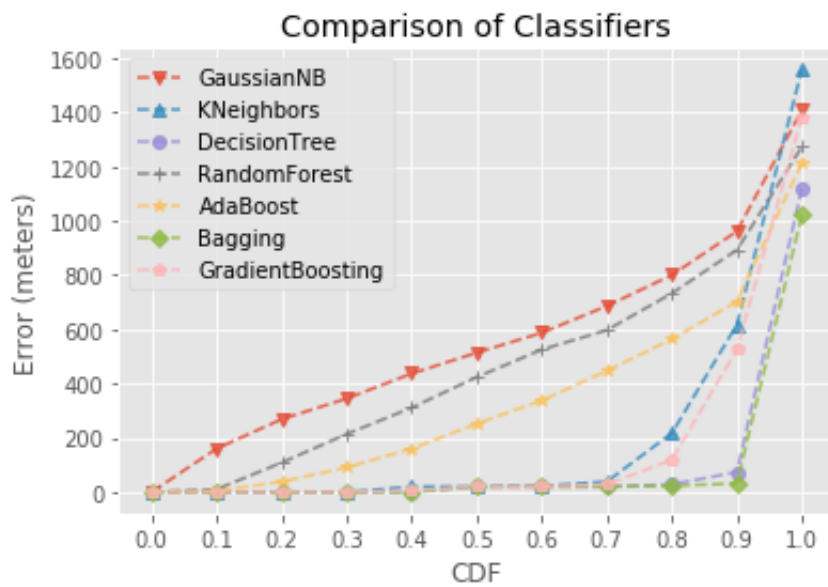


DM-HW3-Q1

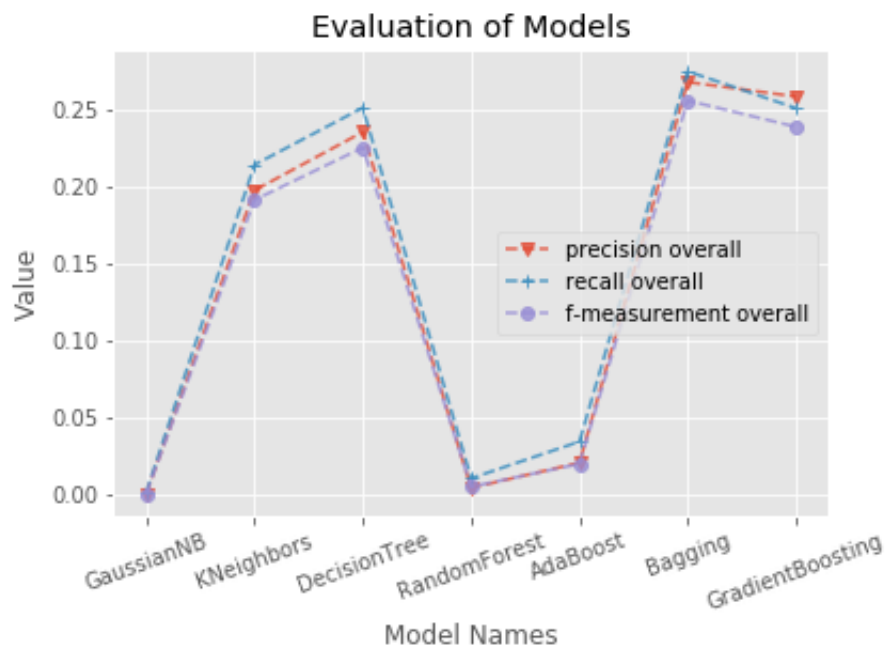
a

1. 代码运行结果拷贝

1. 各分类器下平均误差概率分布图



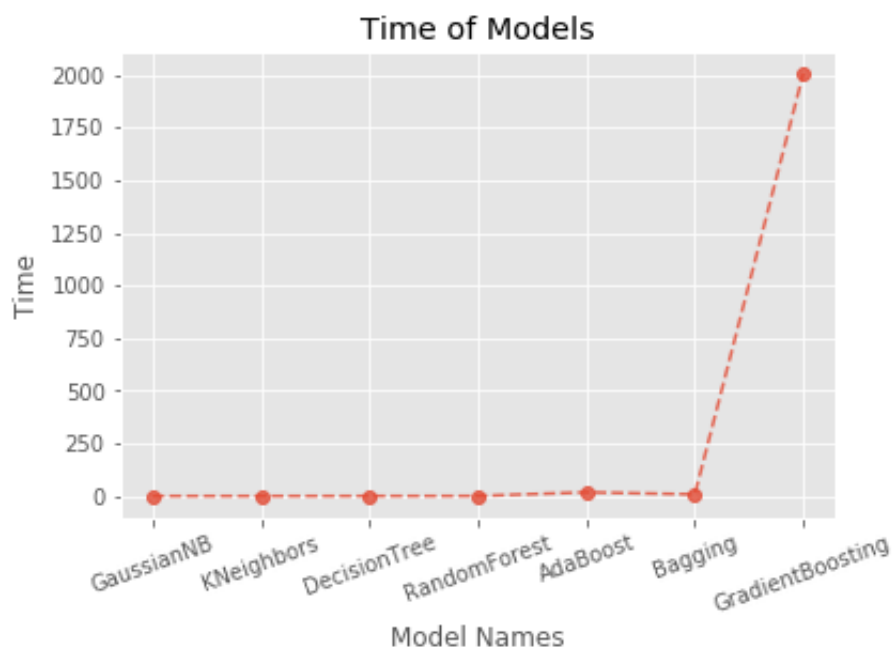
2. 各分类器下的precision/recall/f-measurement (overall)



3. 各分类器下的precision/recall/f-measurement (each grid)

```
{ 'AdaBoost': {'f-measurement foreach': array([ 0.          ,  0.          ,  0.          ,  0.28571429,  0.22222222,
  0.          ,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.          ,  0.          ,  0.          ,  0.36363636,
  0.          ,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.          ,  0.          ,  0.15384615,  0.          ,
  0.          ,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.12698413,  0.          ,  0.          ,  0.          ,
