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1 C:\Users\Alex\Anaconda3\python.exe "C:/Users/Zihang
  Guan/Desktop/Deep-Reinforcement-Learning-for-
  Automated-Stock-Trading-Ensemble-Strategy-ICAIF-2020-
  master/run_DRL.py"
2 2022-04-16 01:59:10.218117: W tensorflow/
  stream_executor/platform/default/dso_loader.cc:59]
  Could not load dynamic library 'cudart64_101.dll';
  dlerror: cudart64_101.dll not found
3 2022-04-16 01:59:10.218886: I tensorflow/
  stream_executor/cuda/cudart_stub.cc:29] Ignore above
  cudart dlerror if you do not have a GPU set up on
  your machine.
4 C:\Users\Alex\Anaconda3\lib\site-packages\
  stable_baselines\__init__.py:33: UserWarning: stable-
  baselines is in maintenance mode, please use [Stable-
  Baselines3 (SB3)](https://github.com/DLR-RM/stable-
  baselines3) for an up-to-date version. You can find a
  [migration guide](https://stable-baselines3.
  readthedocs.io/en/master/guide/migration.html) in SB3
  documentation.
5 warnings.warn(
6   datadate    tic      adjcp      open    ...    rsi
      cci      adx  turbulence
7 0  20090102  AAPL  12.964286  12.268571  ...  100.0
  66.666667  100.0      0.0
8 1  20090102   AXP  19.330000  18.570000  ...  100.0
  66.666667  100.0      0.0
9 2  20090102   BA   45.250000  42.800000  ...  100.0
  66.666667  100.0      0.0
10 3  20090102  CAT  46.910000  44.910000  ...    0.0
   66.666667  100.0      0.0
11 4  20090102  CSC0  16.960000  16.410000  ...  100.0
   66.666667  100.0      0.0
12
13 [5 rows x 12 columns]
14 1053360
15 [20151002 20151005 20151006 ... 20200702 20200706
   20200707]
16 =====Start Ensemble Strategy=====
17 =====
18 turbulence_threshold: 171.0940715631016

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19 =====Model training from: 20090000 to 20151002
20 =====A2C Training=====
21 2022-04-16 01:59:18.058928: I tensorflow/core/
platform/cpu_feature_guard.cc:142] This TensorFlow
binary is optimized with oneAPI Deep Neural Network
Library (oneDNN)to use the following CPU instructions
in performance-critical operations: AVX2
22 To enable them in other operations, rebuild
TensorFlow with the appropriate compiler flags.
23 2022-04-16 01:59:18.102037: I tensorflow/compiler/xla
/service/service.cc:168] XLA service 0x26e5ab93cc0
initialized for platform Host (this does not
guarantee that XLA will be used). Devices:
24 2022-04-16 01:59:18.102350: I tensorflow/compiler/xla
/service/service.cc:176] StreamExecutor device (0
): Host, Default Version
25 2022-04-16 01:59:18.106173: W tensorflow/
stream_executor/platform/default/dso_loader.cc:59]
Could not load dynamic library 'nvcuda.dll'; dlerror
: nvcuda.dll not found
26 2022-04-16 01:59:18.106947: W tensorflow/
stream_executor/cuda/cuda_driver.cc:312] failed call
to cuInit: UNKNOWN ERROR (303)
27 2022-04-16 01:59:18.107760: I tensorflow/
stream_executor/cuda/cuda_diagnostics.cc:169]
retrieving CUDA diagnostic information for host:
LAPTOP-FJQ3PEHG
28 2022-04-16 01:59:18.109502: I tensorflow/
stream_executor/cuda/cuda_diagnostics.cc:176]
hostname: LAPTOP-FJQ3PEHG
29 WARNING:tensorflow:From C:\Users\Alex\Anaconda3\lib\
site-packages\tensorflow\python\training\rmsprop.py:
123: calling Ones.__init__ (from tensorflow.python.
ops.init_ops) with dtype is deprecated and will be
removed in a future version.
