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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 2022-04-15 21:29:37.768541: 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 2022-04-15 21:29:37.773916: 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 2022-04-15 21:30:25.787952: 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 2022-04-15 21:30:26.013418: I tensorflow/compiler/xla
/service/service.cc:168] XLA service 0x212b6a124d0
initialized for platform Host (this does not
guarantee that XLA will be used). Devices:
24 2022-04-15 21:30:26.015593: I tensorflow/compiler/xla
/service/service.cc:176] StreamExecutor device (0
): Host, Default Version
25 2022-04-15 21:30:26.027363: W tensorflow/
stream_executor/platform/default/dso_loader.cc:59]
Could not load dynamic library 'nvcuda.dll'; dlerror
: nvcuda.dll not found
26 2022-04-15 21:30:26.029191: W tensorflow/
stream_executor/cuda/cuda_driver.cc:312] failed call
to cuInit: UNKNOWN ERROR (303)
27 2022-04-15 21:30:26.032972: I tensorflow/
stream_executor/cuda/cuda_diagnostics.cc:169]
retrieving CUDA diagnostic information for host:
LAPTOP-FJQ3PEHG
28 2022-04-15 21:30:26.034329: 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): 11.309454123179117 minutes
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34 =====A2C Validation from: 20151002 to 20160104
35 A2C Sharpe Ratio: -0.04591128786809811
36 =====Trading from: 20160104 to 20160405
37 Used Model: <stable_baselines.a2c.a2c.A2C object at
0x00000212B7D2F1F0>
38 previous_total_asset:1000000
39 end_total_asset:1081001.4652739307
40 total_reward:81001.46527393069
41 total_cost: 3258.8489485047735
42 total trades: 1324
43 Sharpe: 0.2531083768434911
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): 11.353185514609018 minutes
51 =====A2C Validation from: 20160104 to 20160405
52 A2C Sharpe Ratio: 0.18214126362849328
53 =====Trading from: 20160405 to 20160705
54 Used Model: <stable_baselines.a2c.a2c.A2C object at
0x00000212B71DDD90>
55 previous_total_asset:1081001.4652739307
56 end_total_asset:1065137.553112727
57 total_reward:-15863.9121612038
58 total_cost: 3628.682580229656
59 total trades: 1456
60 Sharpe: -0.0500100873463637
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): 10.437422053019207 minutes
68 =====A2C Validation from: 20160405 to 20160705
69 A2C Sharpe Ratio: 0.04816328127425796
70 =====Trading from: 20160705 to 20161003
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71 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x00000212B0BD05B0>
72 previous_total_asset:1065137.553112727
73 end_total_asset:1049540.4542332268
74 total_reward:-15597.09887950006
75 total_cost: 5342.717369158967
76 total trades: 1568
77 Sharpe: -0.0754516068870359
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): 10.417301595211029 minutes
85 =====A2C Validation from: 20160705 to 20161003
86 A2C Sharpe Ratio: -0.03332742631315178
87 =====Trading from: 20161003 to 20170103
88 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x00000212C16FA130>
89 previous_total_asset:1049540.4542332268
90 end_total_asset:1107182.7935318542
91 total_reward:57642.33929862734
92 total_cost: 4491.890520446577
93 total trades: 1348
94 Sharpe: 0.3357290135242526
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): 8.650504807631174 minutes
102 =====A2C Validation from: 20161003 to 20170103
103 A2C Sharpe Ratio: 0.000458273152181699
104 =====Trading from: 20170103 to 20170404
105 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x00000212BCDA53A0>
106 previous_total_asset:1107182.7935318542

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107 end_total_asset:1121094.896264101
108 total_reward:13912.102732246742
109 total_cost: 2285.2189549524664
110 total trades: 511
111 Sharpe: 0.27505584444027364
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): 8.702615455786388 minutes
119 =====A2C Validation from: 20170103 to 20170404
120 A2C Sharpe Ratio: -0.27683890108097875
121 =====Trading from: 20170404 to 20170705
122 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x00000212C25EADF0>
123 previous_total_asset:1121094.896264101
124 end_total_asset:1125736.8637045731
125 total_reward:4641.967440472217
126 total_cost: 1894.4584449441961
127 total trades: 481
128 Sharpe: 0.24715067493786655
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): 8.492013311386108 minutes
136 =====A2C Validation from: 20170404 to 20170705
137 A2C Sharpe Ratio: 0.20301290206745082
138 =====Trading from: 20170705 to 20171003
139 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x00000212BCBF5910>
140 previous_total_asset:1125736.8637045731
141 end_total_asset:1151048.987882656
142 total_reward:25312.124178082915
143 total_cost: 7052.222310543821
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144 total trades: 1514
145 Sharpe: 0.20499830041627146
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): 8.57187923192978 minutes
153 =====A2C Validation from: 20170705 to 20171003
154 A2C Sharpe Ratio: 0.22492641841663957
155 =====Trading from: 20171003 to 20180103
156 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x00000212C2035400>
157 previous_total_asset:1151048.987882656
158 end_total_asset:1258290.6993132497
159 total_reward:107241.71143059363
160 total_cost: 3023.700173479167
161 total trades: 1310
162 Sharpe: 0.5661903535877747
