TABLE I
AUTONOMOUS DRIVING DATASET 1. SS: SEMANTIC SEGMENTATION, OD: OBJECT DETECTION, OT: OBJECT TRACKING, MOT: MULTI-OBJECT TRACKING

Dataset	Year	Size	Temporal	Sensing domain	Tasks	Real/Synthetic
ETH Ped [1]	2007	2,293 frames	✓	onboard	pedestrian detection	real
TUD-Brussels [2]	2009	1,600 frames	×	onboard	(3D) OD	real
Collective activity [3]	2009	44 short videos	✓	others	human activity recognition	real
San Francisco Landmark [4]	2011	150K panoramic images	×	others	landmark identification	real
Daimler Stereo Ped [5]	2011	21,790 frames	✓	onboard	pedestrian detection	real
BelgiumTS [6]	2011	13K traffic sign annotations	×	onboard	traffic sign detection	real
Stanford Tack [7]	2011	14K tracks	✓	onboard	classification	real
TME Motorway [8]	2012	30K frames	✓	onboard	OD, OT	real
MSLU [9]	2013	36.8 km distances	✓	onboard	SLAM	real
SydneyUrbanObject [10]	2013	588 object scans	×	onboard	classification	real
Ground Truth SitXel [11]	2013	78,500 frames	✓	onboard	stereo confidence	real
NYC3DCars [12]	2013	2K images	×	onboard	OD	real
AMUSE [13]	2013	117,440 frames	✓	onboard	SLAM	real
Daimler Ped [14]	2013	12,485 frames	✓	onboard	pedestrian path prediction	real
LISA [15]	2014	6,610 frames	✓	onboard	traffic sign detection	real
Paris-rue-Madame [16]	2014	643 objects	×	onboard	OD, SS	real
TRANCOS [17]	2015	1.2K images	×	V2X	onboard number estimation	real
FlyingThings3D [18]	2015	26,066 frames	✓	others	scene flow estimation	synthetic
Ua-detrac [19]	2015	140K frames	✓	V2X	OD, MOT	real
NCLT [20]	2015	34.9 hours	✓	onboard	odometry	real
CCSAD [21]	2015	96K frames	✓	onboard	scene understanding	real
KAIST MPD [22]	2015	95K color-thermal pair frames	×	onboard	pedestrian detection	real
SAP [23]	2016	19K frames	×	drone	OD, OT	real
LostAndFound [24]	2016	2,104 frames	✓	onboard	obstacle detection	real
UAH-Driveset [25]	2016	500 mins	✓	onboard	lane detection, detection	real
CURE-TSR [26]	2017	2.2M annotated images	×	onboard	traffic sign detection	real
TuSimple [27]	2017	6,408 frames	×	onboard	lane detection, velocity estimation	real
TRoM [28]	2017	712 frames	×	onboard	road marking detection	real
NEXET [29]	2017	91,190 frames	×	onboard	OD	real
DIML [30]	2017	470 videos	✓	onboard	lane detection	real
Bosch STL [31]	2017	13,334 images	✓	onboard	traffic light detection and classification	real
Complex Urban [32]	2017	around 190km paths	✓	onboard	SLAM	real
DDD20 [33]	2017	51 hours event frames	✓	onboard	end-to-end driving	real
PedX [34]	2018	5K images	✓	onboard	pedestrian detection and tracking	real
LiVi-Set [35]	2018	10K frames	✓	onboard	driving behavior prediction	real
Syncapes [36]	2018	25K images	×	onboard	OD, SS	synthetic
NVSEC [37]	2018	around 28 km distances	✓	others	SLAM	real
Aachen Day-Night [38]	2018	4,328 images, 1.65M points	✓	onboard	visual localization	real
CADP [39]	2018	1,416 scenes	×	V2X	traffic accident analysis	real
TAF-BW [40]	2018	2 scenarios	✓	V2X	MOT, V2X communication	real
comma2k19 [41]	2018	2M images	×	onboard	pose estimation, end-to-end driving	real
nighttime drive [42]	2018	35K	×	onboard	SS	real
VEIS [43]	2018	61,305 frames	×	onboard	OD, SS	synthetic
Paris-Lille-3D [44]	2018	2,479 frames	×	onboard	3D SS, classification	real
NightOwis [45]	2018	56K frames	✓	onboard	pedestrian detection, tracking	real
EuroCity Persons [46]	2018	47,300 frames	×	onboard	OD	real
RANUS [47]	2018	4K frames	×	onboard	SS, scene understanding	real
SynthCity [48]	2019	367.9M points in 30 scans	×	onboard	(3D) OD, (3D) SS	synthetic
D^2-City [49]	2019	700K annotated frames	✓	onboard	OD, MOT	real
Caltech Lanes [50]	2019	1,224 frames	×	onboard	lane detection	real
Mcity [51]	2019	1,7500 frames	✓	onboard	SS	real