  0.46153846,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.          ,  0.          ,  0.          ,  0.          ,
  0.          ,  0.          ,  0.          ,  0.          ,  0.4          ,
  0.          ,  0.          ,  0.18181818,  0.          ,  0.          ,
  0.125       ,  0.          ,  0.          ,  0.          ,  0.          ])
```

4. 各分类器下运行时间



1	model_times
---	-------------

```
{ 'AdaBoost': 17.965240399999992,  
  'Bagging': 7.96050320000000051,  
  'DecisionTree': 0.27994979999999992,  
  'GaussianNB': 0.18299750000000002,  
  'GradientBoosting': 2006.8953565999996,  
  'KNeighbors': 0.0721332000000000119,  
  'RandomForest': 0.406187600000000015}
```

4. 部分预测结果

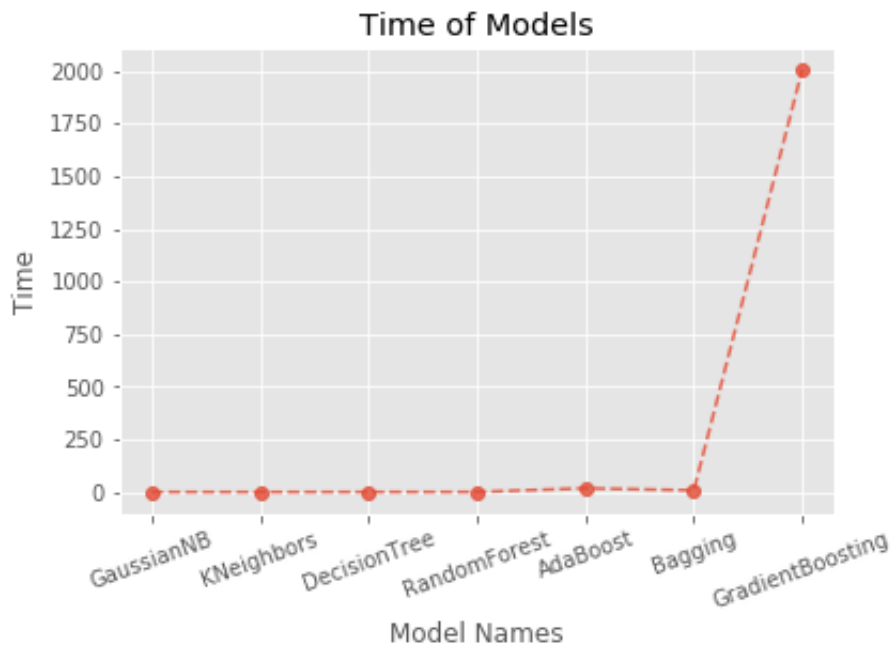
1	model_preds
	4007,
	3081,
	1780,
	5137,
	3907,
	2929,
	2929,
	3417,
	3081,
	2599,
	2929,
	2150,
	4731,
	2929,
	3584,
	372,
	2231,
	372,
	2194,
	2929,