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): 9.519349912802378 minutes
170 =====A2C Validation from: 20171003 to 20180103
171 A2C Sharpe Ratio: 0.22193511921631734
172 =====Trading from: 20180103 to 20180405
173 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x00000212C00C7B50>
174 previous_total_asset:1258290.6993132497
175 end_total_asset:1275314.8422116805
176 total_reward:17024.142898430815
177 total_cost: 1505.027435277064
178 total trades: 283
179 Sharpe: 0.17434092321330083
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): 10.063100465138753 minutes
187 =====A2C Validation from: 20180103 to 20180405
188 A2C Sharpe Ratio: 0.05446551681041298
189 =====Trading from: 20180405 to 20180705
190 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x000000212C208EAF0>
191 previous_total_asset:1275314.8422116805
192 end_total_asset:1239270.8919620237
193 total_reward:-36043.9502496568
194 total_cost: 6264.482563532304
195 total trades: 1044
196 Sharpe: -0.17226701142481354
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): 9.806827239195506 minutes
204 =====A2C Validation from: 20180405 to 20180705
205 A2C Sharpe Ratio: -0.0529008604041673
206 =====Trading from: 20180705 to 20181003
207 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x000000212BF3F9610>
208 previous_total_asset:1239270.8919620237
209 end_total_asset:1242546.7689813825
210 total_reward:3275.877019358799
211 total_cost: 6062.111563887755
212 total trades: 973
213 Sharpe: 0.03936776169063101
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): 10.575830868879954 minutes
221 =====A2C Validation from: 20180705 to 20181003
222 A2C Sharpe Ratio: 0.23130743480032698
223 =====Trading from: 20181003 to 20190104
224 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x00000212BF3F9CA0>
225 previous_total_asset:1242546.7689813825
226 end_total_asset:1246473.572593329
227 total_reward:3926.803611946525
228 total_cost: 436.1838732485664
229 total trades: 117
230 Sharpe: 0.23255266313886075
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): 12.301841886838277 minutes
238 =====A2C Validation from: 20181003 to 20190104
239 A2C Sharpe Ratio: -0.3958586229097345
240 =====Trading from: 20190104 to 20190405
241 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x00000212BF09EAF0>
242 previous_total_asset:1246473.572593329
243 end_total_asset:1329902.4877666743
244 total_reward:83428.91517334525
245 total_cost: 5951.826383144002
246 total trades: 1397
247 Sharpe: 0.29953987822502787
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): 12.02694065173467 minutes
255 =====A2C Validation from: 20190104 to 20190405
256 A2C Sharpe Ratio: 0.015279070028323726
257 =====Trading from: 20190405 to 20190708
258 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x00000212C2048460>
259 previous_total_asset:1329902.4877666743
260 end_total_asset:1331559.2671518014
261 total_reward:1656.7793851271272
262 total_cost: 1042.3374431541645
263 total trades: 151
264 Sharpe: 0.11083578955578818
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): 11.43409190972646 minutes
272 =====A2C Validation from: 20190405 to 20190708
273 A2C Sharpe Ratio: 0.004354900009677307
274 =====Trading from: 20190708 to 20191004
275 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x00000212BFA5B220>
276 previous_total_asset:1331559.2671518014
277 end_total_asset:1330136.0554123865
278 total_reward:-1423.2117394148372
279 total_cost: 925.6265319143115
280 total trades: 197
281 Sharpe: -0.06634909468795142
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): 11.706923270225525 minutes
289 =====A2C Validation from: 20190708 to 20191004
290 A2C Sharpe Ratio: -0.028516163866928984
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291 =====Trading from: 20191004 to 20200106
292 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x00000212BEEBACD0>
293 previous_total_asset:1330136.0554123865
294 end_total_asset:1328922.6660748315
295 total_reward:-1213.3893375550397
296 total_cost: 186.61777732645987
297 total trades: 42
298 Sharpe: -0.40203508326559695
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): 12.002325316270193 minutes
306 =====A2C Validation from: 20191004 to 20200106
307 A2C Sharpe Ratio: -0.39090274356683063
308 =====Trading from: 20200106 to 20200406
309 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x00000212BCD522B0>
310 previous_total_asset:1328922.6660748315
311 end_total_asset:1312576.1638879455
312 total_reward:-16346.502186886035
313 total_cost: 784.6605974116341
314 total trades: 167
315 Sharpe: -0.44836283812818734
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): 12.650383659203847 minutes
323 =====A2C Validation from: 20200106 to 20200406
324 A2C Sharpe Ratio: -0.40751806835532084
325 =====Trading from: 20200406 to 20200707
326 Used Model: <stable_baselines.a2c.a2c.A2C object at
    0x00000212C19AAA90>
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327 previous_total_asset:1312576.1638879455
328 end_total_asset:1314853.705662553
329 total_reward:2277.5417746074963
330 total_cost: 570.4363116003478
331 total trades: 132
332 Sharpe: 0.1527018199881714
333 =====Trading Done=====
334 A2C Intrinsic Strategy took: 191.51111271778743
    minutes
335
336 Process finished with exit code 0
337
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