

Wrapper

October 6, 2022

[1]: `%%bash`

```
mkdir -p TSP
mkdir -p TSP/output

genetic-algorithm/generate_input.exe -o TSP/input.txt
```

[24]: `%%bash`

```
genetic-algorithm/main.exe -i TSP/input.txt -o TSP/output/output_1.txt -mi 1000
```

generation: 0	best: 3.703	average: 1.703
generation: 100	best: 57.018	average: 34.942
generation: 200	best: 80.759	average: 58.937
generation: 300	best: 85.588	average: 62.795
generation: 400	best: 90.152	average: 53.738
generation: 500	best: 176.139	average: 93.996
generation: 600	best: 203.270	average: 140.054
generation: 700	best: 203.270	average: 138.807
generation: 800	best: 196.975	average: 138.064
generation: 900	best: 212.120	average: 132.105

out...

[25]: `%%bash`

```
pso-algorithm/main.exe -i TSP/input.txt -o TSP/output/output_2.txt -c1 2 -c2 2 ↵
↵-mi 1000
```

generation: 0	best: -1390.000	average: -1755.860
generation: 1	best: -1390.000	average: -1755.860
generation: 2	best: -1390.000	average: -1755.860
generation: 3	best: -1390.000	average: -1755.860
generation: 4	best: -1390.000	average: -1755.860
generation: 5	best: -1390.000	average: -1755.860
generation: 6	best: -1390.000	average: -1755.860
generation: 7	best: -1390.000	average: -1755.860
generation: 8	best: -1390.000	average: -1755.860
generation: 9	best: -1390.000	average: -1755.860
generation: 10	best: -1390.000	average: -1755.860

```
generation: 11          best: -1390.000 average: -1755.860
generation: 12          best: -1390.000 average: -1755.860
generation: 13          best: -1390.000 average: -1755.860
out...
```

```
[26]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

```
[27]: def read_input(input_file) :
    with open(input_file, "r") as f:
        inp = f.read()
        lines = inp.split('\n')

        pts_cnt = int(lines[0])

        pts = []
        for i in range(0, pts_cnt):
            [x, y] = lines[i + 1].split(' ')
            x = int(x)
            y = int(y)
            pts.append((x, y))

        return pts

def display_pts(pts) :
    plt.plot(pts[:,0], pts[:,1], 'o', color='black')

def display_route(route_str) :
    route_str = route_str.split(',')
    N = len(route_str)
    route = np.zeros((N + 1, 2))

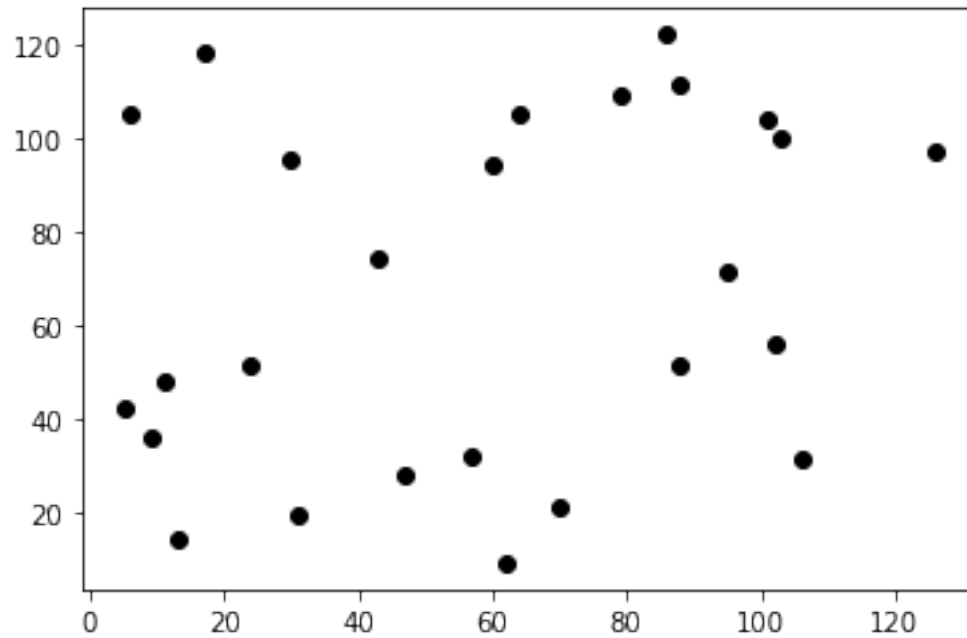
    for i in range(0, N):
        route[i,:] = pts[int(route_str[i]),:]

    route[N,:] = pts[int(route_str[0]),:]
    plt.plot(route[:,0], route[:,1], marker='o')

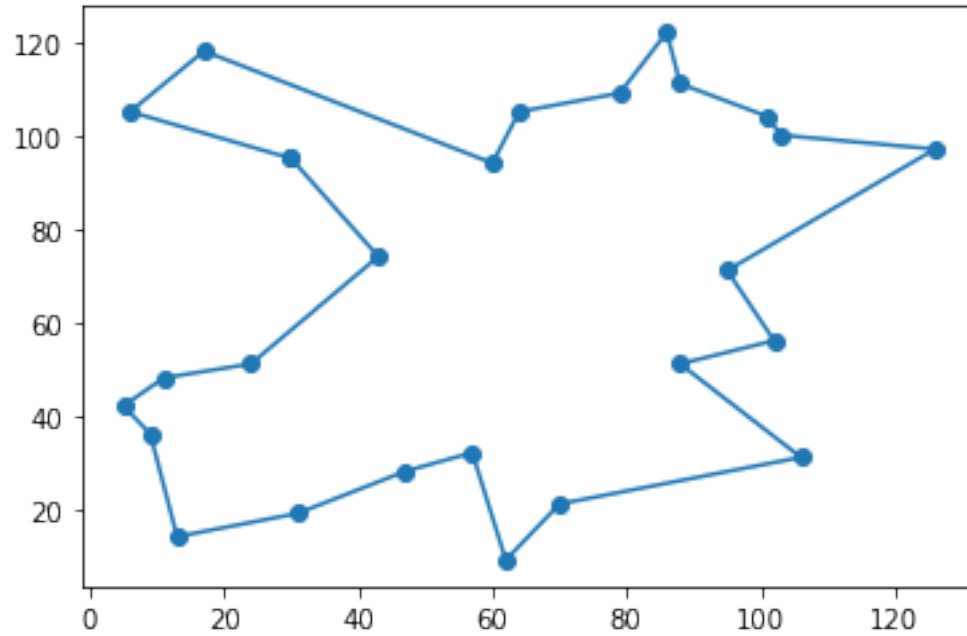
def get_best_route(dir) :
    out = pd.read_csv(dir, delimiter=';')
    return out.groupby(by=["generation"]).agg({'fitness':'max','solution':
↳ 'first'}).sort_values(by=['fitness']).tail(1)['solution'].iloc[0]
```

```
[28]: pts = np.array(read_input("TSP/input.txt"))

display_pts(pts)
```



```
[29]: display_route(get_best_route("TSP/output/output_1.txt"))
```



```
[30]: display_route(get_best_route("TSP/output/output_2.txt"))
```

