.04571357,  0.  
        03289298,  0.1121416 ]]), matrix([[0.07765791, 0.  
        01963972,  0.00445455,  0.08251999],  
3957      [0.07940554,  0.01919699,  0.10309233,  0.06011192
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3957 ],
3958      [0.10461842, 0.03242855, 0.09008299, 0.03951974
  ],
3959      [0.06674648, 0.08873485, 0.08996363, 0.0672615
  ],
3960      [0.09986777, 0.0524647 , 0.09045284, 0.10325308
  ],
3961      [0.06852936, 0.09095481, 0.10353457, 0.10116508
  ]]), matrix([[ 0.08109539, 0.08404965, 0.03580515],
3962      [-0.18981658, -0.21180914, -0.18492714],
3963      [-0.22408578, -0.27934999, -0.18689131],
3964      [-0.22292124, -0.19677631, -0.25788427],
3965      [-0.28047444, -0.23761451, -0.23183126]]), array
  ([[[-0.5694853 , -0.45727791, -0.36763644],
3966      [-0.09685821, -0.19451212, -0.26454614],
3967      [-0.10612636, -0.2022218 , -0.26295308],
3968      [-0.10643807, -0.19920526, -0.29798953]]])
3969
3970 Best n:
3971 0.3
3972 Confusion Matrix:
3973 [[10  0  0]
3974 [ 0  9  1]
3975 [ 0  0 10]]
3976 Precision:
3977 0.9666666666666667
3978 [2018-12-18 10:06:59.035235] training MLP [5, 4, 4] with
  n=0.3
3979 [2018-12-18 10:06:59.035235] iteration 0
3980 [2018-12-18 10:07:01.097066] iteration 1
3981 [2018-12-18 10:07:03.257817] iteration 2
3982 [2018-12-18 10:07:05.296632] iteration 3
3983 [2018-12-18 10:07:07.454388] iteration 4
3984 [2018-12-18 10:07:09.494215] training MLP [5, 4, 4] with
  n=0.1
3985 [2018-12-18 10:07:09.494215] iteration 0
3986 [2018-12-18 10:07:11.548032] iteration 1
3987 [2018-12-18 10:07:13.605861] iteration 2
3988 [2018-12-18 10:07:15.594713] iteration 3
3989 [2018-12-18 10:07:17.586567] iteration 4
3990 [2018-12-18 10:07:19.577420] training MLP [5, 4, 4] with
  n=0.03
3991 [2018-12-18 10:07:19.577420] iteration 0
3992 [2018-12-18 10:07:21.594248] iteration 1
3993 [2018-12-18 10:07:23.703044] iteration 2
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3994 [2018-12-18 10:07:25.790832] iteration 3
3995 [2018-12-18 10:07:27.910610] iteration 4
3996 [2018-12-18 10:07:30.150320] training MLP [5, 4, 4] withn
    n=0.01
3997 [2018-12-18 10:07:30.150320] iteration 0
3998 [2018-12-18 10:07:32.302084] iteration 1
3999 [2018-12-18 10:07:34.489833] iteration 2
4000 [2018-12-18 10:07:36.720536] iteration 3
4001 [2018-12-18 10:07:39.013215] iteration 4
4002 [2018-12-18 10:07:41.213961] training MLP [5, 4, 4] withn
    n=0.003
4003 [2018-12-18 10:07:41.213961] iteration 0
4004 [2018-12-18 10:07:43.403701] iteration 1
4005 [2018-12-18 10:07:45.424537] iteration 2
4006 [2018-12-18 10:07:47.539306] iteration 3
4007 [2018-12-18 10:07:49.583142] iteration 4
4008 ##### Iris Experiment - Layers [5, 4, 4]
4009
4010 Weights:
4011 [matrix([[ 0.0999001 , 0.09811244, 0.01984165, 0.
    01049541, 0.09604793],
4012      [ 0.03948085, 0.04877624, 0.11611588, 0.
    08381908, 0.09784479],
4013      [ 0.0915382 , 0.06658001, -0.00245989, 0.
    06005395, 0.08712426],
4014      [ 0.12633172, 0.08472495, 0.10574175, 0.
    14436957, 0.09663864],
4015      [ 0.10593049, 0.14191729, 0.14005071, 0.
    08795242, 0.11238599],
4016      [ 0.04959687, 0.09589893, 0.12510492, 0.
    05133885, 0.09299222],
4017      [ 0.08095996, 0.06953138, 0.03761077, 0.
    0874415 , 0.04849464],
4018      [ 0.08783408, 0.02864007, 0.02293847, 0.
    03815756, 0.09580581],
4019      [ 0.09058025, 0.03005479, 0.04173575, 0.
    02808357, 0.07442483],
4020      [ 0.04894739, 0.05447297, 0.16222465, 0.
    08465512, 0.0132486 ],
4021      [ 0.07325853, 0.06023873, 0.07878766, 0.
    13566768, 0.09030871],
4022      [ 0.08842064, 0.12917701, 0.16495654, 0.
    15392139, 0.08407633],
4023      [ 0.0546207 , 0.05197851, 0.11506363, 0.
    05095263, 0.09929385]]), matrix([[ 0.05270041, 0.
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4023 03433621, 0.04380299, 0.05877777],
4024 [-0.01713205, -0.06456482, -0.04369218, -0.
      05443264],
4025 [-0.06173254, -0.04687333, -0.05435839, -0.
      02036529],
4026 [-0.09512241, -0.01869602, -0.08987285, -0.
      01444258],
4027 [-0.03190916, -0.03309822, -0.02948015, -0.
      05866364],
4028 [-0.09284027, -0.06353557, -0.11190962, -0.
      0929423 ]]), matrix([[ 0.04852025, 0.06843425, 0.
      0950108 , 0.02681082],
4029 [-0.35964116, -0.37424465, -0.34026508, -0.
      40544187],
4030 [-0.37410746, -0.41430353, -0.41458243, -0.
      37570251],
4031 [-0.36754952, -0.33058559, -0.41898355, -0.
      33166912],
4032 [-0.36027981, -0.40848978, -0.39539343, -0.
      36389101]]), array([-0.28019142, -0.38303 , -0.
      62834427],
4033 [-0.29446013, -0.2654933 , -0.03117194],
4034 [-0.27522086, -0.21680918, -0.04585458],
4035 [-0.34439336, -0.2268746 , -0.05984597],
4036 [-0.27648162, -0.18028021, -0.03958146]])]
4037
4038 Best n:
4039 0.3
4040 Confusion Matrix:
4041 [[10  0  0]
4042 [ 0 10  0]
4043 [ 0  2  8]]
4044 Precision:
4045 0.9333333333333333
4046 [2018-12-18 10:07:51.895799] training MLP [5, 4, 5] with
      n=0.3
4047 [2018-12-18 10:07:51.895799] iteration 0
4048 [2018-12-18 10:07:53.981597] iteration 1
4049 [2018-12-18 10:07:56.098380] iteration 2
4050 [2018-12-18 10:07:58.261132] iteration 3
4051 [2018-12-18 10:08:00.953583] iteration 4
4052 [2018-12-18 10:08:03.172303] training MLP [5, 4, 5] with
      n=0.1
4053 [2018-12-18 10:08:03.172303] iteration 0
4054 [2018-12-18 10:08:05.216140] iteration 1

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4055 [2018-12-18 10:08:07.408866] iteration 2
4056 [2018-12-18 10:08:09.973400] iteration 3
4057 [2018-12-18 10:08:12.020222] iteration 4
4058 [2018-12-18 10:08:14.068032] training MLP [5, 4, 5] withn
    n=0.03
4059 [2018-12-18 10:08:14.068032] iteration 0
4060 [2018-12-18 10:08:16.138261] iteration 1
4061 [2018-12-18 10:08:18.241096] iteration 2
4062 [2018-12-18 10:08:20.417653] iteration 3
4063 [2018-12-18 10:08:22.475138] iteration 4
4064 [2018-12-18 10:08:24.630636] training MLP [5, 4, 5] withn
    n=0.01
4065 [2018-12-18 10:08:24.630636] iteration 0
4066 [2018-12-18 10:08:26.685741] iteration 1
4067 [2018-12-18 10:08:28.779705] iteration 2
4068 [2018-12-18 10:08:30.815532] iteration 3
4069 [2018-12-18 10:08:32.877345] iteration 4
4070 [2018-12-18 10:08:34.912178] training MLP [5, 4, 5] withn
    n=0.003
4071 [2018-12-18 10:08:34.912178] iteration 0
4072 [2018-12-18 10:08:36.969992] iteration 1
4073 [2018-12-18 10:08:38.998809] iteration 2
4074 [2018-12-18 10:08:41.051627] iteration 3
4075 [2018-12-18 10:08:43.174402] iteration 4
4076 ##### Iris Experiment - Layers [5, 4, 5]
4077
4078 Weights:
4079 [matrix([[ 0.04324506,  0.02776879,  0.04264854,  0.
        03116974,  0.08421431],
4080           [ 0.10012444,  0.15476414,  0.13783194,  0.
        15705363,  0.08801362],
4081           [ 0.04439228, -0.04366852,  0.03303372, -0.
        03636834,  0.01515123],
4082           [ 0.17637494,  0.20730205,  0.16078636,  0.
        13231687,  0.15093564],
4083           [ 0.15923213,  0.12627066,  0.18802965,  0.
        20676982,  0.16749416],
4084           [ 0.14501591,  0.14222582,  0.1199434 ,  0.
        14120872,  0.08365397],
4085           [ 0.081473 ,  0.10955729,  0.11577804,  0.
        05892794,  0.08994426],
4086           [-0.04852316,  0.02273419,  0.00546457, -0.
        02471524, -0.03446172],
4087           [ 0.0047453 ,  0.04256138,  0.05221512, -0.
        01859666,  0.00257964],
```

```

4088      [ 0.19043084,  0.1032622 ,  0.18194277,  0.
        13861163,  0.20013555],
4089      [ 0.14261013,  0.137463 ,  0.09613628,  0.
        13736893,  0.11134474],
4090      [ 0.10839428,  0.18317167,  0.15154007,  0.
        12762422,  0.21144582],
4091      [ 0.13880318,  0.12830593,  0.10491322,  0.
        14902521,  0.18323043]], matrix([[ 0.06924941,  0.
        07294438,  0.09040895,  0.0719051 ],
4092      [-0.00331275, -0.07384999, -0.09914508, -0.
        02133757],
4093      [-0.0581512 , -0.10765669, -0.02201719, -0.
        04114617],
4094      [ 0.00576343, -0.04461582, -0.02495526, -0.
        06498211],
4095      [-0.04464813, -0.09335414, -0.04666438,  0.
        00561781],
4096      [-0.05236547, -0.07858908, -0.05805803, -0.
        08509203]], matrix([[ 0.01446301,  0.01427591,  0.
        0521934 ,  0.09047839,  0.02566986],
4097      [-0.42546572, -0.47464248, -0.48571038, -0.
        44296954, -0.45155553],
4098      [-0.48029552, -0.48521599, -0.47511569, -0.
        46068895, -0.42814163],
4099      [-0.47285594, -0.42511312, -0.45134128, -0.
        46202283, -0.50243016],
4100      [-0.48109319, -0.44620924, -0.48753071, -0.
        48495343, -0.41704866]]), array([[[-0.14521898, -0.
        50957905, -0.76322377],
4101      [-0.38211374, -0.14576764,  0.05372741],
4102      [-0.3224985 , -0.13528971,  0.01734262],
4103      [-0.40256173, -0.11067997,  0.09281364],
4104      [-0.38818623, -0.10360486,  0.04636739],
4105      [-0.33707998, -0.13545056,  0.01535123]])]
4106
4107 Best n:
4108 0.3
4109 Confusion Matrix:
4110 [[10  0  0]
4111  [ 5  0  5]
4112  [ 0  0 10]]
4113 Precision:
4114 0.6666666666666666
4115 [2018-12-18 10:08:45.313170] training MLP [5, 4, 6] with
n=0.3

```

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4116 [2018-12-18 10:08:45.313170] iteration 0
4117 [2018-12-18 10:08:47.535895] iteration 1
4118 [2018-12-18 10:08:49.622689] iteration 2
4119 [2018-12-18 10:08:51.782445] iteration 3
4120 [2018-12-18 10:08:53.895242] iteration 4
4121 [2018-12-18 10:08:55.927076] training MLP [5, 4, 6] withn
    n=0.1
4122 [2018-12-18 10:08:55.927076] iteration 0
4123 [2018-12-18 10:08:57.979890] iteration 1
4124 [2018-12-18 10:09:00.014719] iteration 2
4125 [2018-12-18 10:09:02.039552] iteration 3
4126 [2018-12-18 10:09:04.071383] iteration 4
4127 [2018-12-18 10:09:06.136194] training MLP [5, 4, 6] withn
    n=0.03
4128 [2018-12-18 10:09:06.136194] iteration 0
4129 [2018-12-18 10:09:08.170011] iteration 1
4130 [2018-12-18 10:09:10.410721] iteration 2
4131 [2018-12-18 10:09:12.562480] iteration 3
4132 [2018-12-18 10:09:15.145994] iteration 4
4133 [2018-12-18 10:09:17.369713] training MLP [5, 4, 6] withn
    n=0.01
4134 [2018-12-18 10:09:17.369713] iteration 0
4135 [2018-12-18 10:09:19.469515] iteration 1
4136 [2018-12-18 10:09:21.578302] iteration 2
4137 [2018-12-18 10:09:23.644112] iteration 3
4138 [2018-12-18 10:09:25.916803] iteration 4
4139 [2018-12-18 10:09:27.946636] training MLP [5, 4, 6] withn
    n=0.003
4140 [2018-12-18 10:09:27.946636] iteration 0
4141 [2018-12-18 10:09:30.031438] iteration 1
4142 [2018-12-18 10:09:32.066266] iteration 2
4143 [2018-12-18 10:09:34.136071] iteration 3
4144 [2018-12-18 10:09:36.289818] iteration 4
4145 ##### Iris Experiment - Layers [5, 4, 6]
4146
4147 Weights:
4148 [matrix([[ 0.20006128,  0.13511745,  0.2156825 ,  0.
        1738481 ,  0.13827834],
4149      [ 0.23834745,  0.26513082,  0.2476412 ,  0.
        31070292,  0.27702784],
4150      [ 0.05716879,  0.05025033, -0.02176461, -0.
        02039286, -0.21408662],
4151      [ 0.40610503,  0.44415211,  0.38975423,  0.
        40315142,  0.54567173],
4152      [ 0.45050376,  0.42444215,  0.42307191,  0.
        ]])

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4152 42034219,  0.50317964],
4153      [ 0.24083599,  0.21831963,  0.21675899,  0.
        22528974,  0.26512528],
4154      [ 0.21164565,  0.20827061,  0.18047341,  0.
        15224213,  0.18885777],
4155      [ 0.02164619, -0.02958005, -0.00264052, -0.
        07020031, -0.20885269],
4156      [ 0.05738281, -0.03781548,  0.00269752, -0.
        06528649, -0.11030877],
4157      [ 0.30060277,  0.32446081,  0.39838476,  0.
        35077779,  0.41456327],
4158      [ 0.24581294,  0.32873867,  0.31804009,  0.
        24348456,  0.29717981],
4159      [ 0.38157785,  0.3737741 ,  0.3796583 ,  0.
        39052737,  0.40840652],
4160      [ 0.3320118 ,  0.3128264 ,  0.31906027,  0.
        26562356,  0.33557381]], matrix([[ 0.08245128,
4161          0.0975159 ,  0.05832531,  0.02470301],
4161      [-0.00443052,  0.10158877,  0.00177598,  0.
        73532077],
4162      [-0.02442142,  0.07165819, -0.0144382 ,  0.
        69542372],
4163      [ 0.02700679,  0.0614398 , -0.03600629,  0.
        74711468],
4164      [ 0.02535039,  0.04777849,  0.03411524,  0.
        6685868 ],
4165      [-0.07688875,  0.02546414, -0.0704037 ,  0.
        68279179]], matrix([[ 0.08421492,  0.00398012,
4166          0.03675027,  0.09095145,  0.05553347,
4166      0.04507352],
4167      [-0.7504728 , -0.82957247, -1.03315849, -1.
        58223766, -0.8282313 ,
4168          -0.68658391],
4169      [-0.64694371, -0.73572389, -1.07001172, -1.
        61826294, -0.86515361,
4170          -0.65400967],
4171      [-0.79460667, -0.81784516, -1.09286696, -1.
        53694081, -0.89354599,
4172          -0.56063625],
4173      [-0.27427006, -0.17502759, -0.59500722, -1.
        75412063, -0.34075045,
4174          1.23683029]]), array([-0.89603087, -0.
        68023123, -0.28103217],
4175      [ 0.34218867,  0.09110162, -0.61691245],
4176      [ 0.4615592 ,  0.08118867, -0.59504534],

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4177      [ 0.05729033,  0.12733904, -0.32574904],  
4178      [ 0.2537552 , -0.4868848 , -0.07679561],  
4179      [ 0.29604014,  0.12627899, -0.64072637],  
4180      [-0.03104   , -0.13075299, -0.0533112 ]])]  
4181  
4182 Best n:  
4183 0.3  
4184 Confusion Matrix:  
4185 [[10  0  0]  
4186 [ 0  6  4]  
4187 [ 0  0 10]]  
4188 Precision:  
4189 0.8666666666666667  
4190 [2018-12-18 10:09:38.601488] training MLP [5, 5, 3] with  
n=0.3  
4191 [2018-12-18 10:09:38.601488] iteration 0  
4192 [2018-12-18 10:09:41.324919] iteration 1  
4193 [2018-12-18 10:09:43.620613] iteration 2  
4194 [2018-12-18 10:09:45.661436] iteration 3  
4195 [2018-12-18 10:09:47.712257] iteration 4  
4196 [2018-12-18 10:09:49.794041] training MLP [5, 5, 3] with  
n=0.1  
4197 [2018-12-18 10:09:49.794041] iteration 0  
4198 [2018-12-18 10:09:51.836882] iteration 1  
4199 [2018-12-18 10:09:53.907689] iteration 2  
4200 [2018-12-18 10:09:55.924512] iteration 3  
4201 [2018-12-18 10:09:58.229185] iteration 4  
4202 [2018-12-18 10:10:00.465897] training MLP [5, 5, 3] with  
n=0.03  
4203 [2018-12-18 10:10:00.465897] iteration 0  
4204 [2018-12-18 10:10:02.722610] iteration 1  
4205 [2018-12-18 10:10:04.852373] iteration 2  
4206 [2018-12-18 10:10:07.096078] iteration 3  
4207 [2018-12-18 10:10:09.199868] iteration 4  
4208 [2018-12-18 10:10:11.256695] training MLP [5, 5, 3] with  
n=0.01  
4209 [2018-12-18 10:10:11.256695] iteration 0  
4210 [2018-12-18 10:10:13.326504] iteration 1  
4211 [2018-12-18 10:10:15.566201] iteration 2  
4212 [2018-12-18 10:10:17.976832] iteration 3  
4213 [2018-12-18 10:10:20.348805] iteration 4  
4214 [2018-12-18 10:10:22.580199] training MLP [5, 5, 3] with  
n=0.003  
4215 [2018-12-18 10:10:22.580199] iteration 0  
4216 [2018-12-18 10:10:24.677304] iteration 1
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4217 [2018-12-18 10:10:26.723452] iteration 2
4218 [2018-12-18 10:10:28.853580] iteration 3
4219 [2018-12-18 10:10:31.045872] iteration 4
4220 ##### Iris Experiment - Layers [5, 5, 3]
4221
4222 Weights:
4223 matrix([[0.04213599, 0.03005295, 0.07848295, 0.00475549
   , 0.05001388],
4224      [0.08751152, 0.02634345, 0.08801461, 0.03270107
   , 0.04811797],
4225      [0.02775014, 0.06817958, 0.03499309, 0.08962233
   , 0.0333783 ],
4226      [0.02616567, 0.09045868, 0.08787699, 0.08553347
   , 0.05099788],
4227      [0.05576419, 0.02940143, 0.07758226, 0.09538395
   , 0.09654043],
4228      [0.04453176, 0.02505961, 0.0067928 , 0.06288274
   , 0.05194698],
4229      [0.05996583, 0.03662358, 0.09981068, 0.09626508
   , 0.02964707],
4230      [0.06425503, 0.03543881, 0.05483219, 0.05300896
   , 0.07313037],
4231      [0.00986983, 0.02823155, 0.08776463, 0.07651542
   , 0.06076467],
4232      [0.02871447, 0.06329721, 0.04090287, 0.02658252
   , 0.01043699],
4233      [0.05117485, 0.00451214, 0.08753126, 0.07716379
   , 0.06190723],
4234      [0.01098565, 0.05759556, 0.09768109, 0.06001088
   , 0.04755277],
4235      [0.00708921, 0.08826162, 0.01793399, 0.08727612
   , 0.02138651]], matrix([[0.00922984, 0.03218815, 0.
0594102 , 0.0601163 , 0.00591117],
4236      [0.07957306, 0.00884585, 0.03399478, 0.09416716
   , 0.02215614],
4237      [0.06473943, 0.0941248 , 0.00906865, 0.04512748
   , 0.02443511],
4238      [0.012541 , 0.10262555, 0.01315535, 0.04427292
   , 0.06424254],
4239      [0.02465775, 0.06893681, 0.07858838, 0.05046585
   , 0.0990547 ],
4240      [0.01769031, 0.04006346, 0.03418111, 0.09751797
   , 0.04055364]], matrix([[ 0.03559974, 0.04215175, 0.
05030202],
4241      [-0.20714716, -0.20128605, -0.19291275],
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4242 [-0.17273613, -0.19939888, -0.1802658 ],
4243 [-0.19562222, -0.16939584, -0.16901433],
4244 [-0.20528025, -0.14670956, -0.14240976],
4245 [-0.21483823, -0.19151696, -0.20376798]]), array
    ([[[-0.51183635, -0.46252568, -0.39877888],
4246 [-0.12931352, -0.20055712, -0.25989595],
4247 [-0.15955129, -0.18299623, -0.23296257],
4248 [-0.17345201, -0.20737557, -0.2631959 ]]])
4249
4250 Best n:
4251 0.3
4252 Confusion Matrix:
4253 [[10  0  0]
4254 [ 2  1  7]
4255 [ 0  0 10]]
4256 Precision:
4257 0.7
4258 [2018-12-18 10:10:33.343562] training MLP [5, 5, 4] with
    n=0.3
4259 [2018-12-18 10:10:33.343562] iteration 0
4260 [2018-12-18 10:10:35.430364] iteration 1
4261 [2018-12-18 10:10:37.487175] iteration 2
4262 [2018-12-18 10:10:39.610955] iteration 3
4263 [2018-12-18 10:10:41.826682] iteration 4
4264 [2018-12-18 10:10:43.946456] training MLP [5, 5, 4] with
    n=0.1
4265 [2018-12-18 10:10:43.946456] iteration 0
4266 [2018-12-18 10:10:46.074235] iteration 1
4267 [2018-12-18 10:10:48.143026] iteration 2
4268 [2018-12-18 10:10:50.239820] iteration 3
4269 [2018-12-18 10:10:52.279646] iteration 4
4270 [2018-12-18 10:10:54.374439] training MLP [5, 5, 4] with
    n=0.03
4271 [2018-12-18 10:10:54.374439] iteration 0
4272 [2018-12-18 10:10:56.896000] iteration 1
4273 [2018-12-18 10:10:58.991793] iteration 2
4274 [2018-12-18 10:11:01.028619] iteration 3
4275 [2018-12-18 10:11:03.045459] iteration 4
4276 [2018-12-18 10:11:05.261170] training MLP [5, 5, 4] with
    n=0.01
4277 [2018-12-18 10:11:05.261170] iteration 0
4278 [2018-12-18 10:11:07.465900] iteration 1
4279 [2018-12-18 10:11:09.556700] iteration 2
4280 [2018-12-18 10:11:11.687482] iteration 3
4281 [2018-12-18 10:11:13.749296] iteration 4
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4282 [2018-12-18 10:11:15.866065] training MLP [5, 5, 4] withn  
    n=0.003  
4283 [2018-12-18 10:11:15.866065] iteration 0  
4284 [2018-12-18 10:11:17.953874] iteration 1  
4285 [2018-12-18 10:11:20.014674] iteration 2  
4286 [2018-12-18 10:11:22.162439] iteration 3  
4287 [2018-12-18 10:11:24.320195] iteration 4  
4288 ##### Iris Experiment - Layers [5, 5, 4]  
4289  
4290 Weights:  
4291 [matrix([[ 0.03127947,  0.05667978,  0.08355622,  0.  
        04624945,  0.03459977],  
4292      [ 0.09264513,  0.03950694,  0.08419336,  0.  
        0381238 ,  0.10416917],  
4293      [ 0.02853472,  0.01496567,  0.06604345,  0.  
        08533087,  0.05312067],  
4294      [ 0.06148839,  0.11080264,  0.07212735,  0.  
        1211449 ,  0.08948166],  
4295      [ 0.12152253,  0.13251066,  0.1160494 ,  0.  
        06075105,  0.13207504],  
4296      [ 0.03625542,  0.06525024,  0.08892373,  0.  
        0989318 ,  0.0833779 ],  
4297      [ 0.05848387,  0.08914906,  0.03212945,  0.  
        10922672,  0.05391313],  
4298      [ 0.02752281, -0.00464317,  0.03287739,  0.  
        03453064, -0.02619686],  
4299      [ 0.02774764, -0.01051021,  0.01521512,  0.  
        04901733,  0.06378723],  
4300      [ 0.08831644,  0.05415234,  0.04061252,  0.  
        10130489,  0.12143146],  
4301      [ 0.10995194,  0.06624836,  0.0277199 ,  0.  
        09120657,  0.13959949],  
4302      [ 0.1239947 ,  0.1414899 ,  0.08978058,  0.  
        05546926,  0.09972491],  
4303      [ 0.04950913,  0.12576106,  0.10130837,  0.  
        06419077,  0.06975073]]), matrix([[ 0.00721561,  0.  
        0717164 ,  0.06094391,  0.04413943,  0.03828415],  
4304      [-0.07042491, -0.0355411 , -0.02997818, -0.  
        0626385 , -0.02991229],  
4305      [-0.06179577, -0.10156326, -0.10045571, -0.  
        0829851 , -0.07679751],  
4306      [-0.08547409, -0.01422219, -0.08553903, -0.  
        02422911, -0.11401759],  
4307      [-0.07716487, -0.02228671, -0.04632423, -0.  
        07159235, -0.07287005],
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4308      [-0.07065124, -0.05058359, -0.0527064 , -0.
1358626 , -0.07937681]]), matrix([[ 0.07273034,  0.
01372632,  0.08005097,  0.0936118 ],
4309      [-0.34836794, -0.26597283, -0.280752 , -0.
33331619],
4310      [-0.29069202, -0.31750716, -0.32117943, -0.
29720943],
4311      [-0.30577641, -0.29444923, -0.30991444, -0.
32523972],
4312      [-0.26671466, -0.32489378, -0.2879146 , -0.
29534665],
4313      [-0.34411926, -0.27118744, -0.35801469, -0.
33056814]]), array([[-0.28141896, -0.39943847, -0.
57826888],
4314      [-0.2762643 , -0.23221182, -0.12091724],
4315      [-0.29489224, -0.18113318, -0.07145247],
4316      [-0.28782417, -0.17468762, -0.06518611],
4317      [-0.32475799, -0.25031048, -0.05972989]])]
4318
4319 Best n:
4320 0.3
4321 Confusion Matrix:
4322 [[10  0  0]
4323 [ 0  2  8]
4324 [ 0  0 10]]
4325 Precision:
4326 0.7333333333333333
4327 [2018-12-18 10:11:26.570900] training MLP [5, 5, 5] with
n=0.3
4328 [2018-12-18 10:11:26.570900] iteration 0
4329 [2018-12-18 10:11:28.855601] iteration 1
4330 [2018-12-18 10:11:30.980372] iteration 2
4331 [2018-12-18 10:11:33.016201] iteration 3
4332 [2018-12-18 10:11:35.061024] iteration 4
4333 [2018-12-18 10:11:37.160801] training MLP [5, 5, 5] with
n=0.1
4334 [2018-12-18 10:11:37.160801] iteration 0
4335 [2018-12-18 10:11:39.331551] iteration 1
4336 [2018-12-18 10:11:41.536283] iteration 2
4337 [2018-12-18 10:11:43.715027] iteration 3
4338 [2018-12-18 10:11:45.983720] iteration 4
4339 [2018-12-18 10:11:48.155483] training MLP [5, 5, 5] with
n=0.03
4340 [2018-12-18 10:11:48.155483] iteration 0
4341 [2018-12-18 10:11:50.171322] iteration 1
```

