

# Radar动/静态判断准确率分析

## 目录

- 思路
- 实验&结论

## 思路

预研方案：大融合依靠Radar的运动目标提高整体运动灵敏性。需要首先对Radar速度的动静态准确率进行评估。

## 实验&结论

- 数据过滤条件，by[1]实验：

1	类型	速度阈值	横向区间	纵向区间	遮挡率	障碍物与车头theta_diff
2	VEHICLE	< 5 m/s	±6m	8~60m	0	< 20°

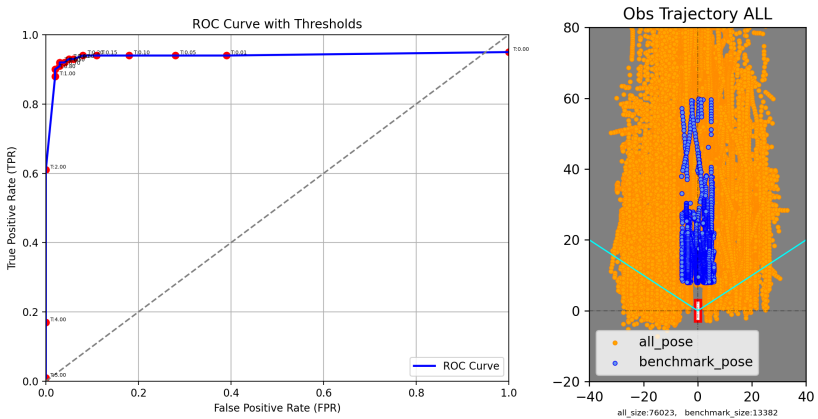
TOTAL:13382(T/F:	6549/ 5291)	TP:6193, FP:5291, TN:0, FN:356, Lidar_only:356	TPR:0.95, FPR:1.00
more_threshold(L-R):0.05-0.00	Precision:0.539,Recall:0.946,F1:0.687		
TOTAL:13382(T/F:	6549/ 5291)	TP:6187, FP:5245, TN:3246, FN:362, Lidar_only:356	TPR:0.94, FPR:0.30
more_threshold(L-R):0.05-0.01	Precision:0.752,Recall:0.945,F1:0.837		
TOTAL:13382(T/F:	6549/ 5291)	TP:6174, FP:1493, TN:4798, FN:375, Lidar_only:356	TPR:0.94, FPR:0.28
more_threshold(L-R):0.05-0.05	Precision:0.805,Recall:0.943,F1:0.869		
TOTAL:13382(T/F:	6549/ 5291)	TP:6172, FP:937, TN:4354, FN:377, Lidar_only:356	TPR:0.94, FPR:0.18
more_threshold(L-R):0.05-0.10	Precision:0.868,Recall:0.942,F1:0.904		
TOTAL:13382(T/F:	6549/ 5291)	TP:6167, FP:580, TN:4711, FN:382, Lidar_only:356	TPR:0.94, FPR:0.11
more_threshold(L-R):0.05-0.15	Precision:0.914,Recall:0.942,F1:0.928		
TOTAL:13382(T/F:	6549/ 5291)	TP:6156, FP:466, TN:4885, FN:395, Lidar_only:356	TPR:0.94, FPR:0.08
more_threshold(L-R):0.05-0.20	Precision:0.936,Recall:0.940,F1:0.938		
TOTAL:13382(T/F:	6549/ 5291)	TP:6121, FP:293, TN:4998, FN:428, Lidar_only:356	TPR:0.93, FPR:0.06
more_threshold(L-R):0.05-0.30	Precision:0.954,Recall:0.935,F1:0.944		
TOTAL:13382(T/F:	6549/ 5291)	TP:6080, FP:243, TN:5048, FN:469, Lidar_only:356	TPR:0.93, FPR:0.05
more_threshold(L-R):0.05-0.40	Precision:0.962,Recall:0.928,F1:0.945		
TOTAL:13382(T/F:	6549/ 5291)	TP:6046, FP:209, TN:5062, FN:503, Lidar_only:356	TPR:0.92, FPR:0.04
more_threshold(L-R):0.05-0.50	Precision:0.967,Recall:0.923,F1:0.944		
TOTAL:13382(T/F:	6549/ 5291)	TP:5993, FP:174, TN:5117, FN:556, Lidar_only:356	TPR:0.92, FPR:0.03
more_threshold(L-R):0.05-0.60	Precision:0.972,Recall:0.915,F1:0.943		
TOTAL:13382(T/F:	6549/ 5291)	TP:5940, FP:148, TN:5143, FN:609, Lidar_only:356	TPR:0.91, FPR:0.03
more_threshold(L-R):0.05-0.70	Precision:0.966,Recall:0.907,F1:0.940		
TOTAL:13382(T/F:	6549/ 5291)	TP:5890, FP:126, TN:5165, FN:659, Lidar_only:356	TPR:0.90, FPR:0.02
more_threshold(L-R):0.05-0.80	Precision:0.979,Recall:0.809,F1:0.938		
TOTAL:13382(T/F:	6549/ 5291)	TP:5768, FP:97, TN:5194, FN:781, Lidar_only:356	TPR:0.88, FPR:0.02
more_threshold(L-R):0.05-1.00	Precision:0.983,Recall:0.881,F1:0.929		
TOTAL:13382(T/F:	6549/ 5291)	TP:4917, FP:50, TN:5271, FN:2532, Lidar_only:356	TPR:0.61, FPR:0.00
more_threshold(L-R):0.00-2.00	Precision:0.965,Recall:0.810,F1:0.878		
TOTAL:13382(T/F:	6549/ 5291)	TP:1110, FP:5, TN:5286, FN:5430, Lidar_only:356	TPR:0.17, FPR:0.00
more_threshold(L-R):0.05-4.00	Precision:0.998,Recall:0.169,F1:0.290		
TOTAL:13382(T/F:	6549/ 5291)	TP:167, FP:5, TN:5286, FN:6482, Lidar_only:356	TPR:0.01, FPR:0.00
more_threshold(L-R):0.05-5.00	Precision:0.939,Recall:0.010,F1:0.020		

