

程序入口

sh main.sh

核心思路

1、构建变量

```
for col in [
    "jd", "jd_c", "magnorm", "mage", "magnorm_m0", "magnorm_m1",
    "magnorm_dmean", "magnorm_m0_dmean", "magnorm_m1_dmean"
]:
    for nn in range(1, 60):
        dvar.append(f"{col}_{nn}_d1_np.sum")
        dvar.append(f"{col}_{nn}_d1_np.max")
        dvar.append(f"{col}_{nn}_d1_np.mean")
        dvar.append(f"{col}_{nn}_d1_np.min")
        dvar.append(f"{col}_{nn}_d1_np.median")
        dvar.append(f"{col}_{nn}_d1_np.max-np.min")
        dvar.append(f"{col}_{nn}_d1_np.max-np.mean")
        dvar.append(f"{col}_{nn}_d1_np.max-np.median")
        dvar.append(f"{col}_{nn}_d1_np.mean-np.median")
        dvar.append(f"{col}_{nn}_d1_np.std")

        dvar.append(f"{col}_{nn}_d2_np.sum")
        dvar.append(f"{col}_{nn}_d2_np.max")
        dvar.append(f"{col}_{nn}_d2_np.mean")
        dvar.append(f"{col}_{nn}_d2_np.min")
        dvar.append(f"{col}_{nn}_d2_np.median")
        dvar.append(f"{col}_{nn}_d2_np.max-np.min")
        dvar.append(f"{col}_{nn}_d2_np.max-np.mean")
        dvar.append(f"{col}_{nn}_d2_np.max-np.median")
        dvar.append(f"{col}_{nn}_d2_np.mean-np.median")
        dvar.append(f"{col}_{nn}_d2_np.std")

        dvar.append(f"{col}_np.sum")
        dvar.append(f"{col}_np.max")
        dvar.append(f"{col}_np.mean")
        dvar.append(f"{col}_np.min")
        dvar.append(f"{col}_np.median")
        dvar.append(f"{col}_np.max-np.min")
        dvar.append(f"{col}_np.max-np.mean")
        dvar.append(f"{col}_np.max-np.median")
        dvar.append(f"{col}_np.mean-np.median")
        dvar.append(f"{col}_np.std")
```

2、异常检测

引入孤立森林

3、聚类算法

引入 `from sklearn.cluster import MeanShift, estimate_bandwidth` 和 `from sklearn.cluster import Birch`

4、结果整合

整合检测类别1-5，取出其中小量级群体作为输出结果。

5、结果展示

Target	0	1	2
Cluster1			
-1	16	0	1
1	36	13	3

Target	0	1	2
Cluster2			
0	28	2	1
1	8	5	1
2	11	3	2
3	5	3	0

Target	0	1	2
Cluster3			
0	14	1	1
1	11	1	0
2	4	2	0
3	4	3	1
4	7	2	1
5	4	0	1
6	2	1	0
7	0	2	0
8	3	0	0
9	2	0	0
10	0	1	0
11	1	0	0

Target	0	1	2
Cluster4			
0	9	1	1
1	4	2	1
2	5	0	0
3	5	0	0
4	1	2	1
5	4	0	0
6	2	0	0
7	2	2	0
8	3	1	0
9	2	1	0
10	2	0	1

11	2	0	0
12	1	1	0
13	2	0	0
14	2	0	0
15	2	0	0
16	1	0	0
17	1	0	0
18	0	1	0
19	0	1	0
20	1	0	0
21	0	1	0
22	1	0	0

Target	0	1	2
Cluster5			

0	2	1	0
1	2	0	0
2	2	0	0
3	1	2	1
4	2	0	0
5	2	0	0
6	1	1	0
7	2	0	0
8	2	0	0
9	1	0	0
10	0	1	1
11	2	0	0
12	5	1	1
13	3	0	0
14	0	1	0
15	2	0	0
16	1	1	0
17	1	0	0
18	2	0	0
19	1	0	0
20	1	0	0
21	2	0	0
22	1	0	0
23	1	0	0
24	0	1	0
25	0	1	0
26	2	2	0
27	1	0	0
28	0	1	0
29	0	0	1
30	1	0	0
31	1	0	0
32	1	0	0
33	1	0	0
34	1	0	0
35	1	0	0
36	1	0	0

37	1	0	0
38	1	0	0
39	1	0	0

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Target	0	1	2
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-1-0-0-0-1	2	0	0
-1-0-0-0-12	4	0	0
-1-0-0-0-35	1	0	0
-1-0-0-2-34	1	0	0
-1-0-1-3-11	1	0	0
-1-0-1-6-39	1	0	0
-1-0-4-8-13	1	0	0
-1-2-2-15-33	1	0	0
-1-2-3-17-23	1	0	0
-1-2-5-10-29	0	0	1