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4342 [2018-12-18 10:11:52.200141] iteration 2
4343 [2018-12-18 10:11:54.245963] iteration 3
4344 [2018-12-18 10:11:56.416730] iteration 4
4345 [2018-12-18 10:11:58.529514] training MLP [5, 5, 5] withn
    n=0.01
4346 [2018-12-18 10:11:58.529514] iteration 0
4347 [2018-12-18 10:12:00.575331] iteration 1
4348 [2018-12-18 10:12:02.737073] iteration 2
4349 [2018-12-18 10:12:04.995773] iteration 3
4350 [2018-12-18 10:12:07.336425] iteration 4
4351 [2018-12-18 10:12:09.788014] training MLP [5, 5, 5] withn
    n=0.003
4352 [2018-12-18 10:12:09.788014] iteration 0
4353 [2018-12-18 10:12:11.900814] iteration 1
4354 [2018-12-18 10:12:13.929627] iteration 2
4355 [2018-12-18 10:12:16.112386] iteration 3
4356 [2018-12-18 10:12:18.159206] iteration 4
4357 ##### Iris Experiment - Layers [5, 5, 5]
4358
4359 Weights:
4360 [matrix([[ 0.07117528,  0.10304    ,  0.09487804,  0.
        02365478,  0.08973347],
4361      [ 0.1190403 ,  0.0353219 ,  0.04891969,  0.
        13507029,  0.0420756 ],
4362      [ 0.00487767,  0.04414644,  0.03249977,  0.
        0027555 ,  0.05948914],
4363      [ 0.09485785,  0.0914971 ,  0.0519599 ,  0.
        08678739,  0.07308938],
4364      [ 0.11912183,  0.06468404,  0.10580854,  0.
        11271971,  0.08216937],
4365      [ 0.1038263 ,  0.03548963,  0.07892799,  0.
        12326997,  0.12196613],
4366      [ 0.11418653,  0.02971496,  0.04712328,  0.
        07780436,  0.03384261],
4367      [-0.0057912 ,  0.05613464,  0.08199288,  0.
        02108622,  0.00839321],
4368      [ 0.05048507,  0.08876806,  0.02984393,  0.
        04963767, -0.01223141],
4369      [ 0.08800784,  0.0571493 ,  0.05704743,  0.
        08001876,  0.12465767],
4370      [ 0.06444056,  0.03922004,  0.10412142,  0.
        13976532,  0.09912005],
4371      [ 0.08724094,  0.04801798,  0.03353274,  0.
        09742171,  0.07429855],
4372      [ 0.05208305,  0.07463406,  0.11119033,  0.]])

```

File - iris

```

4372 09460492, 0.07937918]]), matrix([[ 0.09243594, 0.
4373   08110892, 0.08686309, 0.06799754, 0.06833549],
4374   [-0.09211871, -0.04328346, -0.0810561 , -0.
4375   10361285, -0.075212 ],,
4376   [-0.10876656, -0.02712668, -0.09581401, -0.
4377   01747644, -0.11295452],
4378   [-0.07316282, -0.05816478, -0.13580935, -0.
4379   03903206, -0.11960567],
4380   [-0.06217608, -0.05157258, -0.10549973, -0.
4381   08771301, -0.03427728],
4382   [-0.10811002, -0.07671961, -0.09116588, -0.
4383   03585964, -0.10618478]]), matrix([[ 0.0296185 , 0.
4384   02531395, 0.07591666, 0.05498871, 0.08085942],
4385   [-0.3615525 , -0.34991089, -0.36228555, -0.
4386   33394688, -0.42469344],
4387   [-0.35308612, -0.34877339, -0.40154553, -0.
4388   36447085, -0.40639155],
4389   [-0.36462476, -0.4150896 , -0.38747868, -0.
4390   3943945 , -0.3496417 ],
4391   [-0.32901399, -0.33168191, -0.35430361, -0.
4392   38817378, -0.39435515],
4393   [-0.41321581, -0.37763946, -0.38431927, -0.
4394   41529837, -0.33931574]]), array([[[-0.32565718, -0.
4395   44257545, -0.48833259],
4396   [-0.25689601, -0.18048023, -0.15544553],
4397   [-0.29621913, -0.18294911, -0.14910556],
4398   [-0.23929609, -0.19543417, -0.15435256],
4399   [-0.24204789, -0.16826562, -0.11441713],
4400   [-0.24292648, -0.16826322, -0.17366205]]])
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4403 [2018-12-18 10:12:31.044775] training MLP [5, 5, 6] withn
    n=0.1
4404 [2018-12-18 10:12:31.044775] iteration 0
4405 [2018-12-18 10:12:33.158556] iteration 1
4406 [2018-12-18 10:12:35.372283] iteration 2
4407 [2018-12-18 10:12:37.635980] iteration 3
4408 [2018-12-18 10:12:39.905684] iteration 4
4409 [2018-12-18 10:12:42.035446] training MLP [5, 5, 6] withn
    n=0.03
4410 [2018-12-18 10:12:42.035446] iteration 0
4411 [2018-12-18 10:12:44.264162] iteration 1
4412 [2018-12-18 10:12:46.364964] iteration 2
4413 [2018-12-18 10:12:48.514714] iteration 3
4414 [2018-12-18 10:12:50.713460] iteration 4
4415 [2018-12-18 10:12:52.729286] training MLP [5, 5, 6] withn
    n=0.01
4416 [2018-12-18 10:12:52.729286] iteration 0
4417 [2018-12-18 10:12:54.750124] iteration 1
4418 [2018-12-18 10:12:56.773986] iteration 2
4419 [2018-12-18 10:12:58.779815] iteration 3
4420 [2018-12-18 10:13:01.079491] iteration 4
4421 [2018-12-18 10:13:03.184266] training MLP [5, 5, 6] withn
    n=0.003
4422 [2018-12-18 10:13:03.184266] iteration 0
4423 [2018-12-18 10:13:05.390996] iteration 1
4424 [2018-12-18 10:13:07.469800] iteration 2
4425 [2018-12-18 10:13:09.620561] iteration 3
4426 [2018-12-18 10:13:11.777319] iteration 4
4427 ##### Iris Experiment - Layers [5, 5, 6]
4428
4429 Weights:
4430 [matrix([[-0.00954927,  0.0876974 ,  0.03520643,  0.
    07448312,  0.02676473],
4431           [ 0.18716968,  0.17095116,  0.16131605,  0.
    09166654,  0.14070082],
4432           [-0.01522801,  0.01589414, -0.05997763,  0.
    00935475, -0.0697128 ],
4433           [ 0.24232997,  0.19975455,  0.2550685 ,  0.
    20561356,  0.28234749],
4434           [ 0.2695377 ,  0.17312585,  0.26256753,  0.
    18026466,  0.22485643],
4435           [ 0.12344401,  0.14312095,  0.10798048,  0.
    13515236,  0.15420137],
4436           [ 0.09031654,  0.04853757,  0.07712587,  0.
    06927474,  0.07987521],
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4437      [-0.0027708 ,  0.02630348, -0.04343055,  0.
        04331458, -0.00104886],
4438      [-0.06014562,  0.04395267,  0.0040546 ,  0.
        02109251, -0.03307989],
4439      [ 0.18152931,  0.18480449,  0.15918774,  0.
        14833624,  0.15328962],
4440      [ 0.17481532,  0.14139345,  0.18656295,  0.
        07797335,  0.14784297],
4441      [ 0.18569573,  0.15582549,  0.18282144,  0.
        18706404,  0.19971713],
4442      [ 0.19011841,  0.18666403,  0.16934482,  0.
        14784571,  0.19939756]], matrix([[ 8.78730555e-05,  1.
        62841476e-02,  4.22942482e-02,
4443          2.76043148e-02,  1.95074808e-02],
4444          [-8.70497069e-02, -2.37242381e-02, -3.40821874e-
        02,
4445          -7.91219286e-02, -5.53131757e-02],
4446          [-2.80021573e-02, -3.82311873e-02, -7.78265492e-
        02,
4447          -5.34815281e-02, -7.43510270e-02],
4448          [-4.57194749e-02, -3.97350463e-03, -2.52500728e-
        02,
4449          -8.83572918e-02, -4.80380991e-02],
4450          [-4.70457400e-02, -7.32903432e-03, -5.04233380e-
        02,
4451          -5.53000847e-02, -7.60168635e-02],
4452          [-4.80079759e-02,  4.16125770e-03, -8.22689949e-
        02,
4453          -4.96144584e-02,  2.64138773e-03]], matrix([[[
        0.03137642,  0.09603661,  0.00513963,  0.07169491,  0.
        02182792,
4454          0.09869873],
4455          [-0.48627497, -0.43632855, -0.41119007, -0.
        50089539, -0.47769441,
4456          -0.43396329],
4457          [-0.43085932, -0.46870013, -0.39050436, -0.
        41048981, -0.44022222,
4458          -0.44764013],
4459          [-0.42587448, -0.47242065, -0.45995508, -0.
        50282536, -0.42406661,
4460          -0.49186166],
4461          [-0.44459124, -0.50175121, -0.45498289, -0.
        45965054, -0.48788853,
4462          -0.4946107 ],
4463          [-0.46762194, -0.45684741, -0.49369535, -0.

