training_overview_1638294786.9697845

December 2, 2021

[ ]:

```
import pandas as pd
import os
import matplotlib.pyplot as plt

TIMESTAMP = 1638294786.9697845
DATA_DIRECTORY = '../data'

perf_data = pd.read_csv(os.path.join(DATA_DIRECTORY,␣
 ↪f'{TIMESTAMP}_performance_stats.csv'))
perf_data['timestamp'] = pd.to_datetime(perf_data['timestamp'])
perf_data.head()
```

[ ]:

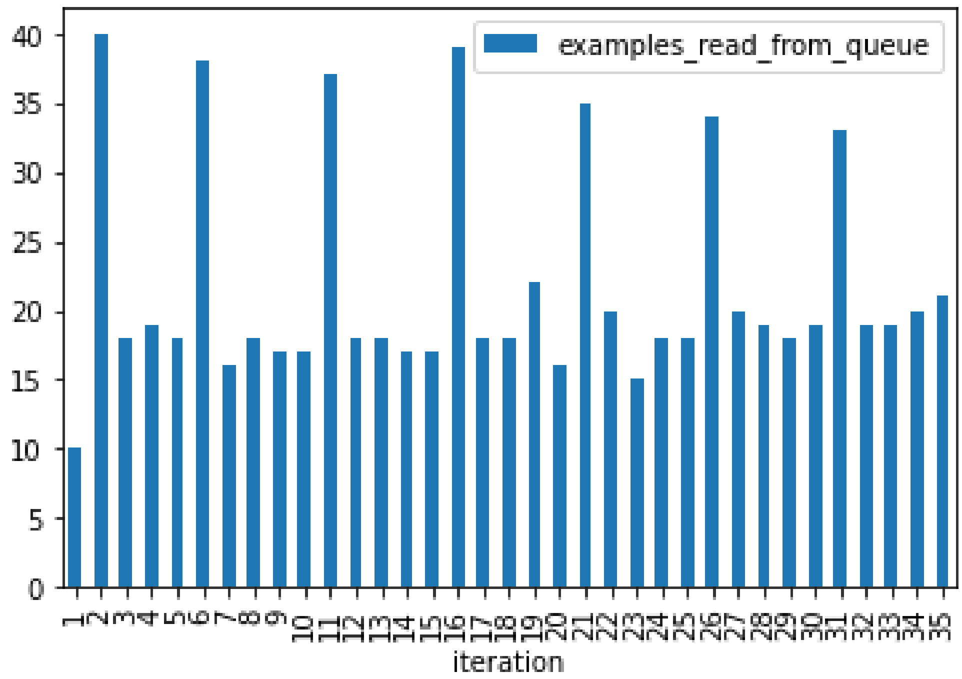
```
   iteration                     timestamp  iteration_duration  \
0          1 1970-01-01 00:00:01.638297318         2119.456653
1          2 1970-01-01 00:00:01.638298375         1056.551436
2          3 1970-01-01 00:00:01.638299467         1092.254802
3          4 1970-01-01 00:00:01.638300572         1105.114981
4          5 1970-01-01 00:00:01.638302916         2344.427264

   training_duration  examples_read_from_queue  length_train_examples
0          17.130143                        10                   2000
1          34.403910                        40                   4000
2          51.698785                        18                   6000
3          69.033993                        19                   8000
4          84.150328                        18                  10000
```