DET [52]	2019	5,424 event-based camera images	×	onboard	lane detection	real
PreSIL [53]	2019	50K frames	✓	onboard	OD, 3D SS	synthetic
H3D [54]	2019	27,721 frames	✓	onboard	(3D) OD, MOT	real
LLAMAS [55]	2019	100K frames	✓	onboard	lane segmentation	real
MIT DriveSeg [56]	2019	5K frames	×	onboard	SS	real
Astyx [57]	2019	500 radar frames	×	onboard	3D OD	real
UNDD [58]	2019	7.2K frames	✓	onboard	SS	real
Boxy [59]	2019	200K frames	✓	onboard	OD	real
RUGD [60]	2019	37K frames	✓	others	SS	real
ApolloCar3D [61]	2019	5,277 driving images	×	onboard	3D instance understanding	real
HEV [62]	2019	230 video clips	✓	onboard	object localization	real
HAD [63]	2019	5,675 video clips	✓	onboard	end-to-end driving	real
CARLA-100 [64]	2019	100 hours driving	✓	onboard	path planning, behavior cloning	synthetic
Brno Urban [65]	2019	375.7 km	✓	onboard	recognition	real
VERI-Wild [66]	2019	416,314 images	✓	V2X	onboard re-identification	real
CityFlow [67]	2019	200K bounding boxes	✓	V2X	OD, MOT, re-identification	real
VLMV [68]	2020	306K frames	✓	V2X	lane merge	real
Small Obstacles [69]	2020	3K frames	×	onboard	small obstacle segmentation	real
Cirrus [70]	2020	6,285 frames	✓	onboard	(3D) OD	real
KITTI InstanceMotSeg [71]	2020	12,919 frames	✓	onboard	moving instance segmentation	real
A*3D [72]	2020	39,179 point cloud frames	×	onboard	(3D) OD	real
Toronto-3D [73]	2020	4 scenarios	×	onboard	3D SS	real
MIT-AVT [74]	2020	1.15M 10s video clips	✓	onboard	SS, anomaly detection	real
CADC [75]	2020	56K	×	onboard	(3D) OD, OT	real
SemanticPOSS [76]	2020	2,988 point cloud frames	✓	onboard	3D SS	synthetic
IDDA [77]	2020	1M frames	×	onboard	segmentation	synthetic

TABLE II
AUTONOMOUS DRIVING DATASET 2

Dataset	Year	Size	Temporal	Sensing domain	Tasks	Real/Synthetic
CARRADA [78]	2020	7,193 radar frames	✓	onboard	SS	real
Titan [79]	2020	75,262 frames	✓	onboard	OD, action recognition	real
NightCity [80]	2020	4,297 frames	×	onboard	nighttime SS	real
PePScenes [81]	2020	40K frames	✓	onboard	(3D) OD, pedestrian action prediction	real
DDAD [82]	2020	21,200 frames	×	onboard	depth estimation	real
MulRan [83]	2020	41.2km paths	✓	onboard	place recognition	real
Oxford Radar RobotCar [84]	2020	240K scans	✓	onboard	odometry	real
OTOH [85]	2020	170K scenes	✓	drone	trajectory prediction, planning	real
DA4AD [86]	2020	9 sequences	✓	onboard	visual localization	real
CPIS [87]	2020	10K frames	×	V2X	cooperative 3D OD	synthetic
EU LTD [88]	2020	around 37 hours	✓	onboard	odometry	real
Newer College [89]	2020	290M points, 2300 seconds	✓	others	SLAM	real
CCD [90]	2020	4.5K videos	✓	onboard	accident prediction	real
LIBRE [91]	2020	40 frames	×	onboard	LiDAR performance benchmark	real
Gated2Depth [92]	2020	17,686 frames	✓	onboard	depth estimation	real
TCGR [93]	2020	839,350 frames	✓	others	traffic control gesture recognition	real
4Seasons [94]	2021	350km recordings	✓	onboard	SLAM	real
PVDN [95]	2021	59,746 frames	✓	onboard	nighttime OD, OT	real
ACDC [96]	2021	4,006 images	×	onboard	SS on adverse conditions	real
DRIV100 [97]	2021	100K frames	×	onboard	domain adaptation SS	real
NEOLIX [98]	2021	30K frames	✓	onboard	3D OD, OT	real
IPS3000+ [99]	2021	14,198 frames	✓	V2X	3D OD	real
AUTOMATUM [100]	2021	30 hours	✓	drone	trajectory prediction	real
DurLAR [101]	2021	100K frames	✓	onboard	depth estimation	real
Reasonable-Crowd [102]	2021	92 scenarios	✓	onboard	driving behavior prediction	synthetic
MOTSynth [103]	2021	768 driving sequences	✓	onboard	Pedestrian detection and tracking	synthetic
MAVD [104]	2021	113,283 images	✓	onboard	OD and OT with sound	real
Multifog KITTI [105]	2021	15K frames	×	onboard	3D OD	synthetic
Comap [106]	2021	4,391 frames	✓	V2X	3D OD	synthetic
R3 [107]	2021	369 scenes	×	onboard	out-of-distribution detection	real