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4463 41979627, -0.40264853,
4464           -0.46864388]], array([-0.02188358, -0.
4465           49476969, -0.74842868],
4466           [-0.37048508, -0.09861583,  0.02289223],
4467           [-0.44646018, -0.09830009,  0.02160304],
4468           [-0.41095005, -0.13806847,  0.02629455],
4469           [-0.47522771, -0.11083052,  0.03670587],
4470           [-0.40927652, -0.16688508,  0.03829235],
4471           [-0.41394798, -0.16459425,  0.04420602]]])
4472
4472 Best n:
4473 0.3
4474 Confusion Matrix:
4475 [[10  0  0]
4476 [ 7  0  3]
4477 [ 0  0 10]]
4478 Precision:
4479 0.6666666666666666
4480 [2018-12-18 10:13:14.071001] training MLP [5, 6, 3] with
n=0.3
4481 [2018-12-18 10:13:14.071999] iteration 0
4482 [2018-12-18 10:13:16.303713] iteration 1
4483 [2018-12-18 10:13:18.547432] iteration 2
4484 [2018-12-18 10:13:20.758158] iteration 3
4485 [2018-12-18 10:13:22.926899] iteration 4
4486 [2018-12-18 10:13:25.085668] training MLP [5, 6, 3] with
n=0.1
4487 [2018-12-18 10:13:25.085668] iteration 0
4488 [2018-12-18 10:13:27.260417] iteration 1
4489 [2018-12-18 10:13:29.271257] iteration 2
4490 [2018-12-18 10:13:31.290095] iteration 3
4491 [2018-12-18 10:13:33.350896] iteration 4
4492 [2018-12-18 10:13:35.529641] training MLP [5, 6, 3] with
n=0.03
4493 [2018-12-18 10:13:35.529641] iteration 0
4494 [2018-12-18 10:13:37.649422] iteration 1
4495 [2018-12-18 10:13:39.885134] iteration 2
4496 [2018-12-18 10:13:41.976929] iteration 3
4497 [2018-12-18 10:13:44.422519] iteration 4
4498 [2018-12-18 10:13:46.768170] training MLP [5, 6, 3] with
n=0.01
4499 [2018-12-18 10:13:46.768170] iteration 0
4500 [2018-12-18 10:13:49.151810] iteration 1
4501 [2018-12-18 10:13:51.276586] iteration 2
4502 [2018-12-18 10:13:53.405361] iteration 3
```

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4503 [2018-12-18 10:13:55.547134] iteration 4
4504 [2018-12-18 10:13:57.616926] training MLP [5, 6, 3] with
    n=0.003
4505 [2018-12-18 10:13:57.616926] iteration 0
4506 [2018-12-18 10:13:59.646766] iteration 1
4507 [2018-12-18 10:14:01.674585] iteration 2
4508 [2018-12-18 10:14:03.708416] iteration 3
4509 [2018-12-18 10:14:05.869171] iteration 4
4510 ##### Iris Experiment - Layers [5, 6, 3]
4511
4512 Weights:
4513 [matrix([[0.02330026, 0.06892222, 0.07860673, 0.07117193
   , 0.06621239],
4514      [0.07099692, 0.04844063, 0.00758718, 0.05407118
   , 0.07840642],
4515      [0.09627702, 0.05596109, 0.02853591, 0.05583835
   , 0.0942541 ],
4516      [0.01624435, 0.01508191, 0.09499013, 0.08788238
   , 0.01101698],
4517      [0.07560656, 0.05322617, 0.04104014, 0.03790295
   , 0.02802215],
4518      [0.02799888, 0.09760173, 0.02409981, 0.08346833
   , 0.00588349],
4519      [0.08304948, 0.05213819, 0.08531966, 0.08154228
   , 0.09206736],
4520      [0.0243576 , 0.0716872 , 0.04219297, 0.03552447
   , 0.00488345],
4521      [0.01650143, 0.01195698, 0.06059599, 0.03015278
   , 0.08512925],
4522      [0.01071059, 0.09972677, 0.01010892, 0.10456825
   , 0.06882152],
4523      [0.05967251, 0.07977278, 0.0715125 , 0.10180471
   , 0.00528749],
4524      [0.10582471, 0.03073529, 0.05098786, 0.09944154
   , 0.07316411],
4525      [0.05779254, 0.06102071, 0.08066925, 0.0341184
   , 0.03842929]]), matrix([[0.07690082, 0.09991555, 0.
   0187208 , 0.01896132, 0.07942796,
4526      0.08012421],
4527      [0.0280911 , 0.01492875, 0.1003126 , 0.07568624
   , 0.0556335 ,
4528      0.08437674],
4529      [0.04075465, 0.01278281, 0.0436991 , 0.05973896
   , 0.05048931,
4530      0.01879885],
```

File - iris

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4531 [0.03917457, 0.03689948, 0.00418369, 0.09645962
     , 0.02689673,
4532      0.07910534],
4533 [0.03426003, 0.10113242, 0.04342332, 0.01840509
     , 0.02111083,
4534      0.04438034],
4535 [0.02585116, 0.01133368, 0.08609301, 0.04246229
     , 0.03019105,
4536      0.05456207]], matrix([[ 0.04360583,  0.0426288
     , 0.07189253],
4537      [-0.18027239, -0.15616336, -0.18260868],
4538      [-0.14752035, -0.15413858, -0.16242272],
4539      [-0.15906795, -0.15252226, -0.14892201],
4540      [-0.11074726, -0.16588252, -0.16695613],
4541      [-0.1881183 , -0.17568724, -0.18296709],
4542      [-0.16171728, -0.16480312, -0.15887999]]), array
     ([[ -0.52070276, -0.46160618, -0.39587524],
4543      [-0.14412155, -0.2228444 , -0.25150526],
4544      [-0.1767429 , -0.1835336 , -0.23838636],
4545      [-0.12610529, -0.1947445 , -0.28337922]])
4546
4547 Best n:
4548 0.3
4549 Confusion Matrix:
4550 [[ 5   5   0]
4551 [ 0  10   0]
4552 [ 0   2   8]]
4553 Precision:
4554 0.7666666666666667
4555 [2018-12-18 10:14:08.293776] training MLP [5, 6, 4] with
     n=0.3
4556 [2018-12-18 10:14:08.293776] iteration 0
4557 [2018-12-18 10:14:10.536484] iteration 1
4558 [2018-12-18 10:14:12.775193] iteration 2
4559 [2018-12-18 10:14:14.830011] iteration 3
4560 [2018-12-18 10:14:17.032743] iteration 4
4561 [2018-12-18 10:14:19.479334] training MLP [5, 6, 4] with
     n=0.1
4562 [2018-12-18 10:14:19.479334] iteration 0
4563 [2018-12-18 10:14:21.573140] iteration 1
4564 [2018-12-18 10:14:23.673931] iteration 2
4565 [2018-12-18 10:14:25.864658] iteration 3
4566 [2018-12-18 10:14:28.136361] iteration 4
4567 [2018-12-18 10:14:30.248132] training MLP [5, 6, 4] with
     n=0.03
```

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4568 [2018-12-18 10:14:30.249132] iteration 0
4569 [2018-12-18 10:14:32.353933] iteration 1
4570 [2018-12-18 10:14:34.792516] iteration 2
4571 [2018-12-18 10:14:37.928711] iteration 3
4572 [2018-12-18 10:14:40.500624] iteration 4
4573 [2018-12-18 10:14:42.827681] training MLP [5, 6, 4] withn
    n=0.01
4574 [2018-12-18 10:14:42.827681] iteration 0
4575 [2018-12-18 10:14:45.023435] iteration 1
4576 [2018-12-18 10:14:47.291454] iteration 2
4577 [2018-12-18 10:14:49.617620] iteration 3
4578 [2018-12-18 10:14:51.982914] iteration 4
4579 [2018-12-18 10:14:54.188642] training MLP [5, 6, 4] withn
    n=0.003
4580 [2018-12-18 10:14:54.188642] iteration 0
4581 [2018-12-18 10:14:56.207493] iteration 1
4582 [2018-12-18 10:14:58.229328] iteration 2
4583 [2018-12-18 10:15:00.257149] iteration 3
4584 [2018-12-18 10:15:02.312964] iteration 4
4585 ##### Iris Experiment - Layers [5, 6, 4]
4586
4587 Weights:
4588 [matrix( [[ 0.06140997,  0.04486893,  0.01817387,  0.
    08005961,  0.09532898],
4589      [ 0.12280564,  0.08058826,  0.15597957,  0.
    09060385,  0.13299017],
4590      [ 0.01802003, -0.0058641 ,  0.01349621,  0.
    06650815,  0.03543518],
4591      [ 0.07280889,  0.18060444,  0.15279218,  0.
    080512 ,  0.1397222 ],
4592      [ 0.13618641,  0.19414417,  0.22120672,  0.
    12138566,  0.18095289],
4593      [ 0.10660335,  0.13535863,  0.06687646,  0.
    05130582,  0.04937501],
4594      [ 0.08832177,  0.05036839,  0.1294851 ,  0.
    06717788,  0.0783537 ],
4595      [ 0.03938182,  0.04385575,  0.02229961, -0.
    00168456,  0.0631943 ],
4596      [ 0.03506532, -0.01454269,  0.0423608 ,  0.
    01684913, -0.02473858],
4597      [ 0.11019935,  0.12724191,  0.10611024,  0.
    13516841,  0.11286787],
4598      [ 0.09619668,  0.12312569,  0.09870858,  0.
    12480895,  0.14590213],
4599      [ 0.06397712,  0.18269429,  0.13772504,  0.
```

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4599 1062568 , 0.13079166],
4600      [ 0.10900399, 0.10220638, 0.17949754, 0.
    07359433, 0.06292953]], matrix([[ 0.08729415, 0.
    08126763, 0.07933734, 0.04383284, 0.04398011,
4601          0.09477796],
4602          [-0.0520784 , -0.05542024, -0.04734286, -0.
    02428157, -0.02399487,
4603          -0.00995318],
4604          [-0.00924568, -0.02512573, -0.0180434 , -0.
    0355818 , -0.01698796,
4605          -0.08556101],
4606          [-0.01107143, -0.01687466, -0.0727153 , -0.
    00560146, 0.00301304,
4607          -0.07473936],
4608          [-0.02703613, -0.01627004, -0.02911637, -0.
    02282883, -0.03944561,
4609          -0.06562295],
4610          [-0.03950398, -0.00774787, -0.00738037, -0.
    03951816, -0.09120991,
4611          -0.09327553]]), matrix([[ 0.06506759, 0.
    04875365, 0.00325303, 0.04536676],
4612          [-0.2513804 , -0.27977168, -0.18930443, -0.
    2376784 ],
4613          [-0.26847408, -0.2492047 , -0.27478404, -0.
    2271588 ],
4614          [-0.28966925, -0.24434032, -0.20418649, -0.
    22668314],
4615          [-0.2212992 , -0.25445125, -0.28243047, -0.
    25091758],
4616          [-0.24974106, -0.20713914, -0.20719886, -0.
    26101027],
4617          [-0.23971935, -0.21897938, -0.29451418, -0.
    24294475]]), array([[[-0.14867328, -0.40984784, -0.
    66638419],
4618          [-0.42975269, -0.19426231, -0.04102213],
4619          [-0.35564406, -0.23811626, -0.01459357],
4620          [-0.39917504, -0.19250638, 0.02860209],
4621          [-0.4343801 , -0.21591673, -0.04739142]]])
4622
4623 Best n:
4624 0.3
4625 Confusion Matrix:
4626 [[10  0  0]
4627  [ 0  0 10]
4628  [ 0  0 10]]

```

```
4629 Precision:  
4630 0.6666666666666666  
4631 [2018-12-18 10:15:04.444738] training MLP [5, 6, 5] with  
n=0.3  
4632 [2018-12-18 10:15:04.444738] iteration 0  
4633 [2018-12-18 10:15:06.564515] iteration 1  
4634 [2018-12-18 10:15:08.629326] iteration 2  
4635 [2018-12-18 10:15:10.706144] iteration 3  
4636 [2018-12-18 10:15:12.742975] iteration 4  
4637 [2018-12-18 10:15:15.003658] training MLP [5, 6, 5] with  
n=0.1  
4638 [2018-12-18 10:15:15.003658] iteration 0  
4639 [2018-12-18 10:15:17.390283] iteration 1  
4640 [2018-12-18 10:15:19.776909] iteration 2  
4641 [2018-12-18 10:15:22.157539] iteration 3  
4642 [2018-12-18 10:15:24.538168] iteration 4  
4643 [2018-12-18 10:15:26.717912] training MLP [5, 6, 5] with  
n=0.03  
4644 [2018-12-18 10:15:26.717912] iteration 0  
4645 [2018-12-18 10:15:28.784722] iteration 1  
4646 [2018-12-18 10:15:30.994448] iteration 2  
4647 [2018-12-18 10:15:33.141213] iteration 3  
4648 [2018-12-18 10:15:35.190050] iteration 4  
4649 [2018-12-18 10:15:37.217878] training MLP [5, 6, 5] with  
n=0.01  
4650 [2018-12-18 10:15:37.217878] iteration 0  
4651 [2018-12-18 10:15:39.237718] iteration 1  
4652 [2018-12-18 10:15:41.267546] iteration 2  
4653 [2018-12-18 10:15:43.296378] iteration 3  
4654 [2018-12-18 10:15:45.547070] iteration 4  
4655 [2018-12-18 10:15:47.928698] training MLP [5, 6, 5] with  
n=0.003  
4656 [2018-12-18 10:15:47.928698] iteration 0  
4657 [2018-12-18 10:15:50.323320] iteration 1  
4658 [2018-12-18 10:15:52.574024] iteration 2  
4659 [2018-12-18 10:15:54.640845] iteration 3  
4660 [2018-12-18 10:15:56.779600] iteration 4  
4661 ##### Iris Experiment - Layers [5, 6, 5]  
4662  
4663 Weights:  
4664 [matrix([[ 0.02279438,  0.07606318,  0.07045797,  0.  
04245288,  0.02989856],  
4665      [ 0.03390224,  0.04146763,  0.1022096 ,  0.  
04411656,  0.06689568],  
4666      [ 0.03038881,  0.0383702 , -0.01824295,  0.
```

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4666 06772181, 0.02950991],
4667      [ 0.07344117, 0.0476469 , 0.13836844, 0.
10365245, 0.08765413],
4668      [ 0.05052018, 0.13152127, 0.07006791, 0.
04610918, 0.05564824],
4669      [ 0.05877352, 0.09256419, 0.09236072, 0.
0839177 , 0.05884408],
4670      [ 0.09568944, 0.07076877, 0.11688318, 0.
02460476, 0.09703034],
4671      [ 0.05193532, 0.05802426, 0.00458729, 0.
08233344, 0.04935946],
4672      [ 0.0631398 , -0.00389026, 0.079598 , 0.
04421951, 0.00784776],
4673      [ 0.05035877, 0.04248091, 0.11466832, 0.
05169409, 0.08994385],
4674      [ 0.10455863, 0.10650837, 0.04419924, 0.
10521462, 0.08058847],
4675      [ 0.12702569, 0.06251822, 0.05559662, 0.
1051307 , 0.08302606],
4676      [ 0.11920887, 0.10178501, 0.08980757, 0.
10418754, 0.03404689]], matrix([[ 0.00064791, 0.
05562449, 0.07996063, 0.03324586, 0.07158573,
4677      0.05969233],
4678      [-0.07663772, -0.03550303, -0.02974666, -0.
08432732, -0.05585518,
4679      -0.02107184],
4680      [-0.06291639, -0.10525381, -0.10077688, -0.
08405032, -0.04345182,
4681      -0.03442453],
4682      [-0.06619211, -0.10337935, -0.09970358, -0.
12034577, -0.05976997,
4683      -0.08505815],
4684      [-0.02892782, -0.06479156, -0.07561437, -0.
07868454, -0.07467036,
4685      -0.06577424],
4686      [-0.10510218, -0.09883532, -0.04355332, -0.
07210625, -0.07820289,
4687      -0.04612332]]), matrix([[ 0.00865161, 0.
05432442, 0.01731219, 0.03632053, 0.02464026],
4688      [-0.34483372, -0.27350001, -0.31835047, -0.
29869559, -0.31497303],
4689      [-0.26560513, -0.32448686, -0.34461516, -0.
30699641, -0.28893835],
4690      [-0.2744467 , -0.32586268, -0.28412346, -0.
33890341, -0.32966016],
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4691      [-0.3427465 , -0.35390285, -0.27695397, -0.
4692          31529632, -0.27267495],
4692      [-0.29265699, -0.27846733, -0.25325888, -0.
4693          28566909, -0.31243097],
4693      [-0.28455872, -0.2880525 , -0.33365159, -0.
4694          29118984, -0.30554323]]), array([[[-0.36804175, -0.
4695          46449901, -0.50460446],
4696      [-0.2134019 , -0.17769068, -0.12250826],
4697      [-0.23575402, -0.14555685, -0.12087209],
4698      [-0.2388215 , -0.1429721 , -0.13649452],
4699      [-0.20344327, -0.17777588, -0.11725092],
4700      [-0.19351992, -0.12790416, -0.14318402]])]
4700 Best n:
4701 0.3
4702 Confusion Matrix:
4703 [[10  0  0]
4704 [ 2  0  8]
4705 [ 0  0 10]]
4706 Precision:
4707 0.6666666666666666
4708 [2018-12-18 10:15:59.001322] training MLP [5, 6, 6] with
n=0.3
4709 [2018-12-18 10:15:59.001322] iteration 0
4710 [2018-12-18 10:16:01.065146] iteration 1
4711 [2018-12-18 10:16:03.113966] iteration 2
4712 [2018-12-18 10:16:05.163789] iteration 3
4713 [2018-12-18 10:16:07.198613] iteration 4
4714 [2018-12-18 10:16:09.243436] training MLP [5, 6, 6] with
n=0.1
4715 [2018-12-18 10:16:09.243436] iteration 0
4716 [2018-12-18 10:16:11.290245] iteration 1
4717 [2018-12-18 10:16:13.394035] iteration 2
4718 [2018-12-18 10:16:15.548793] iteration 3
4719 [2018-12-18 10:16:17.608608] iteration 4
4720 [2018-12-18 10:16:19.803343] training MLP [5, 6, 6] with
n=0.03
4721 [2018-12-18 10:16:19.803343] iteration 0
4722 [2018-12-18 10:16:21.934117] iteration 1
4723 [2018-12-18 10:16:24.081881] iteration 2
4724 [2018-12-18 10:16:26.109724] iteration 3
4725 [2018-12-18 10:16:28.135558] iteration 4
4726 [2018-12-18 10:16:30.162391] training MLP [5, 6, 6] with
n=0.01
4727 [2018-12-18 10:16:30.162391] iteration 0
```

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4728 [2018-12-18 10:16:32.196220] iteration 1
4729 [2018-12-18 10:16:34.232047] iteration 2
4730 [2018-12-18 10:16:36.264876] iteration 3
4731 [2018-12-18 10:16:38.293708] iteration 4
4732 [2018-12-18 10:16:40.350511] training MLP [5, 6, 6] with
    n=0.003
4733 [2018-12-18 10:16:40.350511] iteration 0
4734 [2018-12-18 10:16:42.479298] iteration 1
4735 [2018-12-18 10:16:44.530106] iteration 2
4736 [2018-12-18 10:16:46.575928] iteration 3
4737 [2018-12-18 10:16:48.630744] iteration 4
4738 ##### Iris Experiment - Layers [5, 6, 6]
4739
4740 Weights:
4741 [matrix([[ 0.08055708,  0.08068612,  0.0981463 ,  0.
        0650154 ,  0.05678322],
4742           [ 0.10743995,  0.0894328 ,  0.12599543,  0.
        08329111,  0.10468272],
4743           [-0.00557424, -0.00139235, -0.01591294, -0.
        02561801,  0.01767059],
4744           [ 0.20309864,  0.21206045,  0.1523597 ,  0.
        15922147,  0.18804517],
4745           [ 0.18840811,  0.16164101,  0.14876039,  0.
        12525904,  0.18976479],
4746           [ 0.14680055,  0.09883358,  0.14320897,  0.
        06494915,  0.07397608],
4747           [ 0.09435867,  0.05209272,  0.04525438,  0.
        08983014,  0.03899706],
4748           [-0.03128744,  0.0122123 ,  0.0080521 ,  0.
        01785844, -0.03496803],
4749           [ 0.00638253,  0.04781826,  0.02350684, -0.
        01394988,  0.0503996 ],
4750           [ 0.11741068,  0.16348298,  0.16753422,  0.
        12468224,  0.12038908],
4751           [ 0.09844843,  0.16830312,  0.11448773,  0.
        1549902 ,  0.10737626],
4752           [ 0.11564233,  0.1180347 ,  0.10059694,  0.
        13045238,  0.16731716],
4753           [ 0.08432006,  0.15600803,  0.1259764 ,  0.
        15377096,  0.08995969]]), matrix([[ 0.0108888 ,  0.
        01146382,  0.05541751,  0.08556551,  0.07202473,
4754           0.09132817],
4755           [-0.08302326, -0.07624893, -0.03370418, -0.
        02263628, -0.10830245,
4756           -0.0936626 ]],

