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Implementasi dapat dilihat pada

MaclaurinSeries/evolutionary_computing (github.com)

Perbandingan rute dari GA (input_1) dan PSO (input_2)

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
```

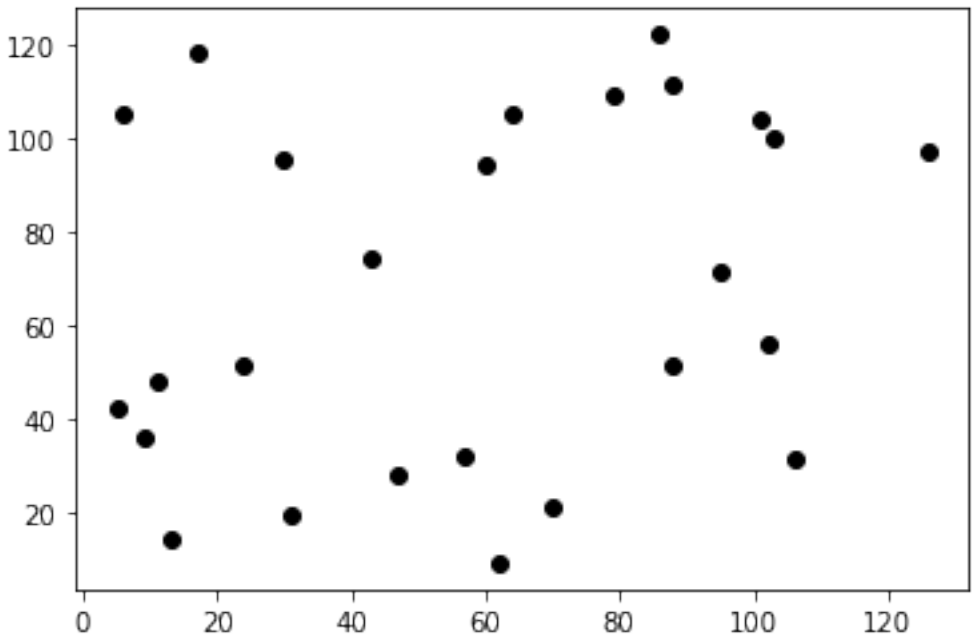
```
generation: 0           best: -1390.000 average: -1755.860
generation: 1           best: -1390.000 average: -1755.860
generation: 2           best: -1390.000 average: -1755.860
generation: 3           best: -1390.000 average: -1755.860
generation: 4           best: -1390.000 average: -1755.860
generation: 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…
```

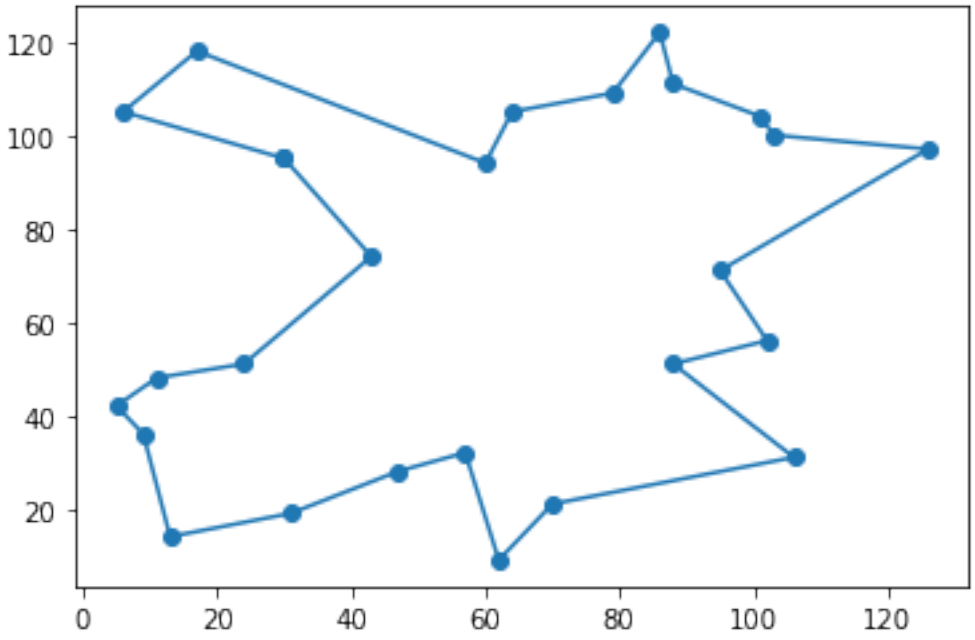
[26]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

[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]
```

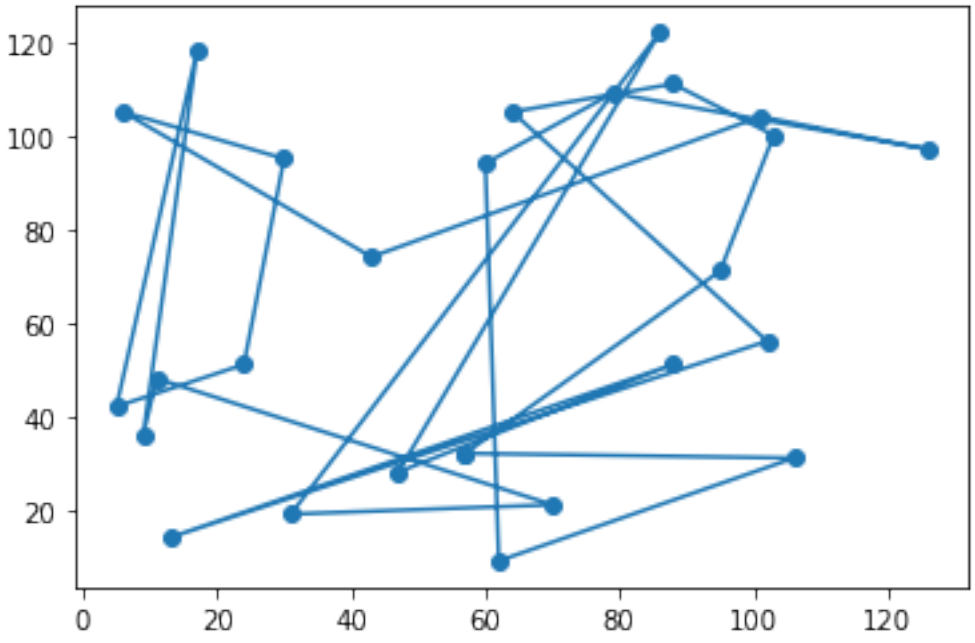
[28]:
```
pts = np.array(read_input("TSP/input.txt"))

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"))
```


120
100
80
60
40
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0
20
40
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100
120