2. 讨论分析部分

1. 以平均误差概率作为标准，KNeighbors/RandomForest/Bagging/GradientBoosting 四种分类器表现都比较好
2. 以 precision/recall/f-measurement 作为标准，也是 yeshiKNeighbors/RandomForest/Bagging/GradientBoosting 四种分类器表现较好
3. GradientBoosting的时间远大于其他分类器

3. 性能比较图表

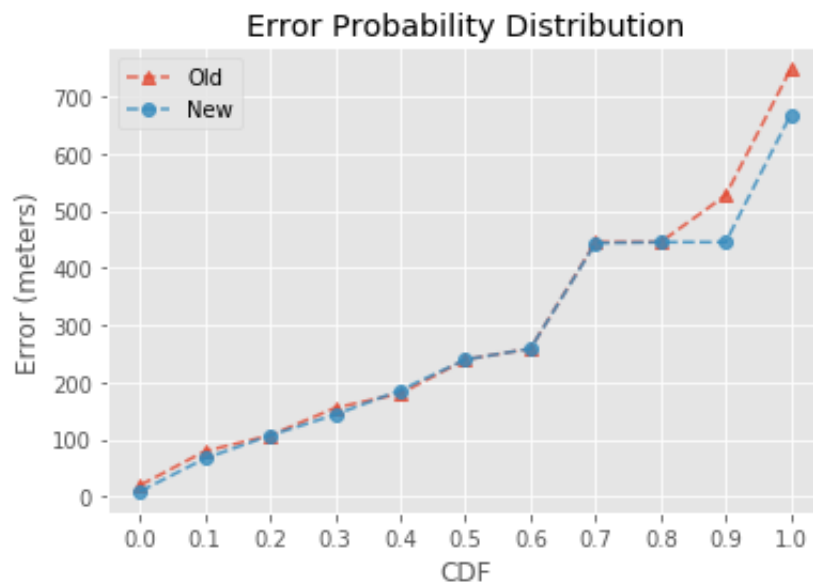
各分类器下运行时间



