NEURAL INFORMATION PROCESSING SYSTEMS

MAN TruckScenes: A Multimodal Dataset for Autonomous Trucking in Diverse Conditions

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Introduction

Why do we need another dataset?

- Autonomous trucking can change the future of logistics
- Perception development needs large-scale datasets
- No large-scale dataset exists for autonomous trucks

  … different operational design domain

  … different sensor mounting positions

  … movable truck-trailer combination

- The world's first dataset for autonomous trucking

	KITTI	nuScenes	Waymo	Argo2	Ours
Scenes	22	1000	1150	1000	747
Sample	1,5 k	40 k	230 k	150 k	30 k
Duration	1,5 h	5,5 h	6,4 h	4,2 h	4,2 h
Coverage	-	4 km²	76 km²	17 km²	100 km²
Camera	4	6	5	9	4
Lidar	1	1	5	2	6
Radar	0	5	0	0	6
GNSS	1	1	0	0	1
IMU	1	1	0	0	2
Map	no	yes	no	yes	no
Range	91 m	141 m	80 m	214 m	226 m
Classes	3	23	4	30	27
Vehicle	car	car	car	car	truck

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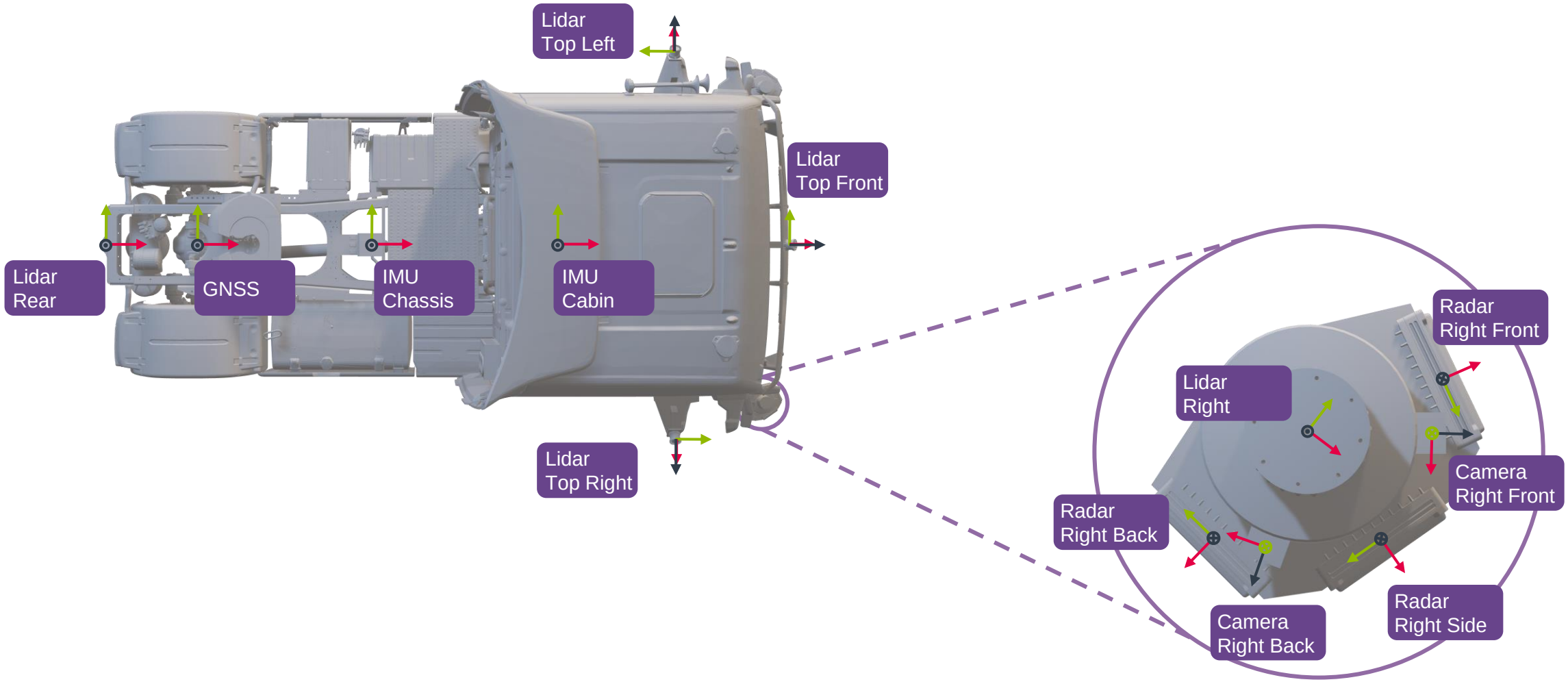
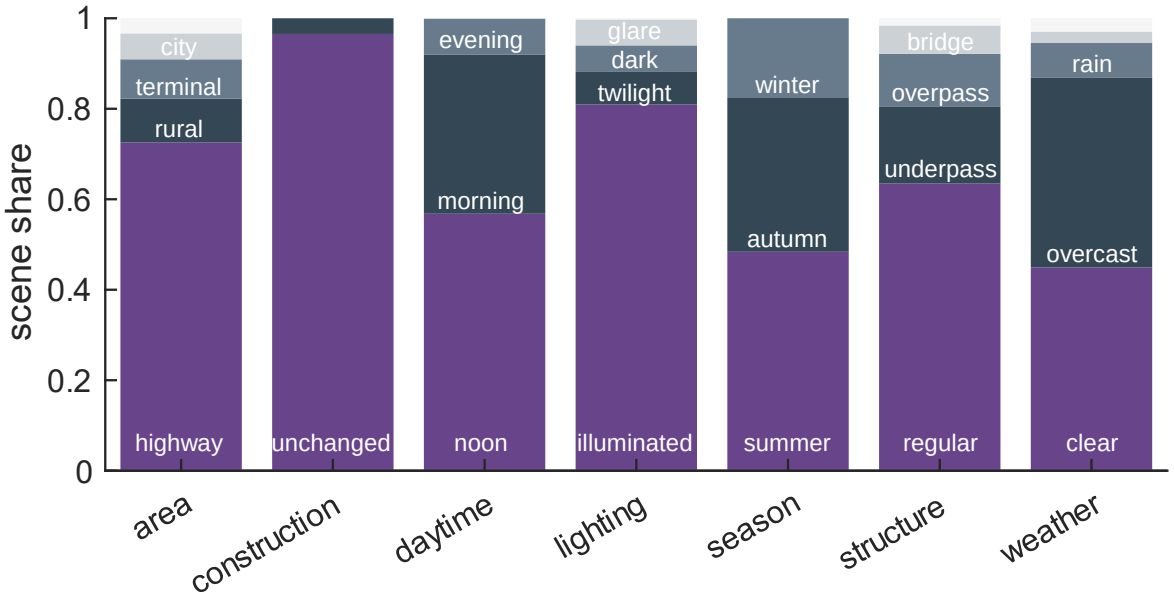
The Autonomous Truck