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4757      [-0.0702792 , -0.0913442 , -0.05363511, -0.
        10465503, -0.06491112,
4758      -0.12374549],
4759      [-0.04570807, -0.06128867, -0.11972146, -0.
        09806804, -0.07986749,
4760      -0.07286752],
4761      [-0.04522913, -0.06055908, -0.02486527, -0.
        02194566, -0.05442927,
4762      -0.05192581],
4763      [-0.0585933 , -0.05725046, -0.07120169, -0.
        04118959, -0.07448169,
4764      -0.12281908]]), matrix([[ 0.06745175,  0.
        00147943,  0.02713624,  0.09148955,  0.02986763,
4765      0.007736 ]],
4766      [-0.35090177, -0.37429454, -0.37454874, -0.
        37515058, -0.34909757,
4767      -0.38636442],
4768      [-0.40550268, -0.32516963, -0.38218035, -0.
        34324526, -0.35560489,
4769      -0.35639953],
4770      [-0.35117106, -0.32980157, -0.32759193, -0.
        39999695, -0.3337359 ,
4771      -0.35751956],
4772      [-0.36910998, -0.3768494 , -0.32475513, -0.
        32819817, -0.40407756,
4773      -0.38514668],
4774      [-0.3979636 , -0.33570168, -0.40346123, -0.
        36222045, -0.34910826,
4775      -0.31841935],
4776      [-0.37918578, -0.39992962, -0.37219652, -0.
        41608412, -0.33905465,
4777      -0.36598352]]), array([-0.15382207, -0.
        38406209, -0.63880493],
4778      [-0.29888117, -0.17865385,  0.01057386],
4779      [-0.30647096, -0.1554065 , -0.04550427],
4780      [-0.35354163, -0.17844114, -0.02483933],
4781      [-0.33955842, -0.19046187, -0.03619685],
4782      [-0.29853055, -0.16676 , -0.01683758],
4783      [-0.29726403, -0.18308232, -0.01923471]])]
4784
4785 Best n:
4786 0.3
4787 Confusion Matrix:
4788 [[10  0  0]
4789  [ 0 10  0]
```

```
4790 [ 0  0 10]]
4791 Precision:
4792 1.0
4793 [2018-12-18 10:16:50.740546] training MLP [6, 3, 3] withn
    n=0.3
4794 [2018-12-18 10:16:50.740546] iteration 0
4795 [2018-12-18 10:16:52.768374] iteration 1
4796 [2018-12-18 10:16:54.772219] iteration 2
4797 [2018-12-18 10:16:56.776066] iteration 3
4798 [2018-12-18 10:16:58.773920] iteration 4
4799 [2018-12-18 10:17:00.778763] training MLP [6, 3, 3] withn
    n=0.1
4800 [2018-12-18 10:17:00.778763] iteration 0
4801 [2018-12-18 10:17:02.775611] iteration 1
4802 [2018-12-18 10:17:04.955344] iteration 2
4803 [2018-12-18 10:17:07.019156] iteration 3
4804 [2018-12-18 10:17:09.276856] iteration 4
4805 [2018-12-18 10:17:11.488594] training MLP [6, 3, 3] withn
    n=0.03
4806 [2018-12-18 10:17:11.488594] iteration 0
4807 [2018-12-18 10:17:13.664330] iteration 1
4808 [2018-12-18 10:17:15.836077] iteration 2
4809 [2018-12-18 10:17:17.832927] iteration 3
4810 [2018-12-18 10:17:19.827779] iteration 4
4811 [2018-12-18 10:17:21.832642] training MLP [6, 3, 3] withn
    n=0.01
4812 [2018-12-18 10:17:21.832642] iteration 0
4813 [2018-12-18 10:17:23.874462] iteration 1
4814 [2018-12-18 10:17:25.897285] iteration 2
4815 [2018-12-18 10:17:27.896151] iteration 3
4816 [2018-12-18 10:17:29.958947] iteration 4
4817 [2018-12-18 10:17:32.029753] training MLP [6, 3, 3] withn
    n=0.003
4818 [2018-12-18 10:17:32.029753] iteration 0
4819 [2018-12-18 10:17:34.109556] iteration 1
4820 [2018-12-18 10:17:36.247337] iteration 2
4821 [2018-12-18 10:17:38.320132] iteration 3
4822 [2018-12-18 10:17:40.326988] iteration 4
4823 ##### Iris Experiment - Layers [6, 3, 3]
4824
4825 Weights:
4826 [matrix([[0.07203854, 0.09445594, 0.00866159, 0.09723904
    , 0.08315137,
4827             0.08698731],
4828             [0.10669954, 0.10144882, 0.09277727, 0.06468922
```

```
4828 , 0.04669476,
4829          0.10823801],
4830          [0.09154489, 0.09190755, 0.03968481, 0.00968609
, 0.02360464,
4831          0.06578514],
4832          [0.05404469, 0.02808977, 0.1063832 , 0.1179591
, 0.09530174,
4833          0.05877915],
4834          [0.04184787, 0.07764423, 0.07526302, 0.06227998
, 0.09068749,
4835          0.07338304],
4836          [0.06346523, 0.01680157, 0.02584522, 0.0259546
, 0.07517288,
4837          0.08766387],
4838          [0.07132734, 0.04372475, 0.10779077, 0.10447791
, 0.07476741,
4839          0.01775071],
4840          [0.04187664, 0.01253481, 0.08274154, 0.00453011
, 0.02651381,
4841          0.03365048],
4842          [0.08633163, 0.03308781, 0.00872472, 0.02296168
, 0.00861938,
4843          0.06586761],
4844          [0.02742267, 0.11065261, 0.11272786, 0.05058892
, 0.03997788,
4845          0.0848521 ],
4846          [0.05145938, 0.07844712, 0.04762378, 0.10462816
, 0.08825451,
4847          0.04464418],
4848          [0.10501152, 0.0885325 , 0.02393388, 0.05727834
, 0.03435659,
4849          0.08133072],
4850          [0.03785406, 0.09429683, 0.03599553, 0.0836196
, 0.05079582,
4851          0.01626422]], matrix([[0.06059976, 0.09931418
, 0.01376761],
4852          [0.06822217, 0.04177889, 0.09482777],
4853          [0.10270813, 0.05626497, 0.03919951],
4854          [0.09392184, 0.04429058, 0.06811251],
4855          [0.07595904, 0.08489391, 0.03131645],
4856          [0.05128739, 0.07726651, 0.07096075],
4857          [0.05455425, 0.0207538 , 0.09942802]]), matrix
([[ 0.03437566, 0.03621012, 0.07522389],
4858          [-0.29146293, -0.22901479, -0.29455529],
4859          [-0.25309044, -0.30447146, -0.29780171],
```

```
4860      [-0.2336421 , -0.27182212, -0.30307724]]), array
4861      ([[[-0.58304112, -0.46244154, -0.34153862],
4862      [-0.09830222, -0.19786883, -0.31546224],
4863      [-0.11385432, -0.17533451, -0.28042182],
4864      [-0.05995775, -0.20378575, -0.28608153]]])
4865 Best n:
4866 0.3
4867 Confusion Matrix:
4868 [[10  0  0]
4869 [ 2  0  8]
4870 [ 0  0 10]]
4871 Precision:
4872 0.6666666666666666
4873 [2018-12-18 10:17:42.411789] training MLP [6, 3, 4] with
n=0.3
4874 [2018-12-18 10:17:42.411789] iteration 0
4875 [2018-12-18 10:17:44.430625] iteration 1
4876 [2018-12-18 10:17:46.453459] iteration 2
4877 [2018-12-18 10:17:48.467304] iteration 3
4878 [2018-12-18 10:17:50.482140] iteration 4
4879 [2018-12-18 10:17:52.492989] training MLP [6, 3, 4] with
n=0.1
4880 [2018-12-18 10:17:52.492989] iteration 0
4881 [2018-12-18 10:17:54.640734] iteration 1
4882 [2018-12-18 10:17:56.752530] iteration 2
4883 [2018-12-18 10:17:58.840316] iteration 3
4884 [2018-12-18 10:18:01.059038] iteration 4
4885 [2018-12-18 10:18:03.270764] training MLP [6, 3, 4] with
n=0.03
4886 [2018-12-18 10:18:03.270764] iteration 0
4887 [2018-12-18 10:18:05.441515] iteration 1
4888 [2018-12-18 10:18:07.796159] iteration 2
4889 [2018-12-18 10:18:09.818006] iteration 3
4890 [2018-12-18 10:18:11.828852] iteration 4
4891 [2018-12-18 10:18:13.830695] training MLP [6, 3, 4] with
n=0.01
4892 [2018-12-18 10:18:13.830695] iteration 0
4893 [2018-12-18 10:18:15.842537] iteration 1
4894 [2018-12-18 10:18:17.849381] iteration 2
4895 [2018-12-18 10:18:20.010124] iteration 3
4896 [2018-12-18 10:18:22.051950] iteration 4
4897 [2018-12-18 10:18:24.092773] training MLP [6, 3, 4] with
n=0.003
4898 [2018-12-18 10:18:24.092773] iteration 0
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4899 [2018-12-18 10:18:26.134599] iteration 1
4900 [2018-12-18 10:18:28.293367] iteration 2
4901 [2018-12-18 10:18:30.299216] iteration 3
4902 [2018-12-18 10:18:32.295063] iteration 4
4903 ##### Iris Experiment - Layers [6, 3, 4]
4904
4905 Weights:
4906 [matrix([[ 0.01420318,  0.0395708 ,  0.06544811,  0.
4907      03296127,  0.07290305,
4907      0.05831187],
4908      [ 0.10945953,  0.1090512 ,  0.09863585,  0.
4908      1166017 ,  0.07530447,
4909      0.0200163 ],
4910      [ 0.01144935,  0.03875419,  0.06692497, -0.
4910      01272354,  0.0374623 ,
4911      0.04981529],
4912      [ 0.16190057,  0.07721219,  0.10655741,  0.
4912      1283551 ,  0.11298686,
4913      0.06179686],
4914      [ 0.1611822 ,  0.08320741,  0.05839632,  0.
4914      12904276,  0.16242955,
4915      0.09006215],
4916      [ 0.10341686,  0.10211641,  0.10366635,  0.
4916      12925629,  0.07724332,
4917      0.08439329],
4918      [ 0.0369615 ,  0.03057484,  0.028928 ,  0.
4918      04173404,  0.1134716 ,
4919      0.01964159],
4920      [ 0.03928396,  0.01047946, -0.00143323,  0.
4920      02473587,  0.00461052,
4921      0.02991069],
4922      [ 0.05691579,  0.08424836,  0.01927737,  0.
4922      01974395,  0.03255276,
4923      0.00859915],
4924      [ 0.14976866,  0.1195641 ,  0.04599488,  0.
4924      10072382,  0.15719935,
4925      0.08964529],
4926      [ 0.10173891,  0.11416489,  0.10388864,  0.
4926      09293702,  0.06661225,
4927      0.06864698],
4928      [ 0.09771809,  0.10539508,  0.07962789,  0.
4928      19428893,  0.1079203 ,
4929      0.11446738],
4930      [ 0.07081547,  0.06632872,  0.0538718 ,  0.
4930      11787252,  0.09926736,
```

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4931          0.09278085]]), matrix([[ 0.04837015,  0.
4932          09547498,  0.09559848],
4933          [-0.07370693, -0.04314139, -0.06767895],
4934          [-0.06171037, -0.04026313, -0.02115612],
4935          [-0.05644076, -0.05114028, -0.01315036],
4936          [-0.05788257, -0.08416355, -0.05641103],
4937          [-0.08603886, -0.11506905, -0.07029696],
4938          [-0.03628684, -0.03306388, -0.016921 ]]),
4939          matrix([[ 0.01712765,  0.01914314,  0.00381243,  0.
4940          02344394],
4941          [-0.518179 , -0.51824144, -0.458475 , -0.
4942          45720046],
4943          [-0.44772884, -0.46369066, -0.46831556, -0.
4944          48393188],
4945          [-0.47288528, -0.44360202, -0.47669154, -0.
4946          45875995]]), array([[-0.21317094, -0.41960456, -0.
4947          61816889],
4948          [-0.34838346, -0.20756903, -0.07488678],
4949          [-0.32983781, -0.22460262, -0.02460444],
4950          [-0.34936415, -0.14830546, -0.0221606 ],
4951          [-0.34459584, -0.18687343, -0.0667407 ]])]

4945
4946 Best n:
4947 0.3
4948 Confusion Matrix:
4949 [[10  0  0]
4950 [ 0  8  2]
4951 [ 0  0 10]]
4952 Precision:
4953 0.9333333333333333
4954 [2018-12-18 10:18:34.841584] training MLP [6, 3, 5] with
4955      n=0.3
4956 [2018-12-18 10:18:34.841584] iteration 0
4957 [2018-12-18 10:18:37.167244] iteration 1
4958 [2018-12-18 10:18:39.331001] iteration 2
4959 [2018-12-18 10:18:41.607688] iteration 3
4960 [2018-12-18 10:18:43.768443] iteration 4
4961 [2018-12-18 10:18:45.886225] training MLP [6, 3, 5] with
4962      n=0.1
4963 [2018-12-18 10:18:45.886225] iteration 0
4964 [2018-12-18 10:18:48.036987] iteration 1
4965 [2018-12-18 10:18:50.297685] iteration 2
4966 [2018-12-18 10:18:52.558382] iteration 3
4967 [2018-12-18 10:18:54.803089] iteration 4
4968 [2018-12-18 10:18:57.023810] training MLP [6, 3, 5] with

```

```
4966 n=0.03
4967 [2018-12-18 10:18:57.023810] iteration 0
4968 [2018-12-18 10:18:59.191564] iteration 1
4969 [2018-12-18 10:19:01.546208] iteration 2
4970 [2018-12-18 10:19:03.777922] iteration 3
4971 [2018-12-18 10:19:05.959666] iteration 4
4972 [2018-12-18 10:19:08.130430] training MLP [6, 3, 5] withn
    n=0.01
4973 [2018-12-18 10:19:08.130430] iteration 0
4974 [2018-12-18 10:19:10.270183] iteration 1
4975 [2018-12-18 10:19:12.555868] iteration 2
4976 [2018-12-18 10:19:14.920505] iteration 3
4977 [2018-12-18 10:19:17.187201] iteration 4
4978 [2018-12-18 10:19:19.392930] training MLP [6, 3, 5] withn
    n=0.003
4979 [2018-12-18 10:19:19.392930] iteration 0
4980 [2018-12-18 10:19:21.583682] iteration 1
4981 [2018-12-18 10:19:23.809387] iteration 2
4982 [2018-12-18 10:19:25.961148] iteration 3
4983 [2018-12-18 10:19:28.211853] iteration 4
4984 ##### Iris Experiment - Layers [6, 3, 5]
4985
4986 Weights:
4987 [matrix([[ 0.04836349,  0.08732696,  0.05406084,  0.
        03005953,  0.06028714,
4988             0.06514889],
4989             [ 0.13734629,  0.05297069,  0.13238451,  0.
        12473488,  0.1102652 ,
4990             0.07576818],
4991             [-0.04478882,  0.05061104, -0.01348686, -0.
        05234248,  0.01861497,
4992             -0.03339635],
4993             [ 0.22609302,  0.13698617,  0.1917928 ,  0.
        228589 ,  0.09343268,
4994             0.20395331],
4995             [ 0.21760206,  0.14838834,  0.1957189 ,  0.
        22315928,  0.17638258,
4996             0.21270777],
4997             [ 0.12027948,  0.06234354,  0.1511161 ,  0.
        10064793,  0.12303343,
4998             0.06649708],
4999             [ 0.09101946,  0.13066452,  0.06338729,  0.
        14782634,  0.0481215 ,
5000             0.09797291],
5001             [ 0.00587948,  0.0501348 ,  0.02114091, -0.
```

File - iris

```
5001 00829245,  0.01359315,
5002              -0.02578962],
5003      [-0.0125047 ,  0.04897179, -0.02790226,  0.
5004      04112876,  0.03361509,
5005      0.01338564],
5006      [ 0.13499152,  0.1697352 ,  0.15405324,  0.
5007      16962613,  0.08092882,
5008      0.18326109],
5009      [ 0.14064855,  0.09852592,  0.16367474,  0.
5010      11294155,  0.10521491,
5011      0.15282134],
5012      [ 0.16297975,  0.1323734 ,  0.17201749,  0.
5013      1532778 ,  0.16814367,
5014      0.13190492],
5015      [ 0.1134221 ,  0.09198896,  0.12962583,  0.
5016      14741169,  0.11071587,
5017      0.08573325]]), matrix([[ 0.00421808,  0.
5018      05013399,  0.07337448],
5019      [-0.06905412, -0.04448997, -0.00881693],
5020      [-0.02111791,  0.00129191, -0.00704186],
5021      [-0.07976549, -0.09231793, -0.075906 ],
5022      [-0.02104614, -0.06340434, -0.03854659],
5023      [-0.02919491, -0.027449 ,  0.01289209],
5024      [-0.06031446,  0.00597691, -0.05086296]]),
5025      matrix([[ 0.01805631,  0.06224154,  0.00374134,  0.
5026      0482808 ,  0.00991828],
5027      [-0.62476888, -0.64083574, -0.64186722, -0.
5028      65284812, -0.62804408],
5029      [-0.6648245 , -0.607136 , -0.64845716, -0.
5030      60261663, -0.62777246],
5031      [-0.60607397, -0.68536253, -0.63086998, -0.
5032      65554938, -0.60143335]]), array([-0.16508729, -0.
5033      54666784, -0.80059988],
5034      [-0.335519 , -0.1321664 ,  0.10652035],
5035      [-0.38734447, -0.06464123,  0.04980258],
5036      [-0.36740395, -0.12743395,  0.11350246],
5037      [-0.32490781, -0.11614438,  0.05983509],
5038      [-0.38620739, -0.05891446,  0.04824394]]])
5039
5040 Best n:
5041 0.3
5042 Confusion Matrix:
5043 [[10  0  0]
5044  [ 0  0 10]
5045  [ 0  0 10]]
```

```
5034 Precision:  
5035 0.6666666666666666  
5036 [2018-12-18 10:19:30.572494] training MLP [6, 3, 6] with  
n=0.3  
5037 [2018-12-18 10:19:30.572494] iteration 0  
5038 [2018-12-18 10:19:32.915143] iteration 1  
5039 [2018-12-18 10:19:35.230810] iteration 2  
5040 [2018-12-18 10:19:37.578460] iteration 3  
5041 [2018-12-18 10:19:39.890127] iteration 4  
5042 [2018-12-18 10:19:42.134835] training MLP [6, 3, 6] with  
n=0.1  
5043 [2018-12-18 10:19:42.134835] iteration 0  
5044 [2018-12-18 10:19:44.447504] iteration 1  
5045 [2018-12-18 10:19:46.684215] iteration 2  
5046 [2018-12-18 10:19:48.908933] iteration 3  
5047 [2018-12-18 10:19:51.099672] iteration 4  
5048 [2018-12-18 10:19:53.445323] training MLP [6, 3, 6] with  
n=0.03  
5049 [2018-12-18 10:19:53.446322] iteration 0  
5050 [2018-12-18 10:19:55.703021] iteration 1  
5051 [2018-12-18 10:19:57.991706] iteration 2  
5052 [2018-12-18 10:20:00.269394] iteration 3  
5053 [2018-12-18 10:20:02.460132] iteration 4  
5054 [2018-12-18 10:20:04.684852] training MLP [6, 3, 6] with  
n=0.01  
5055 [2018-12-18 10:20:04.684852] iteration 0  
5056 [2018-12-18 10:20:07.032499] iteration 1  
5057 [2018-12-18 10:20:09.348178] iteration 2  
5058 [2018-12-18 10:20:11.651837] iteration 3  
5059 [2018-12-18 10:20:13.766620] iteration 4  
5060 [2018-12-18 10:20:16.043309] training MLP [6, 3, 6] with  
n=0.003  
5061 [2018-12-18 10:20:16.043309] iteration 0  
5062 [2018-12-18 10:20:18.236047] iteration 1  
5063 [2018-12-18 10:20:20.450773] iteration 2  
5064 [2018-12-18 10:20:22.678490] iteration 3  
5065 [2018-12-18 10:20:24.902207] iteration 4  
5066 ##### Iris Experiment - Layers [6, 3, 6]  
5067  
5068 Weights:  
5069 [matrix([[ 1.07170089e+00, 8.18942215e-01, 3.12356634e  
+00,  
5070 7.08264172e-01, 1.67035054e+00, 1.18238239e+  
00],  
5071 [ 1.77950349e-01, 5.05143044e-01, 8.92756499e-
```