[ ]:

```
perf_data.plot.bar(x='iteration', y='examples_read_from_queue')
```

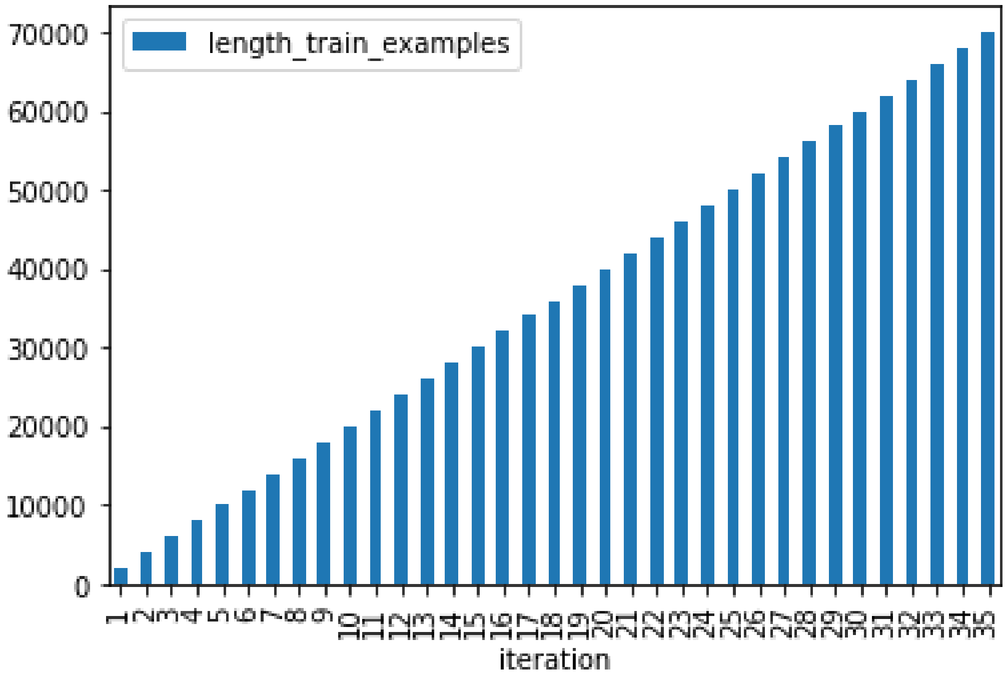
[ ]:

```
<AxesSubplot:xlabel='iteration'>
```



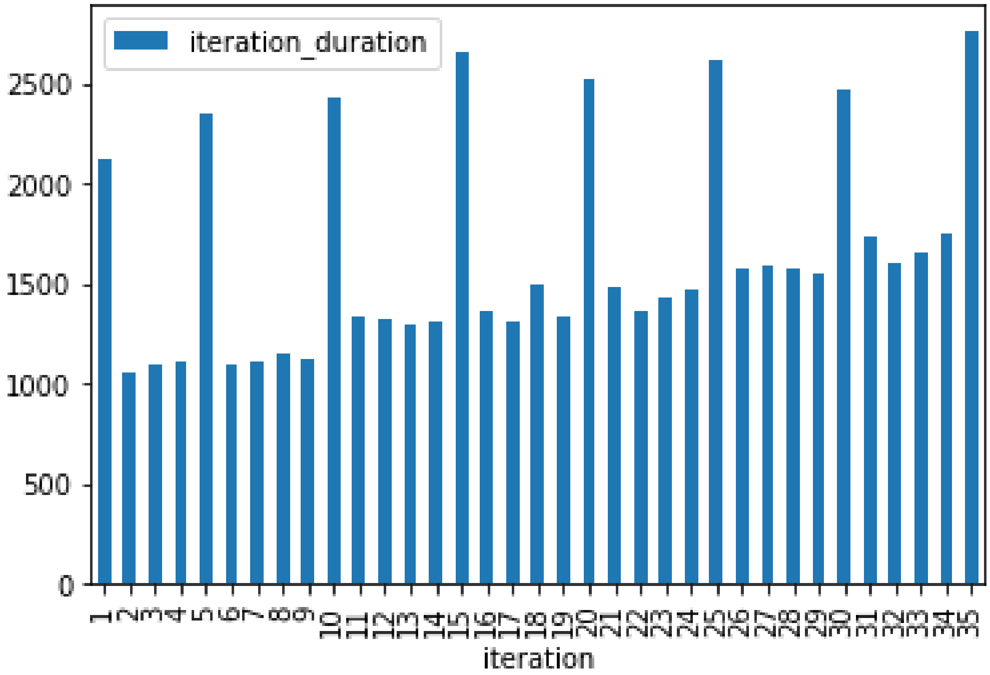
[ ]:
```
perf_data.plot.bar(x='iteration', y='length_train_examples')
```

[ ]:
```
<AxesSubplot:xlabel='iteration'>
```



```
[ ]: perf_data.plot.bar(x='iteration', y='iteration_duration')
```

```
[ ]: <AxesSubplot:xlabel='iteration'>
```