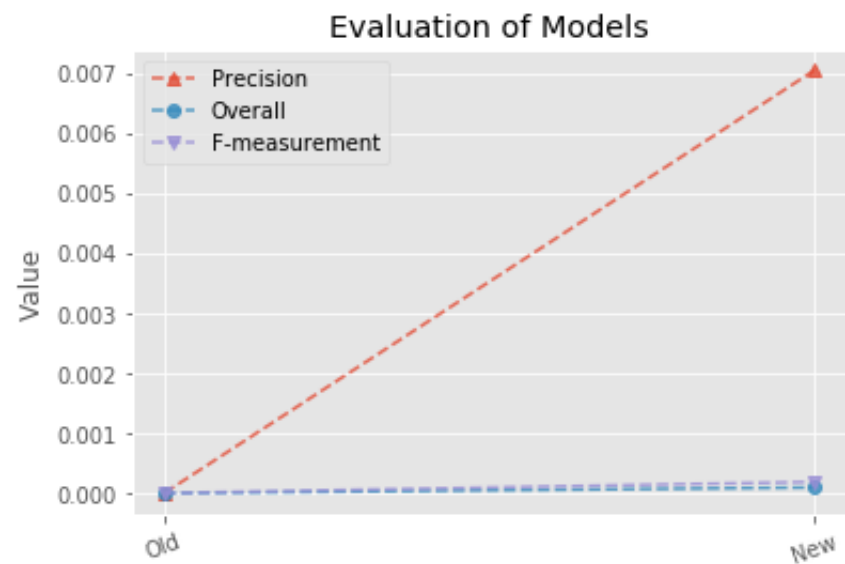
b

1. 代码运行结果拷贝

1. 新旧方案对比（平均误差概率分布图）



2. 新旧方案对比（precision/recall/f-measurement）



2. 讨论分析部分

- 1. 修正算法简述：
 - 1. 设定最大速度不超过2m/s
 - 2. 针对a题的计算结果，找到预测结果点时间序列上前一个点，若速度超过2m/s，则使用其前后亮点的中点来替代
- 2. 结果分析：

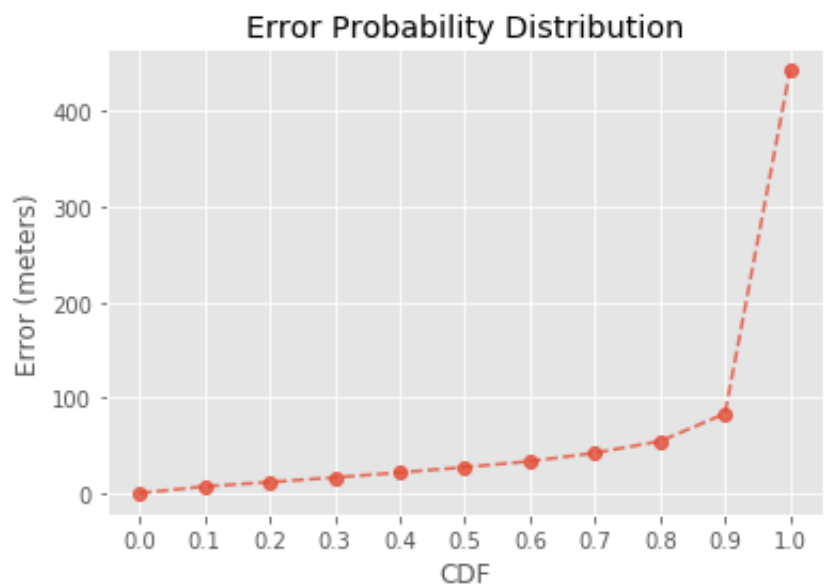
从上述对比图来看，该修正算法对于修正误差较小的点的作用不大，但可以修正部分误差较大的点