30 Instructions for updating:
31 Call initializer instance with the dtype argument
instead of passing it to the constructor
32 save intrinsic loss: Tensor("add_35:0", shape=(),
dtype=float32)
33 Training time (A2C): 2.688208544254303 minutes
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34 =====A2C Validation from: 20151002 to 20160104
35 A2C Sharpe Ratio: -0.02200475381434574
36 =====Trading from: 20160104 to 20160405
37 Used Model: <stable_baselines.a2c.a2c.A2C object at
  0x0000026E5C4DF220>
38 previous_total_asset:10000000
39 end_total_asset:1070927.381127332
40 total_reward:70927.3811273321
41 total_cost: 3896.5656925512276
42 total trades: 1249
43 Sharpe: 0.26009173928346163
44 =====Trading Done=====
45 =====
46 turbulence_threshold: 96.08032158358223
47 =====Model training from: 20090000 to 20160104
48 =====A2C Training=====
49 save intrinsic loss: Tensor("add_35:0", shape=(),
  dtype=float32)
50 Training time (A2C): 3.0714816212654115 minutes
51 =====A2C Validation from: 20160104 to 20160405
52 A2C Sharpe Ratio: 0.13714075308553766
53 =====Trading from: 20160405 to 20160705
54 Used Model: <stable_baselines.a2c.a2c.A2C object at
  0x0000026E5BD8D670>
55 previous_total_asset:1070927.381127332
56 end_total_asset:1114692.690431724
57 total_reward:43765.309304391965
58 total_cost: 4293.469178519585
59 total trades: 1524
60 Sharpe: 0.1528094084219231
61 =====Trading Done=====
62 =====
63 turbulence_threshold: 171.0940715631016
64 =====Model training from: 20090000 to 20160405
65 =====A2C Training=====
66 save intrinsic loss: Tensor("add_35:0", shape=(),
  dtype=float32)
67 Training time (A2C): 3.1619866053263346 minutes
68 =====A2C Validation from: 20160405 to 20160705
69 A2C Sharpe Ratio: 0.042072123173182395
70 =====Trading from: 20160705 to 20161003
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71 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x0000026E643FD3A0>
72 previous_total_asset:1114692.690431724
73 end_total_asset:1132997.5027324033
74 total_reward:18304.812300679274
75 total_cost: 3344.7100286229133
76 total trades: 1493
77 Sharpe: 0.08481906100532999
78 =====Trading Done=====
79 =====
80 turbulence_threshold: 171.0940715631016
81 =====Model training from: 20090000 to 20160705
82 =====A2C Training=====
83 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)
84 Training time (A2C): 2.631535573800405 minutes
85 =====A2C Validation from: 20160705 to 20161003
86 A2C Sharpe Ratio: -0.0199303741310154
87 =====Trading from: 20161003 to 20170103
88 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x0000026E63BEA670>
89 previous_total_asset:1132997.5027324033
90 end_total_asset:1221975.7938112204
91 total_reward:88978.2910788171
92 total_cost: 3744.5264983470333
93 total trades: 1435
94 Sharpe: 0.4134262462462247
95 =====Trading Done=====
96 =====
97 turbulence_threshold: 171.0940715631016
98 =====Model training from: 20090000 to 20161003
99 =====A2C Training=====
100 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)
101 Training time (A2C): 2.642637805143992 minutes
102 =====A2C Validation from: 20161003 to 20170103
103 A2C Sharpe Ratio: 0.7164550592689938
104 =====Trading from: 20170103 to 20170404
105 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x0000026E68918DC0>
106 previous_total_asset:1221975.7938112204

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107 end_total_asset:1362865.7072765676
108 total_reward:140889.91346534714
109 total_cost: 1815.9941969392628
110 total trades: 1240
111 Sharpe: 0.6905545089465637
112 =====Trading Done=====
113 =====
114 turbulence_threshold: 96.08032158358223
115 =====Model training from: 20090000 to 20170103
116 =====A2C Training=====
117 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)
118 Training time (A2C): 2.6632833083470664 minutes
119 =====A2C Validation from: 20170103 to 20170404
120 A2C Sharpe Ratio: 0.2514195657981028
121 =====Trading from: 20170404 to 20170705
122 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x0000026E60FAC6A0>
123 previous_total_asset:1362865.7072765676
124 end_total_asset:1399704.339596412
125 total_reward:36838.63231984433
126 total_cost: 6517.059971434199
127 total trades: 1284
128 Sharpe: 0.2377029611513585
129 =====Trading Done=====
130 =====
131 turbulence_threshold: 171.0940715631016
132 =====Model training from: 20090000 to 20170404