WIBAM [108]	2021	33,092 frames	✓	V2X	3D OD	real
CeyMo [109]	2021	2,887 frames	×	onboard	road marking detection	real
RaidaR [110]	2021	58,542 rainy street scenes	×	onboard	SS	real
Fishyscapes [111]	2021	1,030 frames	×	onboard	SS, anomaly detection	real
RadarScenes [112]	2021	40K radar frames	✓	onboard	OD, classification	real
ROAD [113]	2021	122K frames	✓	onboard	OD, SS	real
All-in-One Drive [114]	2021	100K	✓	onboard	(3D) OD, (3D) SS, trajectory prediction	real
PandaSet [115]	2021	8,240 frames	✓	onboard	(3D) OD, SS, OT	real
SODA10M [116]	2021	20K labeled images	✓	onboard	OD	real
PixSet [117]	2021	29K point cloud frames	×	onboard	(3D) OD	real
RoadObstacle21 [118]	2021	327 scenes	×	onboard	anomaly segmentation	synthetic
VIL-100 [119]	2021	10K frames	×	onboard	lane detection	real
OpenMPD [120]	2021	15K frames	×	onboard	(3D) OD, 3D OT, semantic segmentation	real
WADS [121]	2021	1K point cloud frames	✓	onboard	SS	real
CCTSDB 2021 [122]	2021	16,356 frames	×	onboard	traffic sign detection	real
SemanticUSL [123]	2021	1.2K frames	×	onboard	domain adaptation 3D SS	real
CARLANE [124]	2022	118K frames	✓	onboard	lane detection	synthetic
CrashD [125]	2022	15,340 scenes	×	onboard	3D OD	synthetic
CODD [126]	2022	108 sequences	✓	V2X	multi-agent SLAM	synthetic
CarlaScenes [127]	2022	7 sequences	✓	onboard	(3D) SS, SLAM, depth estimation	synthetic
OPV2V [128]	2022	11,464 frames	×	V2X	onboard-to-onboard perception	synthetic
CARLA-WildLife [129]	2022	26 videos	✓	onboard	out-of-distribution tracking	synthetic
SOS [129]	2022	20 videos	✓	onboard	out-of-distribution tracking	real
RoadSaW [130]	2022	720K frames	✓	onboard	Road surface and wetness estimation	real
I see you [131]	2022	170 sequences, 340 trajectories	✓	V2X	OD	real
ASAP [132]	2022	1.2M images	✓	onboard	online 3D OD	real
Amodal Cityscapes [133]	2022	5K frames	×	onboard	amodal SS	real
SynWoodScape [134]	2022	80K frames	×	onboard	(3D) OD, segmentation	synthetic
TJ4RadSet [135]	2022	7,757 frames	✓	onboard	OD, OT	real
CODA [136]	2022	1,500 frames	×	onboard	corner case detection	real
LiDAR Snowfall [137]	2022	7,385 point cloud frames	✓	onboard	3D OD	synthetic
MUAD [138]	2022	10.4K frames	✓	onboard	OD. SS, depth estimation	synthetic
AUTOCASTSIM [139]	2022	52K frames	✓	V2X	(3D) OD, OT, SS	real
CARTI [140]	2022	11K frames	✓	V2X	cooperative perception	synthetic
K-Lane [141]	2022	15,382 frames	×	onboard	lane detection	real
Ithaca365 [142]	2022	7K frames	×	onboard	3D OD, SS, depth estimation	real
GLARE [143]	2022	2,157 frames	×	onboard	traffic sign detection	real
SUPS [144]	2023	5K frames	✓	onboard	SS, depth estimation, SLAM	synthetic
Boreas [145]	2023	7,111 frames	✓	onboard	(3D) OD, localization	real
Robo3D [146]	2023	476K frames	✓	onboard	(3D) OD, 3D SS	real
ZOD [147]	2023	100K frames	✓	onboard	(3D) OD, segmentation	real
K-Radar [148]	2023	35K radar frames	×	onboard	3D OD, OT	real
aiMotive [149]	2023	26,583 frames	✓	onboard	3D OD, MOT	real
UrbanLaneGraph [150]	2023	around 5,220 km lane spans	✓	drone	lane graph estimation	real
WEDGE [151]	2023	3,360 frames	×	others	OD, classification	synthetic
OpenLane-V2 [152]	2023	466K images	✓	onboard	lane detection, scene understanding	real
V2X-Seq (perception) [153]	2023	15K frames	✓	V2X	cooperative perception	real
SSCBENCH [154]	2023	66,913 frames	×	onboard	semantic scene completion	real
RoadSC [155]	2023	90,759 images	×	onboard	road snow coverage estimation	real
V2X-Real [156]	2024	171K images, 33K LiDAR point clouds	-	V2X	3D OD	real
RCooper [157]	2024	50K images, 30K LiDAR point clouds	✓	V2X	3D OD, OT	real
FLIR [158]	-	26,442 thermal frames	✓	onboard	thermal image OD	real

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