population-v2
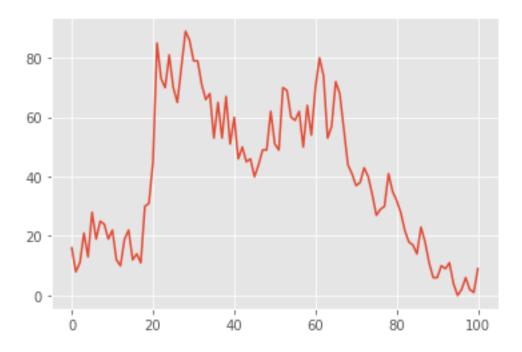
July 30, 2021

```python
[32]: import csv
      import pandas as pd
      import numpy as np
      import matplotlib.pyplot as plt
```

```python
[33]: data: [] = list()
      home: object = None
      away: object = None
      result_name: str = ''
```

```python
[34]: # df = pd.read_csv('./data/202106_202106_    _ .csv', encoding='UTF-8',␣
      →thousands = ',', index_col = 0)
      # df.to_csv('./data/202106_202106_    _ _without_comma.csv', sep=',',␣
      →na_rep='NaN')
      data = csv.reader(open('./data/202106_202106_population.csv', 'rt',␣
      →encoding='UTF-8'))
      next(data)
      data = list(data)
```

```python
[35]: # print(data)
```

```python
[36]: arr = []
      [arr.append(int(j)) for i in data if ' ' in i[0] for j in i[3:]]
      print([i for i in arr])
```

```
[16, 8, 11, 21, 13, 28, 19, 25, 24, 19, 22, 12, 10, 19, 22, 12, 14, 11, 30, 31,
45, 85, 73, 70, 81, 70, 65, 77, 89, 86, 79, 79, 71, 66, 68, 53, 65, 53, 67, 51,
60, 46, 50, 45, 46, 40, 44, 49, 49, 62, 51, 49, 70, 69, 60, 59, 62, 50, 64, 54,
70, 80, 74, 53, 57, 72, 68, 56, 44, 41, 37, 38, 43, 40, 34, 27, 29, 30, 41, 35,
32, 28, 22, 18, 17, 14, 23, 18, 11, 6, 6, 10, 9, 11, 4, 0, 2, 6, 2, 1, 9]
```

```python
[40]: plt.style.use('ggplot')
      plt.plot(arr)
```

```
[40]: [<matplotlib.lines.Line2D at 0x7f8986d48eb0>]
```

```
[41]: for i in data:
          if ' ' in i[0]:
              home = np.array(i[3:], dtype=int)/int(i[2])
```

```
[42]: mn = 1
      result = 0
      for i in data:
          away = np.array(i[3:], dtype=int) / int(i[2])
          s = np.sum((home - away) ** 2)
          if s < mn and ' ' not in i[0]:
              mn = s
              result_name = i[0]
              result = away
      away = result
```

```
<ipython-input-42-25e51aa42364>:4: RuntimeWarning: invalid value encountered in
true_divide
  away = np.array(i[3:], dtype=int) / int(i[2])
```

```
[47]: plt.style.use('ggplot')
      plt.figure(figsize=(10, 5), dpi=300)
      plt.title(f'The area with the most similar population structure to the Pil-dong␣
       ↪area.')
      plt.plot(home, label='Pil-dong')
      plt.plot(away, label='similar to Pil-dong')
      plt.legend()
```

2

```
plt.show()
```

The area with the most similar population structure to the Pil-dong area.