133 =====A2C Training=====
134 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)
135 Training time (A2C): 2.5784878611564634 minutes
136 =====A2C Validation from: 20170404 to 20170705
137 A2C Sharpe Ratio: 0.2888751298768595
138 =====Trading from: 20170705 to 20171003
139 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x0000026E60F57550>
140 previous_total_asset:1399704.339596412
141 end_total_asset:1479019.4582355798
142 total_reward:79315.11863916786
143 total_cost: 8523.019389047244
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144 total trades: 1580
145 Sharpe: 0.4792309978743254
146 =====Trading Done=====
147 =====
148 turbulence_threshold: 171.0940715631016
149 =====Model training from: 20090000 to 20170705
150 =====A2C Training=====
151 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)
152 Training time (A2C): 2.5501190344492595 minutes
153 =====A2C Validation from: 20170705 to 20171003
154 A2C Sharpe Ratio: 0.24134287306878677
155 =====Trading from: 20171003 to 20180103
156 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x0000026E610225B0>
157 previous_total_asset:1479019.4582355798
158 end_total_asset:1636492.7201715598
159 total_reward:157473.26193598006
160 total_cost: 5078.494452724537
161 total trades: 1271
162 Sharpe: 0.727002106228011
163 =====Trading Done=====
164 =====
165 turbulence_threshold: 96.08032158358223
166 =====Model training from: 20090000 to 20171003
167 =====A2C Training=====
168 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)
169 Training time (A2C): 2.9073193947474163 minutes
170 =====A2C Validation from: 20171003 to 20180103
171 A2C Sharpe Ratio: 0.2883556531025714
172 =====Trading from: 20180103 to 20180405
173 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x0000026E66331760>
174 previous_total_asset:1636492.7201715598
175 end_total_asset:1675532.2251898018
176 total_reward:39039.505018241936
177 total_cost: 2360.002726358529
178 total trades: 374
179 Sharpe: 0.1995806606975836
180 =====Trading Done=====
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181 =====
182 turbulence_threshold: 96.08032158358223
183 =====Model training from: 20090000 to 20180103
184 =====A2C Training=====
185 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)
186 Training time (A2C): 2.848594526449839 minutes
187 =====A2C Validation from: 20180103 to 20180405
188 A2C Sharpe Ratio: -0.00091834007310521
189 =====Trading from: 20180405 to 20180705
190 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x0000026E65D401F0>
191 previous_total_asset:1675532.2251898018
192 end_total_asset:1654926.505579085
193 total_reward:-20605.719610716682
194 total_cost: 6866.860734654909
195 total trades: 1088
196 Sharpe: -0.09884107610472433
197 =====Trading Done=====
198 =====
199 turbulence_threshold: 96.08032158358223
200 =====Model training from: 20090000 to 20180405
201 =====A2C Training=====
202 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)
203 Training time (A2C): 2.852320941289266 minutes
204 =====A2C Validation from: 20180405 to 20180705
205 A2C Sharpe Ratio: -0.12036413597553564
206 =====Trading from: 20180705 to 20181003
207 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x0000026E6688D0A0>
208 previous_total_asset:1654926.505579085
209 end_total_asset:1685043.5991692184
210 total_reward:30117.093590133358
211 total_cost: 6128.710259610014
212 total trades: 919
213 Sharpe: 0.3166695308861128
214 =====Trading Done=====
215 =====
216 turbulence_threshold: 96.08032158358223
217 =====Model training from: 20090000 to 20180705

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218 =====A2C Training=====
219 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)
220 Training time (A2C):  2.7963678081830343  minutes
221 =====A2C Validation from:  20180705 to  20181003
222 A2C Sharpe Ratio:  0.07956956423205548
223 =====Trading from:  20181003 to  20190104
224 Used Model:  <stable_baselines.a2c.a2c.A2C object at
    0x0000026E63C01B20>
225 previous_total_asset:1685043.5991692184
226 end_total_asset:1694703.7490981335
227 total_reward:9660.149928915082
228 total_cost:  961.827055830472
229 total trades:  178
230 Sharpe:  0.24198458851992605
231 =====Trading Done=====
232 =====
233 turbulence_threshold:  171.0940715631016
234 =====Model training from:  20090000 to  20181003
235 =====A2C Training=====