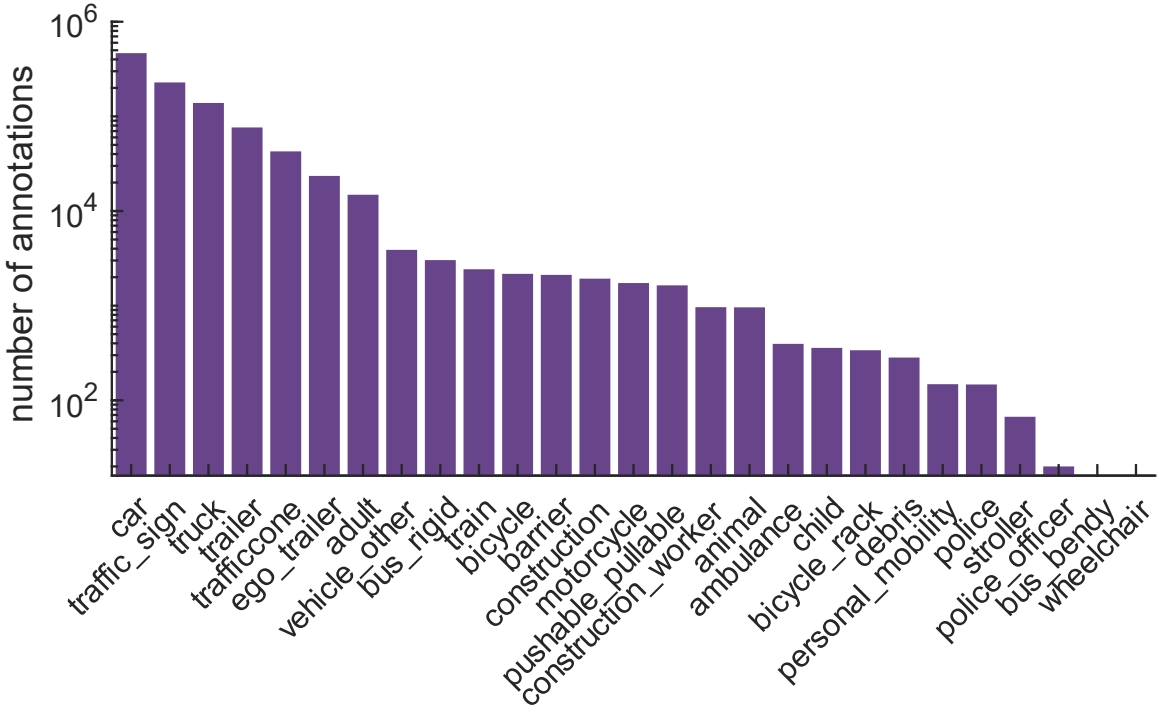
Multimodal data collection



MAN TruckScenes

The world's first dataset for autonomous trucking





› Diverse driving scenes

› A multitude of object classes

MAN TruckScenes

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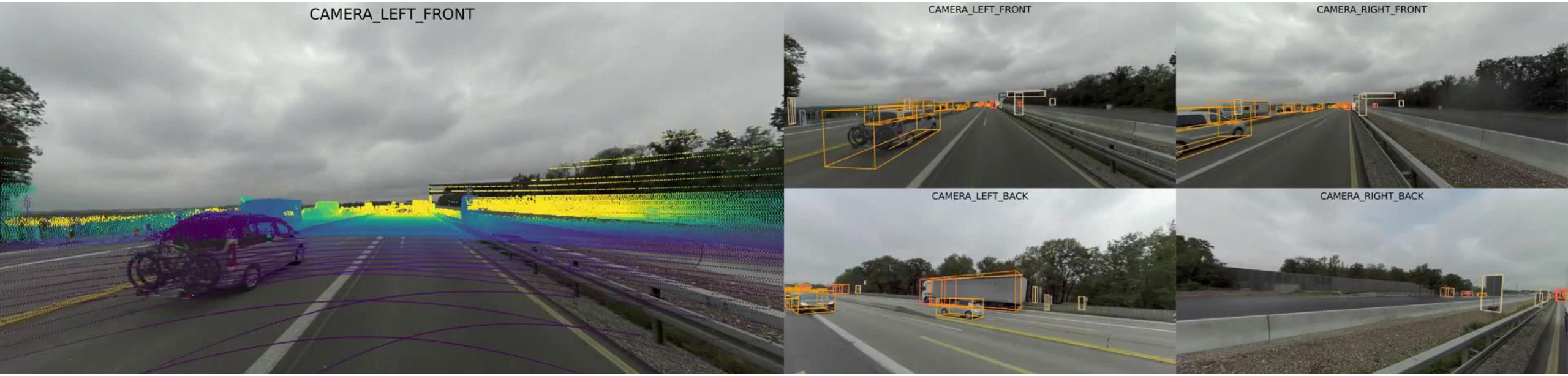

Results

A baseline to beat

Method	Modality	mAP	NDS	ATE	ASE	AOE	AVE	AAE
PETR	Camera	0.02	0.12	1.13	0.69	0.65	1.50	0.56
RadarGNN	Radar	0.07	0.11	0.89	0.81	1.13	8.00	0.57
CenterPoint	Lidar	0.27	0.41	0.41	0.35	0.28	2.73	0.20

- Long-range detection remains challenging
- The detection quality of diverse object classes is insufficient
- No single sensor modality is sufficient for the diverse set of environmental conditions

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