3. 性能比较图表

a题 (RandomForest)	b题 (RandomForest)
0.4s	1.7s

1. 代码运行结果拷贝

1. RandomForest下的平均误差概率分布



2. 预测结果

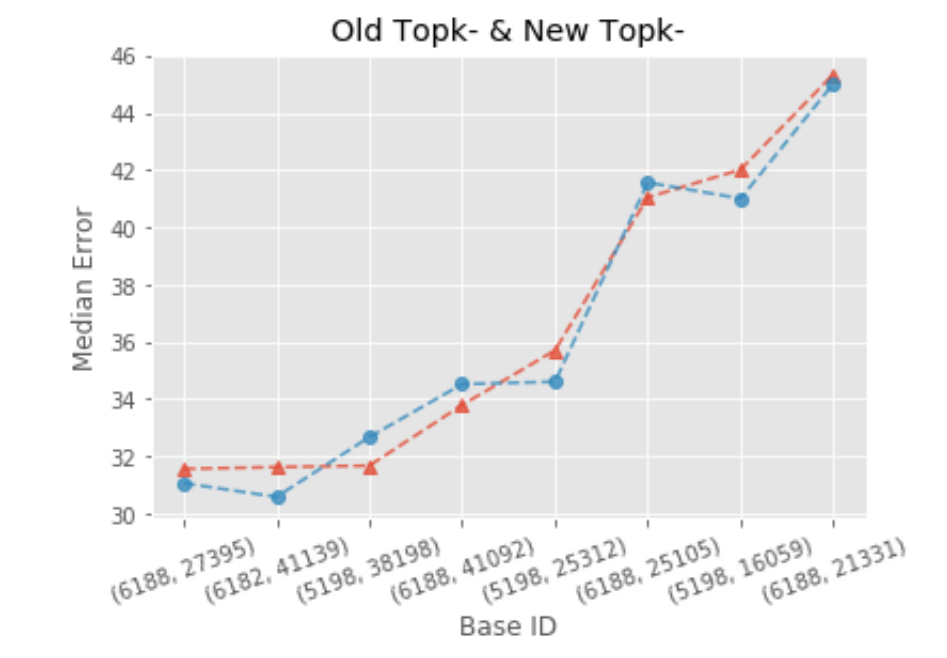
```
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121.22063899999999,
31.281872999999997):
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1  4.600163e+14  1.510221e+12  121.209226  31.284592
2  4.600163e+14  1.510221e+12  121.209207  31.284641
3  4.600163e+14  1.510221e+12  121.209198  31.284655
4  4.600163e+14  1.510221e+12  121.209197  31.284652
5  4.600163e+14  1.510221e+12  121.209195  31.284671
6  4.600163e+14  1.510221e+12  121.209189  31.284683
7  4.600163e+14  1.510221e+12  121.209187  31.284682
8  4.600163e+14  1.510221e+12  121.209187  31.284682
9  4.600163e+14  1.510221e+12  121.209189  31.284710
10 4.600163e+14  1.510221e+12  121.209189  31.284710
11 4.600163e+14  1.512005e+12  121.213481  31.288796
12 4.600163e+14  1.512005e+12  121.213534  31.288770
13 4.600163e+14  1.512005e+12  121.213581  31.288735
14 4.600163e+14  1.512005e+12  121.213682  31.288658
15 4.600163e+14  1.512005e+12  121.213728  31.288603
16 4.600163e+14  1.512005e+12  121.213774  31.288558
17 4.600163e+14  1.512005e+12  121.213820  31.288513
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22 4.600163e+14  1.512005e+12  121.214050  31.288288
23 4.600163e+14  1.512005e+12  121.214096  31.288243
24 4.600163e+14  1.512005e+12  121.214142  31.288198
25 4.600163e+14  1.512005e+12  121.214188  31.288153
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44 4.600163e+14  1.512005e+12  121.215062  31.287298
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46 4.600163e+14  1.512005e+12  121.215154  31.287208
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199 4.600163e+14  1.512005e+12  121.222192  31.280323
200 4.600163e+14  1.512005e+12  121.222238  31.280278
201 4.600163e+14  1.512005e+12  121.222284  31.280233
202 4.600163e+14  1.512005e+12  121.222330  31.280188
203 4.600163e+14  1.512005e+12  121.222376  31.280143
204 4.600163e+14  1.512005e+12  121.222422  31.280098
205 4.600163e+14  1.512005e+12  121.222468  31.280053
206 4.600163e+14  1.512005e+12  121.222514  31.280008
207 4.600163e+14  1.512005e+12  121.222560  31.279963
208 4.600163e+14  1.512005e+12  121.222606  31.279918
209 4.600163e+14  1.512005e+12  121.222652  31.279873
210 4.600163e+14  1.512005e+12  121.222698  31.279828
211 4.600163e+14  1.512005e+12  121.222744  31.279783
212 4.600163e+14  1.512005e+12  121.222790  31.279738
213 4.600163e+14  1.512005e+12  121.222836  31.279693
214 4.600163e+14  1.512005e+12  121.222882  31.279648
215 4.600163e+14  1.512005e+12  121.222928  31.279603
216 4.600163e+14  1.512005e+12  121.222974  31.279558
217 4.600163e+14  1.512005e+12  121.223020  31.279513
218 4.600163e+14  1.512
```