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5071 01,
5072          6.89000684e-01, -1.16957995e+00,  3.43597723e-
      03],
5073          [ 2.35891131e+00,  1.64663617e+00,  1.66119099e+
      00,
5074          1.18844007e+00,  3.08432765e+00,  2.48014796e+
      00],
5075          [-1.83009173e+00, -1.12976794e+00, -6.00710598e-
      01,
5076          -7.75527445e-01, -3.48845512e+00, -2.13243776e+
      00],
5077          [-2.53569483e+00, -1.86827211e+00, -1.43119007e+
      00,
5078          -1.67951266e+00, -3.74118283e+00, -2.82254145e+
      00],
5079          [ 1.32275806e-01,  1.99949034e-01, -5.61197414e-
      02,
5080          1.61481701e-01, -7.87429249e-01,  4.64407886e-
      02],
5081          [-5.48121576e-02, -1.41982809e-01, -6.05540700e-
      01,
5082          -2.07138231e-01, -4.35362347e-01, -1.02685816e-
      01],
5083          [ 1.76195421e+00,  1.17743849e+00,  1.00208530e+
      00,
5084          8.81009485e-01,  2.30895027e+00,  1.83708184e+
      00],
5085          [ 1.17421281e+00,  7.58748546e-01,  6.16167619e-
      01,
5086          5.17922335e-01,  1.67594972e+00,  1.26360939e+
      00],
5087          [-1.53477711e+00, -1.23023419e+00, -1.75996067e+
      00,
5088          -1.27650544e+00, -2.34921940e+00, -1.67954248e+
      00],
5089          [-1.38629352e+00, -1.46756836e+00, -2.43597659e+
      00,
5090          -1.58965206e+00, -1.58185665e+00, -1.46219876e+
      00],
5091          [-2.23368480e+00, -2.07833285e+00, -2.59353178e+
      00,
5092          -2.03369978e+00, -2.48982849e+00, -2.33782720e+
      00],
5093          [-1.97443807e+00, -2.01245238e+00, -2.96552526e+
      00,
```

```

5094      -2.17568229e+00, -1.74591962e+00, -2.04079792e+
00]], matrix([[ 0.09384017,  0.05333671,  0.04046123],
5095      [-0.76426023, -1.36396145, -2.50393163],
5096      [ 0.33590555, -1.27352984, -2.59500368],
5097      [ 2.73458774, -1.19443557, -2.31558071],
5098      [ 0.70247479, -1.19415245, -2.60733926],
5099      [-2.62105457, -0.72261376, -1.46505727],
5100      [-1.13736004, -1.33625725, -2.43531396]]),
matrix([[ 0.0387166 ,  0.09783936,  0.09922367,  0.
00701474,  0.08820817,
5101      0.06933194],
5102      [-0.1994271 , -1.99081009, -1.38166935, -0.
33761296, -1.90958895,
5103      -1.32116393],
5104      [-1.01780448, -5.28113472, -2.84663904, -1.
11183792, -4.71973299,
5105      -2.64070358],
5106      [-3.18207235, -4.52879396, -2.49137113, -2.
89496557, -4.01941419,
5107      -2.41001773]]), array([-8.25212603, -1.
86166127,  4.26408857],
5108      [ 3.49909872,  6.04371019, -5.95985226],
5109      [ 5.33343361, -6.56789077, -5.75774778],
5110      [ 4.89596724, -0.8790487 , -6.61141154],
5111      [ 3.51073168,  5.27646124, -5.96706411],
5112      [ 5.22299041, -5.10533597, -5.95319539],
5113      [ 4.78094378, -0.54797795, -6.57055844]])]
5114
5115 Best n:
5116 0.3
5117 Confusion Matrix:
5118 [[10  0  0]
5119 [ 0 10  0]
5120 [ 0  0 10]]
5121 Precision:
5122 1.0
5123 [2018-12-18 10:20:27.267846] training MLP [6, 4, 3] with
n=0.3
5124 [2018-12-18 10:20:27.267846] iteration 0
5125 [2018-12-18 10:20:29.554529] iteration 1
5126 [2018-12-18 10:20:31.777250] iteration 2
5127 [2018-12-18 10:20:34.064933] iteration 3
5128 [2018-12-18 10:20:36.651484] iteration 4
5129 [2018-12-18 10:20:39.124494] training MLP [6, 4, 3] with
n=0.1

```

```
5130 [2018-12-18 10:20:39.124494] iteration 0
5131 [2018-12-18 10:20:41.579078] iteration 1
5132 [2018-12-18 10:20:43.905738] iteration 2
5133 [2018-12-18 10:20:46.282369] iteration 3
5134 [2018-12-18 10:20:48.622024] iteration 4
5135 [2018-12-18 10:20:50.971670] training MLP [6, 4, 3] withn
    n=0.03
5136 [2018-12-18 10:20:50.971670] iteration 0
5137 [2018-12-18 10:20:53.127429] iteration 1
5138 [2018-12-18 10:20:55.469081] iteration 2
5139 [2018-12-18 10:20:57.666813] iteration 3
5140 [2018-12-18 10:20:59.907525] iteration 4
5141 [2018-12-18 10:21:02.158227] training MLP [6, 4, 3] withn
    n=0.01
5142 [2018-12-18 10:21:02.158227] iteration 0
5143 [2018-12-18 10:21:04.379962] iteration 1
5144 [2018-12-18 10:21:06.606666] iteration 2
5145 [2018-12-18 10:21:08.798405] iteration 3
5146 [2018-12-18 10:21:10.911189] iteration 4
5147 [2018-12-18 10:21:13.070945] training MLP [6, 4, 3] withn
    n=0.003
5148 [2018-12-18 10:21:13.070945] iteration 0
5149 [2018-12-18 10:21:15.293669] iteration 1
5150 [2018-12-18 10:21:17.500398] iteration 2
5151 [2018-12-18 10:21:19.745100] iteration 3
5152 [2018-12-18 10:21:21.948833] iteration 4
5153 ##### Iris Experiment - Layers [6, 4, 3]
5154
5155 Weights:
5156 [matrix([[0.07410591, 0.05379747, 0.03012432, 0.03914149
      , 0.02529608,
      0.04817717],
5157     [0.03679514, 0.0399692 , 0.01053939, 0.03602187
      , 0.05960831,
      0.07954791],
5158     [0.01056024, 0.08023073, 0.05638178, 0.03126419
      , 0.04720755,
      0.08664262],
5159     [0.10076872, 0.09856891, 0.10691074, 0.11919881
      , 0.05193953,
      0.04369848],
5160     [0.10764018, 0.08630162, 0.04768002, 0.04469975
      , 0.07873252,
      0.02749302],
5161     [0.09781374, 0.05692171, 0.09775688, 0.04016564
```

```
5166 , 0.0555151 ,
5167          0.03024381],
5168          [0.02303097, 0.10354136, 0.06331245, 0.02853787
, 0.02274241,
5169          0.0221678 ],
5170          [0.08312667, 0.01511259, 0.06275943, 0.06085902
, 0.07001042,
5171          0.06821369],
5172          [0.07224892, 0.06208622, 0.01644968, 0.02428552
, 0.05548441,
5173          0.01243176],
5174          [0.09681536, 0.02344003, 0.05441038, 0.1001487
, 0.07208504,
5175          0.02684413],
5176          [0.03705917, 0.08191102, 0.0965114 , 0.07851188
, 0.09472467,
5177          0.04692577],
5178          [0.07244151, 0.09672408, 0.06945271, 0.10168745
, 0.09855153,
5179          0.09722001],
5180          [0.07350045, 0.02557058, 0.10763861, 0.07811485
, 0.09230024,
5181          0.07258072]], matrix([[0.06750349, 0.02767022
, 0.02632631, 0.00646615],
5182          [0.02231743, 0.04503161, 0.06706701, 0.02356968
],
5183          [0.04599865, 0.0675455 , 0.01813352, 0.04463471
],
5184          [0.03934256, 0.09210712, 0.00751401, 0.09096835
],
5185          [0.09252576, 0.08003546, 0.02812258, 0.10702381
],
5186          [0.07236728, 0.09387466, 0.04528385, 0.06023804
],
5187          [0.07899944, 0.04581093, 0.05162494, 0.09237773
]]), matrix([[ 0.03030995, 0.00723321, 0.04130391],
5188          [-0.18372794, -0.21518585, -0.22375806],
5189          [-0.23796844, -0.22976232, -0.19238656],
5190          [-0.21294372, -0.18252549, -0.1946494 ],
5191          [-0.237457 , -0.23169347, -0.18041276]]), array
([[-0.54758938, -0.47456315, -0.34074467],
5192          [-0.11487987, -0.21406243, -0.31787996],
5193          [-0.12193812, -0.17205558, -0.30789648],
5194          [-0.12968577, -0.16817126, -0.27087572]]])
```

```
5196 Best n:  
5197 0.3  
5198 Confusion Matrix:  
5199 [[10  0  0]  
5200 [ 2  0  8]  
5201 [ 0  0 10]]  
5202 Precision:  
5203 0.6666666666666666  
5204 [2018-12-18 10:21:24.257504] training MLP [6, 4, 4] with  
n=0.3  
5205 [2018-12-18 10:21:24.257504] iteration 0  
5206 [2018-12-18 10:21:26.662119] iteration 1  
5207 [2018-12-18 10:21:28.853857] iteration 2  
5208 [2018-12-18 10:21:31.112555] iteration 3  
5209 [2018-12-18 10:21:33.331277] iteration 4  
5210 [2018-12-18 10:21:35.453056] training MLP [6, 4, 4] with  
n=0.1  
5211 [2018-12-18 10:21:35.453056] iteration 0  
5212 [2018-12-18 10:21:37.750745] iteration 1  
5213 [2018-12-18 10:21:40.152350] iteration 2  
5214 [2018-12-18 10:21:42.382065] iteration 3  
5215 [2018-12-18 10:21:44.645763] iteration 4  
5216 [2018-12-18 10:21:46.893482] training MLP [6, 4, 4] with  
n=0.03  
5217 [2018-12-18 10:21:46.893482] iteration 0  
5218 [2018-12-18 10:21:49.136177] iteration 1  
5219 [2018-12-18 10:21:51.375888] iteration 2  
5220 [2018-12-18 10:21:53.673564] iteration 3  
5221 [2018-12-18 10:21:55.884292] iteration 4  
5222 [2018-12-18 10:21:58.182981] training MLP [6, 4, 4] with  
n=0.01  
5223 [2018-12-18 10:21:58.182981] iteration 0  
5224 [2018-12-18 10:22:00.528617] iteration 1  
5225 [2018-12-18 10:22:02.851280] iteration 2  
5226 [2018-12-18 10:22:05.028025] iteration 3  
5227 [2018-12-18 10:22:07.315709] iteration 4  
5228 [2018-12-18 10:22:09.649366] training MLP [6, 4, 4] with  
n=0.003  
5229 [2018-12-18 10:22:09.650363] iteration 0  
5230 [2018-12-18 10:22:11.990018] iteration 1  
5231 [2018-12-18 10:22:14.316678] iteration 2  
5232 [2018-12-18 10:22:16.523407] iteration 3  
5233 [2018-12-18 10:22:18.740130] iteration 4  
5234 ##### Iris Experiment - Layers [6, 4, 4]  
5235
```

```
5236 Weights:  
5237 [matrix([[ 0.00156665,  0.05164575,  0.0744548 ,  0.  
      04683287,  0.05434022,  
5238      0.01572438],  
5239      [ 0.08021408,  0.07950473,  0.11594035,  0.  
      08793324,  0.08670068,  
5240      0.13494584],  
5241      [ 0.01882296, -0.01049807,  0.02720084,  0.  
      02841307,  0.01270656,  
5242      0.02167547],  
5243      [ 0.07062803,  0.15906944,  0.14901324,  0.  
      13301672,  0.1713943 ,  
5244      0.14359662],  
5245      [ 0.14479867,  0.13342515,  0.10195709,  0.  
      15793453,  0.09350415,  
5246      0.15519853],  
5247      [ 0.08285939,  0.08798892,  0.13341098,  0.  
      11806204,  0.03824752,  
5248      0.10736029],  
5249      [ 0.12123775,  0.10872981,  0.10582491,  0.  
      10186939,  0.03834941,  
5250      0.10610148],  
5251      [ 0.02099416,  0.02040242,  0.01016406, -0.  
      01574179,  0.02881746,  
5252      0.04585733],  
5253      [ 0.07750654, -0.03159021,  0.01948381,  0.  
      06939264,  0.00154582,  
5254      0.0098152 ],  
5255      [ 0.08530609,  0.08724245,  0.11901412,  0.  
      07397001,  0.14058892,  
5256      0.11675587],  
5257      [ 0.09565681,  0.0961013 ,  0.11496192,  0.  
      11109551,  0.11918471,  
5258      0.10614408],  
5259      [ 0.15211851,  0.16787711,  0.11221645,  0.  
      08933443,  0.07070781,  
5260      0.08972898],  
5261      [ 0.11822599,  0.1126131 ,  0.06108575,  0.  
      15862464,  0.12565853,  
5262      0.10296561]]), matrix([[ 0.01457901,  0.  
      04962322,  0.09262696,  0.08239139],  
5263      [-0.04426384, -0.0574901 , -0.01780408, -0.  
      0432961 ],  
5264      [-0.05117552, -0.10787643, -0.06728043, -0.  
      01924448],
```

```
5265      [-0.07570456, -0.12583039, -0.07231759, -0.
06095092],
5266      [-0.05692388, -0.10602059, -0.04118181, -0.
08393487],
5267      [-0.03786712, -0.0596752 , -0.08568455, -0.
01514037],
5268      [-0.05786648, -0.05408051, -0.03928609, -0.
12401478]], matrix([[ 0.0937851 ,  0.02789736,  0.
07594312,  0.09791134],
5269      [-0.37452309, -0.38711719, -0.35295488, -0.
37594219],
5270      [-0.45288564, -0.39560055, -0.43253487, -0.
42684641],
5271      [-0.37314622, -0.42266696, -0.41327421, -0.
41630884],
5272      [-0.41361374, -0.34358917, -0.38424151, -0.
41736939]], array([-0.20073574, -0.42971795, -0.
67302391,
5273      [-0.35806409, -0.183852 ,  0.02528829],
5274      [-0.36549773, -0.16914827, -0.03406592],
5275      [-0.33059724, -0.20499816, -0.03203631],
5276      [-0.35719828, -0.17827663,  0.01644162]]])
5277
5278 Best n:
5279 0.3
5280 Confusion Matrix:
5281 [[10  0  0]
5282 [ 0  2  8]
5283 [ 0  0 10]]
5284 Precision:
5285 0.7333333333333333
5286 [2018-12-18 10:22:21.023815] training MLP [6, 4, 5] with
n=0.3
5287 [2018-12-18 10:22:21.023815] iteration 0
5288 [2018-12-18 10:22:23.421433] iteration 1
5289 [2018-12-18 10:22:25.787072] iteration 2
5290 [2018-12-18 10:22:28.112734] iteration 3
5291 [2018-12-18 10:22:30.337452] iteration 4
5292 [2018-12-18 10:22:32.545181] training MLP [6, 4, 5] with
n=0.1
5293 [2018-12-18 10:22:32.545181] iteration 0
5294 [2018-12-18 10:22:34.934805] iteration 1
5295 [2018-12-18 10:22:37.415377] iteration 2
5296 [2018-12-18 10:22:40.281727] iteration 3
5297 [2018-12-18 10:22:42.880229] iteration 4
```

```
5298 [2018-12-18 10:22:45.730589] training MLP [6, 4, 5] withn  
      n=0.03  
5299 [2018-12-18 10:22:45.730589] iteration 0  
5300 [2018-12-18 10:22:48.276121] iteration 1  
5301 [2018-12-18 10:22:50.632766] iteration 2  
5302 [2018-12-18 10:22:52.966423] iteration 3  
5303 [2018-12-18 10:22:55.341054] iteration 4  
5304 [2018-12-18 10:22:57.615745] training MLP [6, 4, 5] withn  
      n=0.01  
5305 [2018-12-18 10:22:57.615745] iteration 0  
5306 [2018-12-18 10:22:59.965391] iteration 1  
5307 [2018-12-18 10:23:02.238083] iteration 2  
5308 [2018-12-18 10:23:04.432819] iteration 3  
5309 [2018-12-18 10:23:06.770473] iteration 4  
5310 [2018-12-18 10:23:09.019177] training MLP [6, 4, 5] withn  
      n=0.003  
5311 [2018-12-18 10:23:09.019177] iteration 0  
5312 [2018-12-18 10:23:11.233903] iteration 1  
5313 [2018-12-18 10:23:13.467615] iteration 2  
5314 [2018-12-18 10:23:15.879227] iteration 3  
5315 [2018-12-18 10:23:18.562683] iteration 4  
5316 ##### Iris Experiment - Layers [6, 4, 5]  
5317  
5318 Weights:  
5319 [matrix([[ 1.08368600e-02,   8.39459811e-02,   9.56572697e-  
      -02,  
      7.13690618e-05,   3.26785012e-02,   4.74455817e-  
      02],  
      [ 1.37494340e-01,   1.33045119e-01,   1.36146682e-  
      01,  
      1.01640888e-01,   1.35811134e-01,   1.57945929e-  
      01],  
      [ 9.21221824e-03,   -3.64368434e-02,   -3.44104992e-  
      02,  
      1.32612886e-02,   -3.84190340e-03,   -3.13449553e-  
      02],  
      [ 1.64809406e-01,   1.60783105e-01,   1.52076203e-  
      01,  
      2.25645793e-01,   1.49264896e-01,   1.93515668e-  
      01],  
      [ 2.00853802e-01,   1.53877427e-01,   1.73503088e-  
      01,  
      1.85635956e-01,   2.30589833e-01,   1.94574927e-  
      01],  
      [ 8.72465613e-02,   9.03639821e-02,   4.11903104e-
```