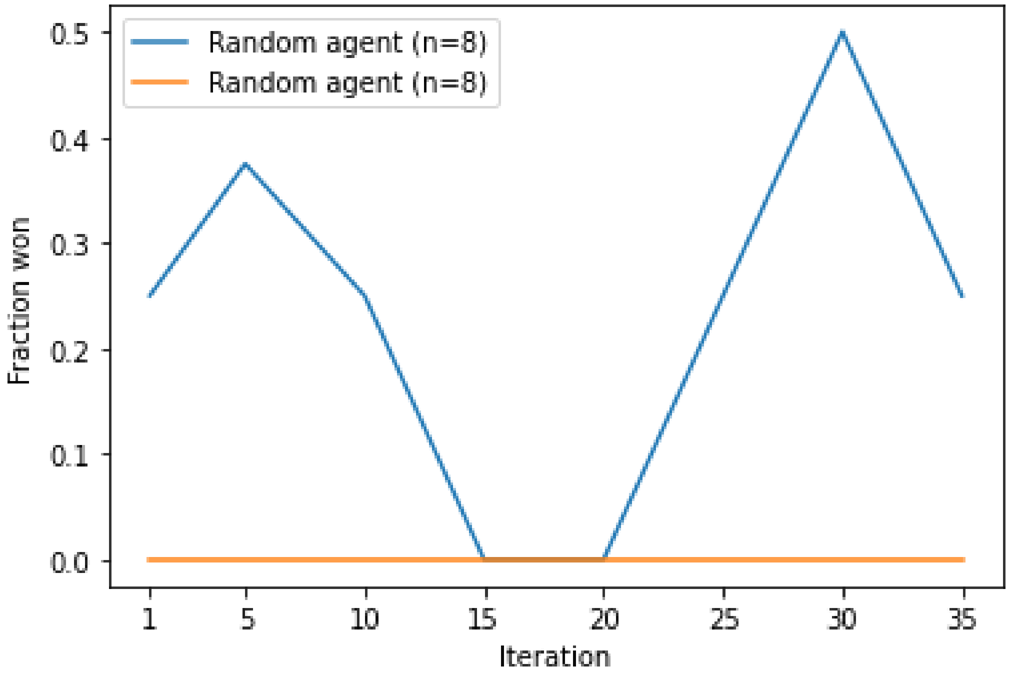
```
[ ]: rndm_data = pd.read_csv(os.path.join(DATA_DIRECTORY,␣
      ↪f'{TIMESTAMP}_random_player_game_stats.csv'))
     rndm_data['timestamp'] = pd.to_datetime(perf_data['timestamp'])
     rndm_data.set_index('iteration')
     rndm_data.head()
```

```
[ ]:    iteration                     timestamp  wins  losses  draws  \
     0          1 1970-01-01 00:00:01.638297318   2.0     2.0    4.0
     1          5 1970-01-01 00:00:01.638298375   3.0     2.0    3.0
     2         10 1970-01-01 00:00:01.638299467   2.0     3.0    3.0
     3         15 1970-01-01 00:00:01.638300572   0.0     1.0    7.0
     4         20 1970-01-01 00:00:01.638302916   0.0     1.0    7.0

        nnet_cumul_rewards  random_cumul_rewards
     0            0.166667             -0.166667
     1            0.166667             -0.166667
     2           -0.333333              0.333333
     3           -0.166667              0.166667
     4           -0.333333              0.333333
```