3. 性能比较图图表

a题 (RandomForest)	c题 (RandomForest)
0.4s	7.9s
d	

1. 代码运行结果拷贝

1. c题与d题的 Top k- 中位误差比较



2. Top k- 的预测结果（部分）

```
{(5198,
16059,
121.209767,
31.284987): [(-0.0051915534288347583, 0.0028435057623187763),
(-0.0023088244624694678, 0.0064231884502479629),
(-0.0052692871149855759, 0.0021030453113748508),
(-0.005142799396057789, 0.0032712558174612417),
(-0.0055232216178096568, 0.0051962902121427236),
(-0.0051600821894442726, 0.00534693193400984),
(-0.001913458322465769, 0.0062856627060498861),
(-0.00094621232589303748, 0.0064231884502479629),
(-0.0044051095140431769, 0.0040117364653969659),
(-0.005315087534152255, 0.0024648513066543136),
(-0.0037976602281783122, 0.006677696034161457),
(-0.0045364718823025559, 0.0057669664429085355),
(-0.0019919059514286967, 0.0062904778191573071),
(-0.0048503093708087792, 0.0037726600707765428),
(0.00037208113332940651, 0.0064231884502479629),
(-0.003667389079949096, 0.0031296407934460306),
(-0.0039954213669885271, 0.0075571561884868223),
(-0.003575844302957707, 0.0064655772580121638),
(-0.0053250479043701615, 0.0021034956763747487),
(-0.0051224994417401705, 0.003553509472338423),
(-0.0049848865874803352, 0.0018783050118886904),
(-0.0040591034567175367, 0.0076024890207331752),
(-0.00092476276378898939, 0.0062904778191573071),
(-0.0047045709723884934, 0.0037010618649593379),
(-0.0052415234839220193, 0.0021218735659580936),
(-0.0043773522452035833, 0.0046819349124282792),
```

3. 运行时间

16.757375000001048

2. 讨论分析部分

1. 从c题与d题的 Top k- 中位误差比较来看，该处理对提高精确度几乎没有起到帮助，甚至有些基站的中位置反而加大了
2. 可能是不同基站之间有不可忽视的差别，不能简单将结果好的基站数据融入结果差的中去

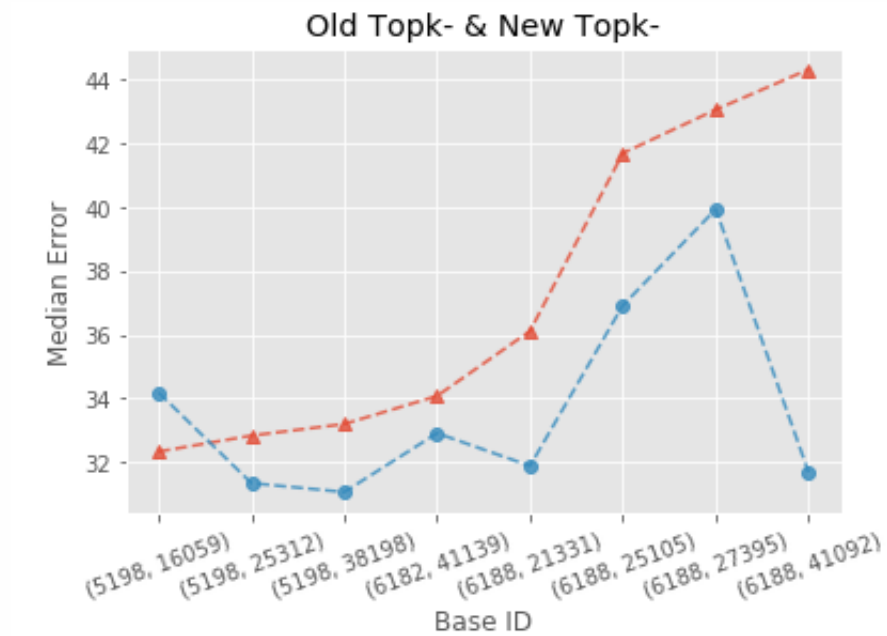
3. 性能比较图图表

c题 (RandomForest)	d题 (RandomForest)
7.9s	16.8s

e

运行结果拷贝

1. c题与e题的 Top k- 中位误差比较



2. 运行时间

86.11301800000001

2. 讨论分析部分

- 从c题与d题的 Top k- 中位误差比较来看，该处理对提高精确度起到一定帮助（大部分基站的中位误差都变小了）
- 使用与基站相似且结果较好的数据进行融合，在一定程度上能提高模型的精确度

3. 性能比较图图表

c题 (RandomForest)

d题 (RandomForest)

7.9s

86.1s