```

5329 02,
5330           1.58899392e-01,   8.79485897e-02,   5.81455659e-
      02],
5331           [ 1.16632264e-01,   1.35744411e-01,   3.37276015e-
      02,
5332           1.30224880e-01,   1.23589163e-01,   1.08644587e-
      01],
5333           [ 4.17682420e-02,   3.79057233e-02,   3.23785929e-
      02,
5334           1.39440458e-02,   -4.12217719e-02,   -4.81305201e-
      02],
5335           [ 3.61205985e-03,   4.99359559e-03,   -3.06224185e-
      02,
5336           -2.93633562e-02,   -4.17067768e-02,   -1.11158327e-
      02],
5337           [ 1.71067844e-01,   1.10132149e-01,   1.34995356e-
      01,
5338           1.94296448e-01,   1.75357663e-01,   1.74675681e-
      01],
5339           [ 1.28431736e-01,   1.22857597e-01,   1.01115900e-
      01,
5340           1.23998537e-01,   1.51358264e-01,   1.33311111e-
      01],
5341           [ 2.21543421e-01,   1.82313582e-01,   1.37668920e-
      01,
5342           1.58867779e-01,   1.19253248e-01,   1.83503588e-
      01],
5343           [ 1.30678251e-01,   1.74451531e-01,   1.07707449e-
      01,
5344           1.50214685e-01,   1.50169231e-01,   8.71403109e-
      02]], matrix([[ 0.07557011,   0.00322431,   0.09774777,
      0.04540624],
5345           [-0.08634878,   -0.00069194,   -0.07732512,   -0.
      03226283],
5346           [-0.05014831,   -0.04601893,   -0.06815197,   -0.
      09057447],
5347           [-0.04985103,   -0.04918528,   -0.0908214 ,   -0.
      08284732],
5348           [-0.08207833,   -0.02846104,   -0.06554442,   -0.
      05638816],
5349           [-0.05440648,   -0.02139079,   -0.0783693 ,   -0.
      09378224],
5350           [-0.09079336,   -0.07452698,   -0.04687562,   -0.
      06681798]]), matrix([[ 0.08545885,   0.09279943,   0.
      03392354,   0.01993932,   0.07528801],

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```
5351      [-0.49679603, -0.46602753, -0.49638015, -0.
5352          50453411, -0.51907616],
5352      [-0.50446073, -0.53477398, -0.49084213, -0.
5353          4937519 , -0.48920573],
5353      [-0.5163378 , -0.48142435, -0.47897185, -0.
5354          48649853, -0.49330373],
5354      [-0.51373871, -0.51585758, -0.48709272, -0.
5355          46051834, -0.50864452]]), array([[[-0.07537857, -0.
5356          49185967, -0.73139398],
5355      [-0.38210403, -0.14797669,  0.08935234],
5356      [-0.3873642 , -0.09266032, -0.01167994],
5357      [-0.45534574, -0.17705822,  0.01812777],
5358      [-0.42592889, -0.15508242,  0.01445747],
5359      [-0.41440068, -0.0988908 ,  0.03384326]])]
5360
5361 Best n:
5362 0.3
5363 Confusion Matrix:
5364 [[10  0  0]
5365 [ 0  0 10]
5366 [ 0  0 10]]
5367 Precision:
5368 0.6666666666666666
5369 [2018-12-18 10:23:21.268123] training MLP [6, 4, 6] with
n=0.3
5370 [2018-12-18 10:23:21.268123] iteration 0
5371 [2018-12-18 10:23:24.135472] iteration 1
5372 [2018-12-18 10:23:26.772956] iteration 2
5373 [2018-12-18 10:23:29.172574] iteration 3
5374 [2018-12-18 10:23:31.538211] iteration 4
5375 [2018-12-18 10:23:33.823893] training MLP [6, 4, 6] with
n=0.1
5376 [2018-12-18 10:23:33.823893] iteration 0
5377 [2018-12-18 10:23:36.054610] iteration 1
5378 [2018-12-18 10:23:38.315308] iteration 2
5379 [2018-12-18 10:23:40.671953] iteration 3
5380 [2018-12-18 10:23:43.123541] iteration 4
5381 [2018-12-18 10:23:45.373245] training MLP [6, 4, 6] with
n=0.03
5382 [2018-12-18 10:23:45.373245] iteration 0
5383 [2018-12-18 10:23:47.650931] iteration 1
5384 [2018-12-18 10:23:49.989585] iteration 2
5385 [2018-12-18 10:23:52.345231] iteration 3
5386 [2018-12-18 10:23:54.638909] iteration 4
5387 [2018-12-18 10:23:56.841639] training MLP [6, 4, 6] with
```

```
5387 n=0.01
5388 [2018-12-18 10:23:56.841639] iteration 0
5389 [2018-12-18 10:23:59.057365] iteration 1
5390 [2018-12-18 10:24:01.237109] iteration 2
5391 [2018-12-18 10:24:03.551776] iteration 3
5392 [2018-12-18 10:24:05.837461] iteration 4
5393 [2018-12-18 10:24:08.031198] training MLP [6, 4, 6] with
      n=0.003
5394 [2018-12-18 10:24:08.031198] iteration 0
5395 [2018-12-18 10:24:10.300889] iteration 1
5396 [2018-12-18 10:24:12.599566] iteration 2
5397 [2018-12-18 10:24:14.793305] iteration 3
5398 [2018-12-18 10:24:17.068994] iteration 4
5399 ##### Iris Experiment - Layers [6, 4, 6]
5400
5401 Weights:
5402 [matrix([[ 0.07545275,  0.08879015,  0.05181161,  0.
      06332963,  0.12128569,
      0.04140994],
      [ 0.20053594,  0.2388744 ,  0.19711913,  0.
      2074342 ,  0.20164621,
      0.20184126],
      [-0.03958939, -0.02369629,  0.0233431 , -0.
      12846128, -0.00957512,
      -0.11524092],
      [ 0.36723883,  0.34774552,  0.38306185,  0.
      36037398,  0.33612201,
      0.38730228],
      [ 0.35118133,  0.42164147,  0.3514693 ,  0.
      39778451,  0.32196694,
      0.37477116],
      [ 0.1922443 ,  0.18562619,  0.21360443,  0.
      22760243,  0.18521848,
      0.17091438],
      [ 0.17703273,  0.09894479,  0.21164134,  0.
      18786581,  0.16770722,
      0.18765286],
      [ 0.01420826, -0.05842828, -0.04232091, -0.
      11848278, -0.02139886,
      -0.03998023],
      [-0.02011368, -0.01969069,  0.00917163, -0.
      0258672 ,  0.00211564,
      -0.08303564],
      [ 0.31912416,  0.2840435 ,  0.29710218,  0.
      2883165 ,  0.23329937,
```

```
5421          0.30533485],  
5422          [ 0.18995647,  0.27754401,  0.21638083,  0.  
    27799325,  0.22567726,  
5423          0.19684039],  
5424          [ 0.31703365,  0.34876202,  0.34252063,  0.  
    37270333,  0.28974901,  
5425          0.33088149],  
5426          [ 0.23148804,  0.23028465,  0.28936541,  0.  
    27051895,  0.30447759,  
5427          0.28010557]]), matrix([[ 0.09360087,  0.  
    01782058,  0.03456272,  0.06330915],  
5428          [-0.0317575 ,  0.48075056, -0.0223005 ,  0.  
    01688946],  
5429          [-0.03227393,  0.45462865, -0.01624276, -0.  
    00485136],  
5430          [ 0.006897 ,  0.53762046, -0.03209112, -0.  
    04408944],  
5431          [-0.10001908,  0.50936521, -0.03059482, -0.  
    05868503],  
5432          [-0.04894813,  0.50872297, -0.02190338,  0.  
    02979794],  
5433          [-0.04858353,  0.4318591 , -0.02102874, -0.  
    03397636]]), matrix([[ 4.93678353e-02,  6.23601167e-04  
    , 6.17519365e-02,  
5434          1.22626594e-02,  9.23828624e-02,  9.11367713e-  
    02],  
5435          [-5.90559240e-01, -8.91790227e-01, -6.30805468e-  
    01,  
5436          -9.12422145e-01, -5.34837105e-01, -1.39454383e+  
    00],  
5437          [-2.64026206e-01, -1.09581069e+00, -3.89305278e-  
    01,  
5438          1.45899618e-01,  1.37137843e-01, -1.81581065e+  
    00],  
5439          [-5.84801799e-01, -8.78878260e-01, -5.84057602e-  
    01,  
5440          -1.03557900e+00, -5.76241435e-01, -1.27905452e+  
    00],  
5441          [-5.06400008e-01, -7.66230072e-01, -5.32224129e-  
    01,  
5442          -9.55289607e-01, -3.94478647e-01, -1.58311861e+  
    00]]), array([[ -0.58499096, -0.6384766 , -0.54188051],  
5443          [ 0.20515767, -0.03597368, -0.46387815],  
5444          [-0.63128727, -0.15158526,  0.48685814],  
5445          [ 0.17821761, -0.07213642, -0.44038311],
```

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5446      [-0.61670281, -0.20179348,  0.52164987],  
5447      [-0.03672346,  0.11938393, -0.20821949],  
5448      [ 0.18165041, -0.4462674 , -0.12543621]]])  
5449  
5450 Best n:  
5451 0.3  
5452 Confusion Matrix:  
5453 [[10  0  0]  
5454 [ 0 10  0]  
5455 [ 0  0 10]]  
5456 Precision:  
5457 1.0  
5458 [2018-12-18 10:24:19.537572] training MLP [6, 5, 3] with  
n=0.3  
5459 [2018-12-18 10:24:19.537572] iteration 0  
5460 [2018-12-18 10:24:21.923199] iteration 1  
5461 [2018-12-18 10:24:24.203885] iteration 2  
5462 [2018-12-18 10:24:26.507559] iteration 3  
5463 [2018-12-18 10:24:28.699297] iteration 4  
5464 [2018-12-18 10:24:30.870055] training MLP [6, 5, 3] with  
n=0.1  
5465 [2018-12-18 10:24:30.871046] iteration 0  
5466 [2018-12-18 10:24:33.212698] iteration 1  
5467 [2018-12-18 10:24:35.427423] iteration 2  
5468 [2018-12-18 10:24:37.604169] iteration 3  
5469 [2018-12-18 10:24:40.040765] iteration 4  
5470 [2018-12-18 10:24:42.680257] training MLP [6, 5, 3] with  
n=0.03  
5471 [2018-12-18 10:24:42.680257] iteration 0  
5472 [2018-12-18 10:24:44.955954] iteration 1  
5473 [2018-12-18 10:24:47.415522] iteration 2  
5474 [2018-12-18 10:24:49.536296] iteration 3  
5475 [2018-12-18 10:24:51.665074] iteration 4  
5476 [2018-12-18 10:24:53.754867] training MLP [6, 5, 3] with  
n=0.01  
5477 [2018-12-18 10:24:53.754867] iteration 0  
5478 [2018-12-18 10:24:55.799691] iteration 1  
5479 [2018-12-18 10:24:57.846528] iteration 2  
5480 [2018-12-18 10:24:59.938307] iteration 3  
5481 [2018-12-18 10:25:02.167024] iteration 4  
5482 [2018-12-18 10:25:04.444713] training MLP [6, 5, 3] with  
n=0.003  
5483 [2018-12-18 10:25:04.444713] iteration 0  
5484 [2018-12-18 10:25:06.684423] iteration 1  
5485 [2018-12-18 10:25:08.988096] iteration 2
```

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5486 [2018-12-18 10:25:11.297767] iteration 3
5487 [2018-12-18 10:25:13.696385] iteration 4
5488 ##### Iris Experiment - Layers [6, 5, 3]
5489
5490 Weights:
5491 [matrix([[ 0.09135993,  0.02109034,  0.0791062 ,  0.
      06628542,  0.09571632,
5492           0.04453759],
5493           [ 0.06136179,  0.00778652,  0.05225398,  0.
      06799283,  0.07074633,
5494           0.06376249],
5495           [ 0.01232416,  0.09553968,  0.06638682,  0.
      07840942,  0.03422374,
5496           0.01373989],
5497           [ 0.08206946,  0.04673466,  0.06290296,  0.
      05205021,  0.07671771,
5498           0.0936926 ],
5499           [ 0.10248062,  0.04890039,  0.02864799,  0.
      04876543,  0.00782452,
5500           0.030128 ],
5501           [ 0.06982175,  0.08448446,  0.0543668 ,  0.
      08900464, -0.00310454,
5502           0.09420279],
5503           [ 0.0225966 ,  0.08738998,  0.08003192,  0.
      02022081,  0.09013845,
5504           0.03021373],
5505           [ 0.01588192,  0.02879865,  0.07126529,  0.
      0708143 ,  0.0662338 ,
5506           0.03866431],
5507           [ 0.00921681,  0.0259077 ,  0.04078114,  0.
      01372044,  0.0183581 ,
5508           0.0696274 ],
5509           [ 0.02088663,  0.09591172,  0.03075111,  0.
      011351961,  0.05979332,
5510           0.02842965],
5511           [ 0.09379258,  0.02971248,  0.03600299,  0.
      07309858,  0.06651582,
5512           0.03061186],
5513           [ 0.02771511,  0.05615461,  0.04781811,  0.
      07566191,  0.01991162,
5514           0.09739837],
5515           [ 0.09532508,  0.04650161,  0.09150101,  0.
      03924342,  0.07338437,
5516           0.09266711]]), matrix([[ 0.070496 ,  0.
      03255693,  0.02388822,  0.08691579,  0.08539086],
```

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5517      [-0.10043041, -0.0787135 , -0.096928 , -0.
      06335486, -0.04213215],
5518      [-0.04852101, -0.00027891, -0.0114501 , -0.
      05064637, -0.04598785],
5519      [-0.0825315 , -0.03559378, -0.06915954, -0.
      05329078, -0.03092117],
5520      [ 0.0260294 , -0.02388101, -0.07109736, -0.
      04002429, -0.06041305],
5521      [-0.00640294, -0.03730095, -0.0932161 , -0.
      05134193, -0.06884975],
5522      [-0.02434176, -0.02422497, -0.0556241 , -0.
      10168022, -0.06531504]]), matrix([[ 0.00739311,  0.
      06222824,  0.09028384],
5523      [-0.17473329, -0.21921167, -0.21132396],
5524      [-0.22200751, -0.18659612, -0.16281047],
5525      [-0.23881333, -0.19357969, -0.18650547],
5526      [-0.19346443, -0.22048601, -0.2509699 ],
5527      [-0.19077275, -0.20713613, -0.16732409]]), array
      ([[ -0.40974086, -0.45248952, -0.51484261],
5528      [-0.2303538 , -0.16226914, -0.08937566],
5529      [-0.19287321, -0.18344216, -0.19066112],
5530      [-0.26938091, -0.23773253, -0.14672922]]])
5531
5532 Best n:
5533 0.3
5534 Confusion Matrix:
5535 [[10  0  0]
5536 [ 0 10  0]
5537 [ 0  3  7]]
5538 Precision:
5539 0.9
5540 [2018-12-18 10:25:16.076014] training MLP [6, 5, 4] with
      n=0.3
5541 [2018-12-18 10:25:16.076014] iteration 0
5542 [2018-12-18 10:25:18.455645] iteration 1
5543 [2018-12-18 10:25:20.645382] iteration 2
5544 [2018-12-18 10:25:22.735180] iteration 3
5545 [2018-12-18 10:25:24.918924] iteration 4
5546 [2018-12-18 10:25:27.033722] training MLP [6, 5, 4] with
      n=0.1
5547 [2018-12-18 10:25:27.033722] iteration 0
5548 [2018-12-18 10:25:29.206457] iteration 1
5549 [2018-12-18 10:25:31.434172] iteration 2
5550 [2018-12-18 10:25:33.488989] iteration 3
5551 [2018-12-18 10:25:35.780667] iteration 4

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5552 [2018-12-18 10:25:38.032370] training MLP [6, 5, 4] withn  
      n=0.03  
5553 [2018-12-18 10:25:38.033371] iteration 0  
5554 [2018-12-18 10:25:40.448980] iteration 1  
5555 [2018-12-18 10:25:42.748655] iteration 2  
5556 [2018-12-18 10:25:45.056329] iteration 3  
5557 [2018-12-18 10:25:47.172110] iteration 4  
5558 [2018-12-18 10:25:49.227942] training MLP [6, 5, 4] withn  
      n=0.01  
5559 [2018-12-18 10:25:49.227942] iteration 0  
5560 [2018-12-18 10:25:51.383684] iteration 1  
5561 [2018-12-18 10:25:53.429523] iteration 2  
5562 [2018-12-18 10:25:55.551285] iteration 3  
5563 [2018-12-18 10:25:57.632086] iteration 4  
5564 [2018-12-18 10:25:59.773852] training MLP [6, 5, 4] withn  
      n=0.003  
5565 [2018-12-18 10:25:59.773852] iteration 0  
5566 [2018-12-18 10:26:02.070530] iteration 1  
5567 [2018-12-18 10:26:04.352215] iteration 2  
5568 [2018-12-18 10:26:06.688871] iteration 3  
5569 [2018-12-18 10:26:08.974554] iteration 4  
5570 ##### Iris Experiment - Layers [6, 5, 4]  
5571  
5572 Weights:  
5573 [matrix( [[ 0.08305708, 0.06272568, 0.05499376, 0.  
      07172328, 0.04975239,  
5574          0.02329586],  
5575          [ 0.08754781, 0.08818319, 0.12025487, 0.  
      02824499, 0.10509873,  
5576          0.08253426],  
5577          [ 0.0609691 , 0.00483269, -0.01639037, 0.  
      03073016, 0.01699163,  
5578          -0.0111971 ],  
5579          [ 0.07772561, 0.15950722, 0.10575555, 0.  
      10564123, 0.1108703 ,  
5580          0.14095758],  
5581          [ 0.08800553, 0.08142401, 0.10554197, 0.  
      11535071, 0.08763481,  
5582          0.16884112],  
5583          [ 0.0451671 , 0.05864384, 0.1106137 , 0.  
      01642655, 0.08194353,  
5584          0.06608726],  
5585          [ 0.06474947, 0.06584446, 0.07650915, 0.  
      0600671 , 0.07035251,  
5586          0.11498642],
```