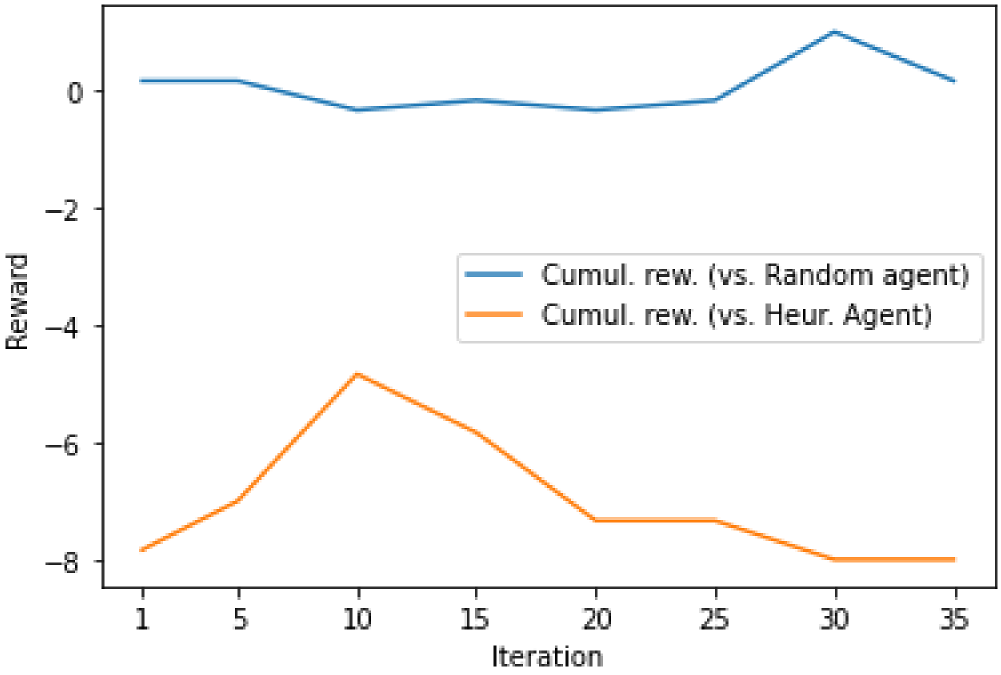
```
[ ]: hrstc_data = pd.read_csv(os.path.join(DATA_DIRECTORY,␣
      ↪f'{TIMESTAMP}_heuristic_player_game_stats.csv'))
     hrstc_data['timestamp'] = pd.to_datetime(perf_data['timestamp'])
     hrstc_data.set_index('iteration')
     hrstc_data.head()
```

```
[ ]:    iteration                     timestamp  wins  losses  draws  \
     0          1 1970-01-01 00:00:01.638297318   0.0     8.0    0.0
     1          5 1970-01-01 00:00:01.638298375   0.0     8.0    0.0
     2         10 1970-01-01 00:00:01.638299467   0.0     5.0    3.0
     3         15 1970-01-01 00:00:01.638300572   0.0     6.0    2.0
     4         20 1970-01-01 00:00:01.638302916   0.0     8.0    0.0

        nnet_cumul_rewards  random_cumul_rewards
     0           -7.833333              7.833333
     1           -7.000000              7.000000
     2           -4.833333              4.833333
     3           -5.833333              5.833333
     4           -7.333333              7.333333
```

```
[ ]: rndm_n_games = int(rndm_data['wins'][0] + rndm_data['losses'][0] +␣
      ↪rndm_data['draws'][0])
     hrstc_n_games = int(rndm_data['wins'][0] + rndm_data['losses'][0] +␣
      ↪rndm_data['draws'][0])

     rndm_fraction_won = rndm_data.apply(lambda row: row['wins'] / rndm_n_games,␣
      ↪axis=1).to_list()
     hrstc_fraction_won = hrstc_data.apply(lambda row: row['wins'] / hrstc_n_games,␣
      ↪axis=1).to_list()

     plt.plot(rndm_data['iteration'], rndm_fraction_won,  label=f'Random agent␣
      ↪(n={rndm_n_games})')
     plt.plot(rndm_data['iteration'], hrstc_fraction_won,  label=f'Random agent␣
      ↪(n={hrstc_n_games})')
     plt.xticks(rndm_data['iteration'])
     plt.xlabel('Iteration')
     plt.ylabel(f'Fraction won')
     plt.legend()
     plt.show()
```



```
[ ]: plt.plot(rndm_data['iteration'], rndm_data['nnet_cumul_rewards'], ␣
      ↪label=f'Cumul. rew. (vs. Random agent)')
     plt.plot(rndm_data['iteration'], hrstc_data['nnet_cumul_rewards'], ␣
      ↪label=f'Cumul. rew. (vs. Heur. Agent)')
     plt.xticks(rndm_data['iteration'])
     plt.xlabel('Iteration')
     plt.ylabel(f'Reward')
     plt.legend()
     plt.show()
```


0
−2
−4
−6
−8
Reward
1
5
10
15
20
25
30
35
Iteration
Cumul. rew. (vs. Random agent)
Cumul. rew. (vs. Heur. Agent)