236 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)
237 Training time (A2C):  2.8617889483769736  minutes
238 =====A2C Validation from:  20181003 to  20190104
239 A2C Sharpe Ratio:  -0.30930395448265136
240 =====Trading from:  20190104 to  20190405
241 Used Model:  <stable_baselines.a2c.a2c.A2C object at
    0x0000026E661CABB0>
242 previous_total_asset:1694703.7490981335
243 end_total_asset:1778702.8090850338
244 total_reward:83999.0599869003
245 total_cost:  5877.864091366944
246 total trades:  1384
247 Sharpe:  0.2477388083063826
248 =====Trading Done=====
249 =====
250 turbulence_threshold:  96.08032158358223
251 =====Model training from:  20090000 to  20190104
252 =====A2C Training=====
253 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)

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254 Training time (A2C): 2.7960716088612876 minutes
255 =====A2C Validation from: 20190104 to 20190405
256 A2C Sharpe Ratio: -0.09220807539425722
257 =====Trading from: 20190405 to 20190708
258 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x0000026E65EFF220>
259 previous_total_asset:1778702.8090850338
260 end_total_asset:1786122.7414995972
261 total_reward:7419.932414563373
262 total_cost: 1078.5737811269564
263 total trades: 166
264 Sharpe: 0.3075507909568837
265 =====Trading Done=====
266 =====
267 turbulence_threshold: 96.08032158358223
268 =====Model training from: 20090000 to 20190405
269 =====A2C Training=====
270 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)
271 Training time (A2C): 2.854661516348521 minutes
272 =====A2C Validation from: 20190405 to 20190708
273 A2C Sharpe Ratio: 0.22619493771308438
274 =====Trading from: 20190708 to 20191004
275 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x0000026E65B5FE50>
276 previous_total_asset:1786122.7414995972
277 end_total_asset:1783531.4682236137
278 total_reward:-2591.27327598352
279 total_cost: 2382.8523029989233
280 total trades: 392
281 Sharpe: -0.050097010476285724
282 =====Trading Done=====
283 =====
284 turbulence_threshold: 96.08032158358223
285 =====Model training from: 20090000 to 20190708
286 =====A2C Training=====
287 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)
288 Training time (A2C): 2.785315692424774 minutes
289 =====A2C Validation from: 20190708 to 20191004
290 A2C Sharpe Ratio: -0.17134553834999244
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291 =====Trading from: 20191004 to 20200106
292 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x0000026E6407E580>
293 previous_total_asset:1783531.4682236137
294 end_total_asset:1784148.728672735
295 total_reward:617.2604491212405
296 total_cost: 201.98491160576816
297 total trades: 56
298 Sharpe: 0.10189572145658862
299 =====Trading Done=====
300 =====
301 turbulence_threshold: 96.08032158358223
302 =====Model training from: 20090000 to 20191004
303 =====A2C Training=====
304 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)
305 Training time (A2C): 2.8652162392934164 minutes
306 =====A2C Validation from: 20191004 to 20200106
307 A2C Sharpe Ratio: -0.05616555173726358
308 =====Trading from: 20200106 to 20200406
309 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x0000026E6623F850>
310 previous_total_asset:1784148.728672735
311 end_total_asset:1759605.0622485792
312 total_reward:-24543.6664241557
313 total_cost: 1119.438493924084
314 total trades: 198
315 Sharpe: -0.41642084775797245
316 =====Trading Done=====
317 =====
318 turbulence_threshold: 96.08032158358223
319 =====Model training from: 20090000 to 20200106
320 =====A2C Training=====
321 save intrinsic loss: Tensor("add_35:0", shape=(),
    dtype=float32)
322 Training time (A2C): 2.908966116110484 minutes
323 =====A2C Validation from: 20200106 to 20200406
324 A2C Sharpe Ratio: -0.45276307251700715
325 =====Trading from: 20200406 to 20200707
326 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x0000026E66198D00>

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327 previous_total_asset:1759605.0622485792
328 end_total_asset:1759897.1165656303
329 total_reward:292.0543170510791
330 total_cost: 303.42955126070984
331 total trades: 92
332 Sharpe: 0.05411352414055359
333 =====Trading Done=====
334 A2C Intrinsic Strategy took: 50.6766242146492
    minutes
335
336 Process finished with exit code 0
337
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