动态阈值取值(0.2~0.5), F1值较好

AUC: 0.9382499999999998

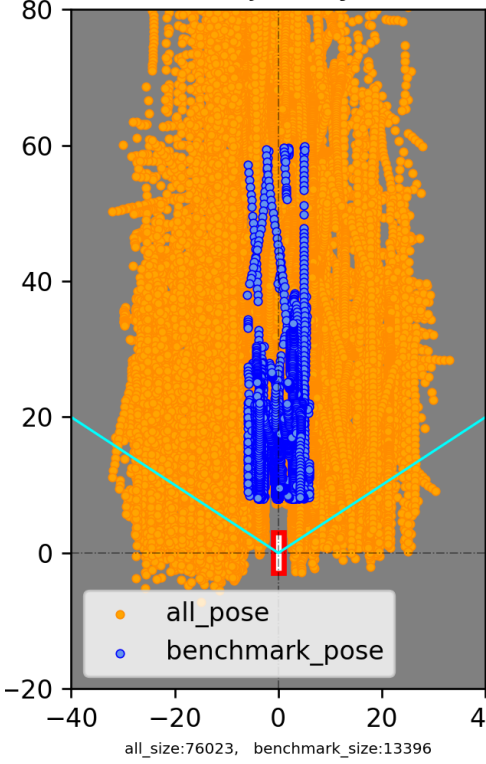
- 结论

**i** ROC曲线证明以Lidar动静态判断准确的情况下，设置不同Radar速度阈值对障碍物做动态判断的分类器效果较好(AUC≈0.94)，同时在速度阈值区间（0.2~0.5）Radar的动态障碍物判断有较高的准确率和召回率。

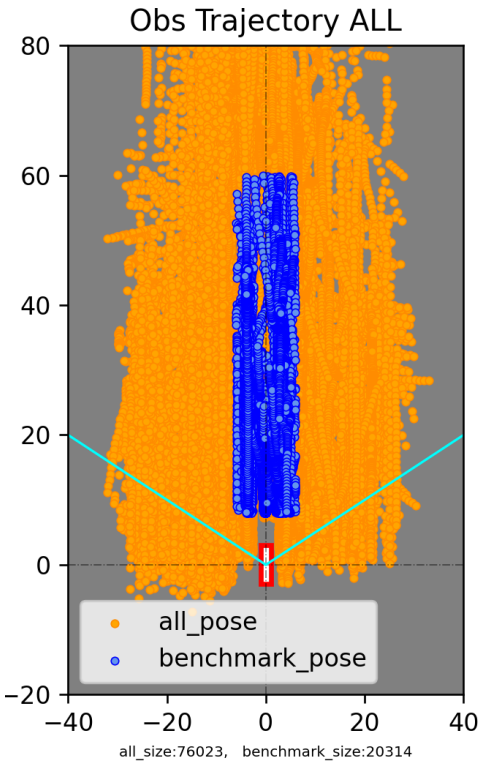


附录

【1】 过滤条件实验结果

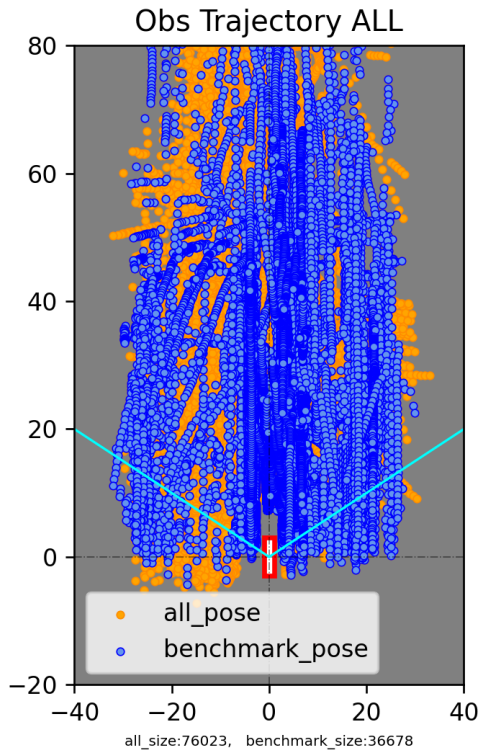
1	方法	统计点可视化	统计结果
2	滤波后结果	<div><div>Obs Trajectory ALL</div><div>all_size:76023, benchmark_size:13396</div></div>	TOTAL:13396(T/F: 6531/ 5321) ITP:611 move_threshord(L-R):0.05-0.20   Precis
	<div>1. 关闭朝向过滤 2. 关闭遮挡率过滤</div>		TOTAL:20314(T/F:11419/ 6238) ITP:10: move_threshord(L-R):0.05-0.20   Precis

3



关闭范围限制

4



TOTAL:36678(T/F:17483/ 9322) ITP:12  
move\_threshord(L-R):0.05-0.20 IIPrecis