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5587      [-0.008654 , -0.00330469,  0.00328323,  0.  
03214816, -0.00837135,  
5588      -0.00455068],  
5589      [-0.01006891, -0.01369263, -0.0167194 ,  0.  
06070692,  0.00337872,  
5590      0.00702533],  
5591      [ 0.12543126,  0.15268049,  0.14957479,  0.  
10909701,  0.07663719,  
5592      0.11387767],  
5593      [ 0.06907344,  0.09269524,  0.07332985,  0.  
09731013,  0.12718061,  
5594      0.09348522],  
5595      [ 0.12453316,  0.13817112,  0.08454991,  0.  
0750667 ,  0.14251789,  
5596      0.12105743],  
5597      [ 0.06926407,  0.08958261,  0.14778522,  0.  
03781486,  0.118965 ,  
5598      0.0801854 ]]), matrix([[ 0.0325612 ,  0.  
07968169,  0.06905341,  0.07134256,  0.09017704],  
5599      [-0.06079674, -0.0880147 , -0.03341929, -0.  
03408147, -0.07781219],  
5600      [-0.06615608, -0.10733068, -0.0693123 , -0.  
06228158, -0.10830736],  
5601      [-0.13195228, -0.03183259, -0.02952233, -0.  
08508551, -0.0574638 ],  
5602      [-0.0601176 , -0.01678696, -0.08772342, -0.  
07703652, -0.03667995],  
5603      [-0.04350727, -0.05313846, -0.03875037, -0.  
09792941, -0.04309701],  
5604      [-0.06526533, -0.01996557, -0.02395164, -0.  
07809606, -0.08518986]]), matrix([[ 0.07736283,  0.  
05842656,  0.07901101,  0.02839046],  
5605      [-0.28060242, -0.27575919, -0.35138392, -0.  
31827077],  
5606      [-0.27672336, -0.33639303, -0.31885656, -0.  
28591039],  
5607      [-0.30124063, -0.32614671, -0.25488729, -0.  
28406409],  
5608      [-0.32304846, -0.28715664, -0.32490369, -0.  
34737188],  
5609      [-0.31579507, -0.31948051, -0.30960913, -0.  
31551449]]), array([[ -0.2501413 , -0.42060936, -0.  
63831222],  
5610      [-0.31473982, -0.17583249, -0.03529476],  
5611      [-0.32385805, -0.22131538, -0.06137102],
```

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5612      [-0.27688854, -0.1915837 , -0.0542371 ],
5613      [-0.35256079, -0.17957283,  0.01828259]]])
5614
5615 Best n:
5616 0.3
5617 Confusion Matrix:
5618 [[10  0  0]
5619 [ 0  3  7]
5620 [ 0  0 10]]
5621 Precision:
5622 0.7666666666666667
5623 [2018-12-18 10:26:11.340191] training MLP [6, 5, 5] withn
      n=0.3
5624 [2018-12-18 10:26:11.340191] iteration 0
5625 [2018-12-18 10:26:13.726818] iteration 1
5626 [2018-12-18 10:26:16.021496] iteration 2
5627 [2018-12-18 10:26:18.403126] iteration 3
5628 [2018-12-18 10:26:20.471953] iteration 4
5629 [2018-12-18 10:26:22.666669] training MLP [6, 5, 5] withn
      n=0.1
5630 [2018-12-18 10:26:22.666669] iteration 0
5631 [2018-12-18 10:26:24.720488] iteration 1
5632 [2018-12-18 10:26:26.892237] iteration 2
5633 [2018-12-18 10:26:29.049996] iteration 3
5634 [2018-12-18 10:26:31.112806] iteration 4
5635 [2018-12-18 10:26:33.180617] training MLP [6, 5, 5] withn
      n=0.03
5636 [2018-12-18 10:26:33.180617] iteration 0
5637 [2018-12-18 10:26:35.432322] iteration 1
5638 [2018-12-18 10:26:37.683024] iteration 2
5639 [2018-12-18 10:26:40.109644] iteration 3
5640 [2018-12-18 10:26:42.366326] iteration 4
5641 [2018-12-18 10:26:44.583049] training MLP [6, 5, 5] withn
      n=0.01
5642 [2018-12-18 10:26:44.583049] iteration 0
5643 [2018-12-18 10:26:46.609885] iteration 1
5644 [2018-12-18 10:26:48.640726] iteration 2
5645 [2018-12-18 10:26:50.697529] iteration 3
5646 [2018-12-18 10:26:52.748361] iteration 4
5647 [2018-12-18 10:26:54.886116] training MLP [6, 5, 5] withn
      n=0.003
5648 [2018-12-18 10:26:54.886116] iteration 0
5649 [2018-12-18 10:26:56.956925] iteration 1
5650 [2018-12-18 10:26:59.241610] iteration 2
5651 [2018-12-18 10:27:01.516298] iteration 3
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5652 [2018-12-18 10:27:03.817974] iteration 4
5653 ##### Iris Experiment - Layers [6, 5, 5]
5654
5655 Weights:
5656 [matrix([[ 0.05736307,  0.09081476,  0.09450697,  0.
      08455982,  0.06811412,
5657          0.05850878],
5658          [ 0.08179066,  0.08474239,  0.05083617,  0.
      12482369,  0.0884418 ,
5659          0.09610124],
5660          [ 0.00744743,  0.06457957,  0.02510778, -0.
      02441202, -0.03312633,
5661          0.0557219 ],
5662          [ 0.11862661,  0.14330924,  0.13596145,  0.
      19644243,  0.12831246,
5663          0.16774313],
5664          [ 0.14068884,  0.08008699,  0.11164959,  0.
      14423751,  0.17026788,
5665          0.12283805],
5666          [ 0.03317398,  0.03904399,  0.04854729,  0.
      09056906,  0.09677315,
5667          0.10706669],
5668          [ 0.08945276,  0.06288698,  0.0362361 ,  0.
      05356196,  0.09213183,
5669          0.10547523],
5670          [-0.00413136,  0.07928222, -0.00121483, -0.
      0398007 ,  0.04486736,
5671          0.02786108],
5672          [ 0.07395342,  0.03759475,  0.06553582,  0.
      03085185,  0.01147302,
5673          -0.00785627],
5674          [ 0.08259287,  0.049951 ,  0.08256919,  0.
      1160001 ,  0.15312504,
5675          0.08485713],
5676          [ 0.13257412,  0.11902747,  0.12103565,  0.
      09108498,  0.11602449,
5677          0.08818372],
5678          [ 0.1540532 ,  0.09907508,  0.12348477,  0.
      13568271,  0.10558684,
5679          0.09815019],
5680          [ 0.05418781,  0.04399106,  0.15024204,  0.
      12847065,  0.10276657,
5681          0.14181695]]), matrix([[ 0.0980056 ,  0.
      01473221,  0.01850873,  0.08741589,  0.07706787],
5682          [-0.11738977, -0.10351689, -0.04060037, -0.
```

```

5682 0188552 , -0.05027457],
5683      [-0.05283361, -0.01173367, -0.04781629, -0.
5684          05822229, -0.07526658],
5685      [-0.0903695 , -0.02772859, -0.02745445, -0.
5686          06079964, -0.08819051],
5687      [-0.09044665, -0.09959028, -0.04728709, -0.
5688          06311461, -0.07196237],
5689      [-0.06533598, -0.01504947, -0.07193889, -0.
5690          03134463, -0.11556859],
5691      [-0.08071927, -0.04803092, -0.09984356, -0.
5692          04532277, -0.06700684]], matrix([[ 0.04733183,  0.
5693          01043765,  0.07235084,  0.0413393 ,  0.03259532],
5694      [-0.35249322, -0.32289974, -0.39182715, -0.
5695          35465196, -0.40708205],
5696      [-0.33621608, -0.40482227, -0.37629925, -0.
5697          33294662, -0.39898019],
5698      [-0.39831506, -0.3995824 , -0.33166097, -0.
5699          39954263, -0.38511913],
5700      [-0.3613014 , -0.32607618, -0.39075392, -0.
5701          39346374, -0.31200829],
5702      [-0.38772686, -0.40920728, -0.40391211, -0.
5703          40684752, -0.37928525]], array([[[-0.24119997, -0.
5704          5174057 , -0.69544037],
5705      [-0.33055077, -0.12619107, -0.02996575],
5706      [-0.30199304, -0.09441384, -0.0028888 ],
5707      [-0.28372886, -0.15327585, -0.01759463],
5708      [-0.28708945, -0.12903915,  0.01951615],
5709      [-0.29662568, -0.10385544,  0.01268701]]])
5710
5711
5712
5713

```

```

5713 n=0.1
5714 [2018-12-18 10:27:17.662001] iteration 0
5715 [2018-12-18 10:27:19.821770] iteration 1
5716 [2018-12-18 10:27:21.864581] iteration 2
5717 [2018-12-18 10:27:24.060319] iteration 3
5718 [2018-12-18 10:27:26.263049] iteration 4
5719 [2018-12-18 10:27:28.327873] training MLP [6, 5, 6] withn
    n=0.03
5720 [2018-12-18 10:27:28.327873] iteration 0
5721 [2018-12-18 10:27:30.534606] iteration 1
5722 [2018-12-18 10:27:32.662363] iteration 2
5723 [2018-12-18 10:27:34.921064] iteration 3
5724 [2018-12-18 10:27:37.185759] iteration 4
5725 [2018-12-18 10:27:39.566389] training MLP [6, 5, 6] withn
    n=0.01
5726 [2018-12-18 10:27:39.566389] iteration 0
5727 [2018-12-18 10:27:41.816094] iteration 1
5728 [2018-12-18 10:27:44.015829] iteration 2
5729 [2018-12-18 10:27:46.102639] iteration 3
5730 [2018-12-18 10:27:48.173445] iteration 4
5731 [2018-12-18 10:27:50.340186] training MLP [6, 5, 6] withn
    n=0.003
5732 [2018-12-18 10:27:50.340186] iteration 0
5733 [2018-12-18 10:27:52.497943] iteration 1
5734 [2018-12-18 10:27:54.622720] iteration 2
5735 [2018-12-18 10:27:56.775480] iteration 3
5736 [2018-12-18 10:27:59.093145] iteration 4
5737 ##### Iris Experiment - Layers [6, 5, 6]
5738
5739 Weights:
5740 [matrix([[ 0.072213 , 0.04161452, -0.0028065 , 0.
      01824265, 0.06162757,
      -0.01365996],
5741 [ 0.09762291, 0.15119303, 0.12044766, 0.
      17429981, 0.15799255,
      0.14064317],
5742 [ 0.01833411, -0.04079843, -0.0693975 , -0.
      0143261 , -0.07629107,
      -0.05159663],
5743 [ 0.20121314, 0.23878534, 0.26740696, 0.
      25921617, 0.23313849,
      0.26548373],
5744 [ 0.22865554, 0.1765916 , 0.22685728, 0.
      21796727, 0.25878708,
      0.28178114],
```

```

5750      [ 0.08507016,  0.12198232,  0.17267535,  0.
           11956777,  0.15033933,
5751      0.10076582],
5752      [ 0.07802425,  0.12194701,  0.10794318,  0.
           15659346,  0.09206932,
5753      0.10430179],
5754      [ 0.03280738,  0.02666873, -0.07610437, -0.
           02313812, -0.04199909,
5755      0.00608415],
5756      [ 0.01636631, -0.04963445, -0.05688606,  0.
           00338723,  0.01315484,
5757      -0.05815932],
5758      [ 0.16951186,  0.16213382,  0.17154051,  0.
           14488774,  0.23837235,
5759      0.16452578],
5760      [ 0.13133691,  0.14409814,  0.14584709,  0.
           20359054,  0.10320016,
5761      0.17889729],
5762      [ 0.16973348,  0.20928691,  0.27598893,  0.
           20072919,  0.19360875,
5763      0.17554956],
5764      [ 0.14036405,  0.11615138,  0.20094365,  0.
           14745468,  0.21366697,
5765      0.21431316]], matrix([[ 0.06858899,  0.
           06096453,  0.00886339,  0.09635021,  0.07298906],
5766      [-0.01213719, -0.02113805, -0.01567681, -0.
           01680248,  0.0508948 ],
5767      [ 0.00476394, -0.03476342,  0.04810378, -0.
           00099867, -0.00901623],
5768      [ 0.04451087, -0.01784825, -0.00956529, -0.
           01037047,  0.02215971],
5769      [-0.02783801, -0.04370036,  0.01635589,  0.
           02673048, -0.04073268],
5770      [-0.02104773, -0.03704798, -0.04549765, -0.
           02136178, -0.04970279],
5771      [-0.04527929, -0.02973711, -0.04253841,  0.
           01921129,  0.03157993]], matrix([[ 0.07637442,  0.
           03902344,  0.04951427,  0.08554379,  0.07218402,
5772      0.08964701],
5773      [-0.42484872, -0.41738803, -0.44845526, -0.
           49815235, -0.41990941,
5774      -0.43094286],
5775      [-0.48569227, -0.50442029, -0.45704715, -0.
           49206229, -0.48621408,
5776      -0.46528523],
```

```
5777 [-0.44038984, -0.47545208, -0.45208668, -0.  
      44246218, -0.45660053,  
5778     -0.44999064],  
5779     [-0.47487454, -0.43887499, -0.42971139, -0.  
      41286622, -0.49760563,  
5780     -0.47336754],  
5781     [-0.47365292, -0.42609879, -0.47236062, -0.  
      46217194, -0.46646773,  
5782     -0.49384369]], array([-0.01436172, -0.  
      46286532, -0.81925288],  
5783     [-0.42484242, -0.1454255 , 0.0874559 ],  
5784     [-0.45338343, -0.16874729, 0.06943695],  
5785     [-0.45330443, -0.17136363, 0.07881494],  
5786     [-0.42218699, -0.13386087, 0.0853305 ],  
5787     [-0.45827762, -0.15253399, 0.12105027],  
5788     [-0.48225841, -0.13573011, 0.07053118]])]  
5789  
5790 Best n:  
5791 0.3  
5792 Confusion Matrix:  
5793 [[10  0  0]  
5794 [ 1  1  8]  
5795 [ 0  0 10]]  
5796 Precision:  
5797 0.7  
5798 [2018-12-18 10:28:01.473775] training MLP [6, 6, 3] with  
      n=0.3  
5799 [2018-12-18 10:28:01.473775] iteration 0  
5800 [2018-12-18 10:28:03.794439] iteration 1  
5801 [2018-12-18 10:28:06.100111] iteration 2  
5802 [2018-12-18 10:28:08.290849] iteration 3  
5803 [2018-12-18 10:28:10.397648] iteration 4  
5804 [2018-12-18 10:28:12.464458] training MLP [6, 6, 3] with  
      n=0.1  
5805 [2018-12-18 10:28:12.464458] iteration 0  
5806 [2018-12-18 10:28:14.583226] iteration 1  
5807 [2018-12-18 10:28:16.654031] iteration 2  
5808 [2018-12-18 10:28:18.796798] iteration 3  
5809 [2018-12-18 10:28:20.983539] iteration 4  
5810 [2018-12-18 10:28:23.255233] training MLP [6, 6, 3] with  
      n=0.03  
5811 [2018-12-18 10:28:23.255233] iteration 0  
5812 [2018-12-18 10:28:25.984660] iteration 1  
5813 [2018-12-18 10:28:28.554180] iteration 2  
5814 [2018-12-18 10:28:30.904826] iteration 3
```

```
5815 [2018-12-18 10:28:33.102561] iteration 4
5816 [2018-12-18 10:28:35.221342] training MLP [6, 6, 3] withn
      n=0.01
5817 [2018-12-18 10:28:35.221342] iteration 0
5818 [2018-12-18 10:28:37.575986] iteration 1
5819 [2018-12-18 10:28:39.925633] iteration 2
5820 [2018-12-18 10:28:42.114371] iteration 3
5821 [2018-12-18 10:28:44.162205] iteration 4
5822 [2018-12-18 10:28:46.272978] training MLP [6, 6, 3] withn
      n=0.003
5823 [2018-12-18 10:28:46.272978] iteration 0
5824 [2018-12-18 10:28:48.484705] iteration 1
5825 [2018-12-18 10:28:50.791385] iteration 2
5826 [2018-12-18 10:28:52.988111] iteration 3
5827 [2018-12-18 10:28:55.389727] iteration 4
5828 ##### Iris Experiment - Layers [6, 6, 3]
5829
5830 Weights:
5831 [matrix([[ 0.01265615,  0.01342414,  0.02164425,  0.
      09050636,  0.05511145,
5832           0.03966679],
5833           [ 0.05421187,  0.11091233,  0.09017088,  0.
      05567424,  0.10813856,
5834           0.10537305],
5835           [ 0.07420287,  0.01302218,  0.00612518,  0.
      00613784,  0.02021902,
5836           0.00963573],
5837           [ 0.04930842,  0.05656806,  0.06341593,  0.
      08987744,  0.11606777,
5838           0.0556053 ],
5839           [ 0.11131849,  0.11120144,  0.07207377,  0.
      06320891,  0.10308473,
5840           0.08799753],
5841           [ 0.03149265,  0.07935554,  0.07943067,  0.
      06551451,  0.03246058,
5842           0.04271549],
5843           [ 0.11501373,  0.01502802,  0.05886375,  0.
      02708287,  0.03794715,
5844           0.05873117],
5845           [ 0.05456186,  0.00637683,  0.068798 ,  0.
      0740485 , -0.00277901,
5846           0.07641708],
5847           [ 0.03815539,  0.02544445,  0.00299762,  0.
      06963901,  0.08525932,
5848           0.03468486],
```

```

5849      [ 0.13304821,  0.11885589,  0.07295378,  0.
  05547359,  0.04852519,
5850      0.08189286],
5851      [ 0.10378971,  0.03280241,  0.10140199,  0.
  06277068,  0.07145478,
5852      0.02855328],
5853      [ 0.06406011,  0.06921213,  0.05360217,  0.
  08764167,  0.04394818,
5854      0.136792 ],
5855      [ 0.05037163,  0.0691566 ,  0.01744554,  0.
  07192822,  0.05393701,
5856      0.10183581]], matrix([[ 0.0053175 ,  0.
  09169069,  0.08803756,  0.05884117,  0.01405884,
5857      0.02297673],
5858      [-0.01065694, -0.08107153, -0.01829789,  0.
  01197875, -0.03569154,
5859      -0.07097071],
5860      [ 0.01256814, -0.10159605, -0.00505631, -0.
  01980767, -0.05534501,
5861      -0.06176742],
5862      [-0.00158712, -0.08596216, -0.00741789, -0.
  01326208, -0.03705766,
5863      -0.06606048],
5864      [-0.0434003 , -0.03732604, -0.09053926, -0.
  10643432, -0.0286482 ,
5865      -0.02003466],
5866      [-0.07177429, -0.04129072, -0.02747446, -0.
  05339749, -0.05750561,
5867      0.00472326],
5868      [ 0.00256776, -0.11900023,  0.00632255, -0.
  03173745, -0.06862842,
5869      -0.0623327 ]]), matrix([[ 0.02324515,  0.
  09740925,  0.05403307],
5870      [-0.14608319, -0.14547891, -0.19110319],
5871      [-0.21726914, -0.19823293, -0.20558135],
5872      [-0.19405556, -0.15795639, -0.12548379],
5873      [-0.19534107, -0.1438758 , -0.18944192],
5874      [-0.19617328, -0.20210016, -0.14183116],
5875      [-0.13686817, -0.18518685, -0.14190938]]), array
  ([[[-0.31494845, -0.44167029, -0.6206783 ],
5876      [-0.34911429, -0.17345899, -0.03007053],
5877      [-0.31917444, -0.236045 , -0.05306665],
5878      [-0.29222024, -0.22534687, -0.09687413]]])
5879
5880 Best n:

```

```
5881 0.3
5882 Confusion Matrix:
5883 [[10  0  0]
5884 [ 2  0  8]
5885 [ 0  0 10]]
5886 Precision:
5887 0.6666666666666666
5888 [2018-12-18 10:28:57.781352] training MLP [6, 6, 4] withn
      n=0.3
5889 [2018-12-18 10:28:57.781352] iteration 0
5890 [2018-12-18 10:29:00.058040] iteration 1
5891 [2018-12-18 10:29:02.387699] iteration 2
5892 [2018-12-18 10:29:04.688374] iteration 3
5893 [2018-12-18 10:29:07.028039] iteration 4
5894 [2018-12-18 10:29:09.097851] training MLP [6, 6, 4] withn
      n=0.1
5895 [2018-12-18 10:29:09.097851] iteration 0
5896 [2018-12-18 10:29:11.264599] iteration 1
5897 [2018-12-18 10:29:13.422344] iteration 2
5898 [2018-12-18 10:29:15.607087] iteration 3
5899 [2018-12-18 10:29:17.655904] iteration 4
5900 [2018-12-18 10:29:19.783680] training MLP [6, 6, 4] withn
      n=0.03
5901 [2018-12-18 10:29:19.783680] iteration 0
5902 [2018-12-18 10:29:21.817510] iteration 1
5903 [2018-12-18 10:29:24.000252] iteration 2
5904 [2018-12-18 10:29:26.222974] iteration 3
5905 [2018-12-18 10:29:28.465681] iteration 4
5906 [2018-12-18 10:29:30.797338] training MLP [6, 6, 4] withn
      n=0.01
5907 [2018-12-18 10:29:30.797338] iteration 0
5908 [2018-12-18 10:29:33.000071] iteration 1
5909 [2018-12-18 10:29:35.093882] iteration 2
5910 [2018-12-18 10:29:37.237631] iteration 3
5911 [2018-12-18 10:29:39.487334] iteration 4
5912 [2018-12-18 10:29:41.557142] training MLP [6, 6, 4] withn
      n=0.003
5913 [2018-12-18 10:29:41.557142] iteration 0
5914 [2018-12-18 10:29:43.605981] iteration 1
5915 [2018-12-18 10:29:45.699760] iteration 2
5916 [2018-12-18 10:29:47.816541] iteration 3
5917 [2018-12-18 10:29:50.032264] iteration 4
5918 ##### Iris Experiment - Layers [6, 6, 4]
5919
5920 Weights:
```

```
5921 [matrix([[ 0.07933586,  0.02792055,  0.03799749,  0.
      06318317,  0.07949411,
5922          0.06152298],
5923          [ 0.01417685,  0.08339788,  0.11294056,  0.
      03672673,  0.08378055,
5924          0.08943207],
5925          [-0.00533012,  0.06497715,  0.00772619,  -0.
      00673179,  0.08526381,
5926          0.06356988],
5927          [ 0.053961 ,  0.03972239,  0.0665827 ,  0.
      11228337,  0.10286067,
5928          0.1107797 ],
5929          [ 0.11190411,  0.08536799,  0.10105979,  0.
      0953326 ,  0.05023429,
5930          0.04781918],
5931          [ 0.05983878,  0.06820471,  0.03445724,  0.
      06353847,  0.09708161,
5932          0.03356576],
5933          [ 0.08363778,  0.05481518,  0.02218219,  0.
      07393051,  0.01680643,
5934          0.03783403],
5935          [ 0.03982346,  0.05110455,  -0.00824411,  -0.
      00634526,  0.01810644,
5936          0.0746484 ],
5937          [ 0.03595296,  0.02746234,  0.0156979 ,  -0.
      00761828,  0.01198266,
5938          0.07348586],
5939          [ 0.05712007,  0.04724163,  0.04213959,  0.
      10373215,  0.11778407,
5940          0.09197224],
5941          [ 0.07965132,  0.07555158,  0.08858531,  0.
      063377 ,  0.10396112,
5942          0.01672436],
5943          [ 0.09497202,  0.11231559,  0.10118378,  0.
      03588781,  0.10319503,
5944          0.10851938],
5945          [ 0.07010994,  0.06851948,  0.04871215,  0.
      08324163,  0.09415922,
5946          0.05621121]], matrix([[0.01618153, 0.01645008
      , 0.0963011 , 0.01085425, 0.05715826,
5947          0.07744914],
5948          [0.02609541, 0.05340001, 0.09578223, 0.02282547
      , 0.01759268,
5949          0.06312895],
5950          [0.08928593, 0.04056399, 0.07645777, 0.0315812
```

```

5950 , 0.07546425,
5951 0.00916957],
5952 [0.08403052, 0.09385993, 0.09831132, 0.06580851
, 0.09337399,
5953 0.08065814],
5954 [0.03827029, 0.11005188, 0.08849727, 0.07942914
, 0.02080167,
5955 0.09904584],
5956 [0.08257049, 0.02954199, 0.02783838, 0.09474594
, 0.07785262,
5957 0.03403503],
5958 [0.0655833 , 0.07403731, 0.05995074, 0.04541163
, 0.03545847,
5959 0.06308993]]), matrix([[ 0.00766459,  0.
07922374,  0.07274348,  0.08965264],
5960 [-0.23525117, -0.22138772, -0.18989751, -0.
25945283],
5961 [-0.23209069, -0.222559 , -0.27247501, -0.
24821516],
5962 [-0.22160947, -0.26601072, -0.22315398, -0.
239538 ],
5963 [-0.21087006, -0.22673071, -0.19070939, -0.
23232903],
5964 [-0.21117625, -0.23948868, -0.26126824, -0.
18739644],
5965 [-0.18526359, -0.18204223, -0.2255165 , -0.
20077331]]), array([[[-0.57842542, -0.42626909, -0.
31372511],
5966 [-0.08760823, -0.21208707, -0.26284802],
5967 [-0.08796156, -0.21570895, -0.29496818],
5968 [-0.09061013, -0.16376339, -0.2688654 ],
5969 [-0.06817481, -0.1999775 , -0.3026993 ]])]

5970
5971 Best n:
5972 0.3
5973 Confusion Matrix:
5974 [[10  0  0]
5975 [ 0  2  8]
5976 [ 0  0 10]]
5977 Precision:
5978 0.7333333333333333
5979 [2018-12-18 10:29:52.444873] training MLP [6, 6, 5] with
n=0.3
5980 [2018-12-18 10:29:52.444873] iteration 0
5981 [2018-12-18 10:29:54.854486] iteration 1

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File - iris

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5982 [2018-12-18 10:29:57.172164] iteration 2
5983 [2018-12-18 10:29:59.261961] iteration 3
5984 [2018-12-18 10:30:01.517648] iteration 4
5985 [2018-12-18 10:30:03.587457] training MLP [6, 6, 5] withn
    n=0.1
5986 [2018-12-18 10:30:03.587457] iteration 0
5987 [2018-12-18 10:30:05.656279] iteration 1
5988 [2018-12-18 10:30:07.843019] iteration 2
5989 [2018-12-18 10:30:09.901841] iteration 3
5990 [2018-12-18 10:30:11.971630] iteration 4
5991 [2018-12-18 10:30:14.258315] training MLP [6, 6, 5] withn
    n=0.03
5992 [2018-12-18 10:30:14.258315] iteration 0
5993 [2018-12-18 10:30:16.513017] iteration 1
5994 [2018-12-18 10:30:18.796700] iteration 2
5995 [2018-12-18 10:30:21.059396] iteration 3
5996 [2018-12-18 10:30:23.318097] iteration 4
5997 [2018-12-18 10:30:25.680736] training MLP [6, 6, 5] withn
    n=0.01
5998 [2018-12-18 10:30:25.680736] iteration 0
5999 [2018-12-18 10:30:27.843491] iteration 1
6000 [2018-12-18 10:30:30.120179] iteration 2
6001 [2018-12-18 10:30:32.183990] iteration 3
6002 [2018-12-18 10:30:34.219837] iteration 4
6003 [2018-12-18 10:30:36.267639] training MLP [6, 6, 5] withn
    n=0.003
6004 [2018-12-18 10:30:36.267639] iteration 0
6005 [2018-12-18 10:30:38.475369] iteration 1
6006 [2018-12-18 10:30:40.703089] iteration 2
6007 [2018-12-18 10:30:42.997764] iteration 3
6008 [2018-12-18 10:30:45.253464] iteration 4
6009 ##### Iris Experiment - Layers [6, 6, 5]
6010
6011 Weights:
6012 [matrix([[ 0.06080319,  0.01634266,  0.06792906,  0.
6013   0964257 ,  0.083008 ,
6014   0.03533392],
6015   [ 0.05699703,  0.08451353,  0.09584934,  0.
6016   13153323,  0.08088219,
6017   0.11604318],
6018   [-0.00430767,  0.0055895 ,  0.00843683, -0.
6019   00269885,  0.08955494,
6020   0.0208795 ],
6021   [ 0.12969644,  0.1328567 ,  0.10896452,  0.
6022   13501156,  0.07592682,
```

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```
6019          0.09982194],  
6020          [ 0.07420338,  0.08176424,  0.07199688,  0.  
    08229927,  0.09786245,  
6021          0.06899956],  
6022          [ 0.07178952,  0.11315189,  0.01552226,  0.  
    03260203,  0.0610701 ,  
6023          0.10085505],  
6024          [ 0.03440161,  0.09380387,  0.03316131,  0.  
    04097227,  0.03865194,  
6025          0.0461935 ],  
6026          [-0.01257359,  0.07007997,  0.04422141,  0.  
    00121944,  0.07423768,  
6027          0.05624146],  
6028          [ 0.06766228,  0.00162247,  0.01334316,  0.  
    04410776,  0.08420071,  
6029          0.07824766],  
6030          [ 0.10295827,  0.11050665,  0.05196784,  0.  
    06113358,  0.04818124,  
6031          0.08711149],  
6032          [ 0.04486776,  0.04965605,  0.02299029,  0.  
    04891481,  0.06353761,  
6033          0.09813461],  
6034          [ 0.11931096,  0.14313534,  0.08814083,  0.  
    06059347,  0.04667896,  
6035          0.06504695],  
6036          [ 0.12908493,  0.07495383,  0.11434709,  0.  
    07803218,  0.02692384,  
6037          0.03543208]], matrix([[ 0.00273021,  0.  
    03245289,  0.0709292 ,  0.03858301,  0.09988504,  
6038          0.05833922],  
6039          [-0.08770289, -0.10491928, -0.0448083 , -0.  
    03222813, -0.02358318,  
6040          -0.08210414],  
6041          [-0.12614525, -0.07856133, -0.1161528 , -0.  
    0271351 , -0.03577078,  
6042          -0.03372102],  
6043          [-0.09366302, -0.04027718, -0.04802781, -0.  
    03154015, -0.09693881,  
6044          -0.0567432 ],  
6045          [-0.04167891,  0.01462831, -0.05017442, -0.  
    04449767, -0.03962227,  
6046          -0.05223361],  
6047          [-0.12253478, -0.09023388, -0.08427613, -0.  
    09009624, -0.05822041,  
6048          -0.05874556],
```

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6049      [-0.08611735, -0.04185416, -0.09818497, -0.
07866432, -0.0694239 ,
6050      -0.01556696]], matrix([[ 0.00525726,  0.097371
,  0.00968076,  0.0849735 ,  0.02996015],
6051      [-0.33640898, -0.36552184, -0.27351776, -0.
34289542, -0.33800038],
6052      [-0.31377456, -0.35693137, -0.31019047, -0.
32106918, -0.29884203],
6053      [-0.32972875, -0.3154215 , -0.28501533, -0.
30884546, -0.306185 ],
6054      [-0.29959815, -0.3173596 , -0.31011912, -0.
33595161, -0.2801521 ],
6055      [-0.2664966 , -0.27296232, -0.34024544, -0.
34642618, -0.28975077],
6056      [-0.29909213, -0.32185091, -0.28502897, -0.
29799721, -0.29014583]]), array([[[-0.34360593, -0.
48305388, -0.53434399],
6057      [-0.19868682, -0.13909339, -0.1241204 ],
6058      [-0.27373189, -0.13296425, -0.07343963],
6059      [-0.18041636, -0.11871892, -0.13531337],
6060      [-0.25080251, -0.15850744, -0.11446457],
6061      [-0.26560894, -0.16626604, -0.10322199]])]
6062
6063 Best n:
6064 0.3
6065 Confusion Matrix:
6066 [[ 9  1  0]
6067 [ 0 10  0]
6068 [ 0  0 10]]
6069 Precision:
6070 0.9666666666666667
6071 [2018-12-18 10:30:47.588138] training MLP [6, 6, 6] with
n=0.3
6072 [2018-12-18 10:30:47.588138] iteration 0
6073 [2018-12-18 10:30:49.728905] iteration 1
6074 [2018-12-18 10:30:51.925624] iteration 2
6075 [2018-12-18 10:30:54.154339] iteration 3
6076 [2018-12-18 10:30:56.425031] iteration 4
6077 [2018-12-18 10:30:58.485845] training MLP [6, 6, 6] with
n=0.1
6078 [2018-12-18 10:30:58.485845] iteration 0
6079 [2018-12-18 10:31:00.596629] iteration 1
6080 [2018-12-18 10:31:02.815354] iteration 2
6081 [2018-12-18 10:31:05.099039] iteration 3
6082 [2018-12-18 10:31:07.370729] iteration 4

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6083 [2018-12-18 10:31:09.699401] training MLP [6, 6, 6] withn
    n=0.03
6084 [2018-12-18 10:31:09.699401] iteration 0
6085 [2018-12-18 10:31:11.965096] iteration 1
6086 [2018-12-18 10:31:14.111849] iteration 2
6087 [2018-12-18 10:31:16.348571] iteration 3
6088 [2018-12-18 10:31:18.465341] iteration 4
6089 [2018-12-18 10:31:20.680064] training MLP [6, 6, 6] withn
    n=0.01
6090 [2018-12-18 10:31:20.680064] iteration 0
6091 [2018-12-18 10:31:22.768875] iteration 1
6092 [2018-12-18 10:31:24.915626] iteration 2
6093 [2018-12-18 10:31:27.041404] iteration 3
6094 [2018-12-18 10:31:29.404041] iteration 4
6095 [2018-12-18 10:31:31.594780] training MLP [6, 6, 6] withn
    n=0.003
6096 [2018-12-18 10:31:31.594780] iteration 0
6097 [2018-12-18 10:31:33.899453] iteration 1
6098 [2018-12-18 10:31:36.210122] iteration 2
6099 [2018-12-18 10:31:38.291936] iteration 3
6100 [2018-12-18 10:31:40.338745] iteration 4
6101 ##### Iris Experiment - Layers [6, 6, 6]
6102
6103 Weights:
6104 [matrix( [[ 8.38432516e-02,   4.63489684e-02,   6.23828946e
      -02,
      6.76323998e-02,   8.94439792e-02,   8.65962854e-
      02],
      [ 8.28445309e-02,   7.08690030e-02,   1.51963065e-
      01,
      1.20247690e-01,   1.39558789e-01,   8.98824628e-
      02],
      [ 3.91278355e-02,   3.44358386e-02,   -5.61800537e-
      03,
      6.65810683e-03,   -1.83257001e-02,   1.55639233e-
      03],
      [ 1.77922656e-01,   1.88403882e-01,   1.85326436e-
      01,
      2.05494630e-01,   9.86743947e-02,   1.89764191e-
      01],
      [ 1.43380337e-01,   1.79357508e-01,   1.43139302e-
      01,
      1.26448775e-01,   1.51142860e-01,   1.74668043e-
      01],
      [ 7.65504289e-02,   6.50685434e-02,   9.12965686e-
      01]
  )

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6139      [-0.03000073, -0.05347172, -0.04232983, -0.
       11852941, -0.1151902 ,
6140      -0.07590945],
6141      [-0.03118026, -0.03076476, -0.11645035, -0.
       11631469, -0.03622069,
6142      -0.10408382]]), matrix([[ 0.02696463,  0.
       01349484,  0.04608195,  0.05897574,  0.09784234,
6143      0.08517929],
6144      [-0.39879625, -0.36147871, -0.37867449, -0.
       3357259 , -0.35187742,
6145      -0.38199136],
6146      [-0.37907988, -0.40514635, -0.33766916, -0.
       35623896, -0.43026577,
6147      -0.41060419],
6148      [-0.3369296 , -0.38290871, -0.34449165, -0.
       39532548, -0.35838802,
6149      -0.42231198],
6150      [-0.33662987, -0.3547829 , -0.40537094, -0.
       37787151, -0.42684555,
6151      -0.34850775],
6152      [-0.41898104, -0.34378329, -0.41249468, -0.
       42489004, -0.36008997,
6153      -0.375146 ],
6154      [-0.35208224, -0.38317061, -0.41206387, -0.
       37191595, -0.41013417,
6155      -0.35601199]]), array([-0.15384163, -0.
       51019371, -0.63083894],
6156      [-0.30997794, -0.14534645, -0.07919593],
6157      [-0.3095268 , -0.1135208 , -0.05367419],
6158      [-0.36692623, -0.10787671, -0.05421632],
6159      [-0.36697349, -0.13081117, -0.04046157],
6160      [-0.3334554 , -0.14285558, -0.02573566],
6161      [-0.34843102, -0.12998504, -0.06856004]])]
6162
6163 Best n:
6164 0.3
6165 Confusion Matrix:
6166 [[10  0  0]
6167 [ 3  0  7]
6168 [ 0  0 10]]
6169 Precision:
6170 0.6666666666666666
6171 ##### Iris Experiment - Best Topology [3]
6172
6173 Weights:
```

```
6174 [matrix([[-8.35197588,  1.37219133,  1.27304378],  
6175      [-1.29447301, -1.55349051, -0.26197682],  
6176      [-3.33109439,  2.37854327,  2.09177955],  
6177      [ 1.76119285, -3.61777884, -1.98777772],  
6178      [ 1.89499224, -3.64648132, -2.05620642],  
6179      [ 0.26640921, -1.00445501, -0.15768243],  
6180      [ 0.60583775, -0.51355615, -0.03961874],  
6181      [-1.92279165,  1.9067116 ,  1.58843181],  
6182      [-1.2271354 ,  1.29786147,  1.17680809],  
6183      [ 4.90561224, -2.27461838, -1.40964128],  
6184      [ 5.71899948, -1.37682998, -0.89785383],  
6185      [ 4.84859947, -2.2864464 , -1.40992022],  
6186      [ 5.50114809, -1.47999352, -1.03826657]]), array  
([[[-4.4517383 ,  3.85703738, -2.46029869],  
6187      [-3.07760858, -7.42299554,  5.97755109],  
6188      [ 5.15752573, -6.08599913, -4.02446113],  
6189      [ 3.66191006, -1.78671731, -5.48729087]]])  
6190  
6191 Best n:  
6192 0.3  
6193 Confusion Matrix:  
6194 [[10  0  0]  
6195  [ 0 10  0]  
6196  [ 0  2  8]]  
6197 Test Precision:  
6198 1.0  
6199 Validation Precision:  
6200 0.9333333333333333  
6201  
6202 Process finished with exit code 0  
6203
```