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")
```

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

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