

Operational Design Domain (ODD) First Stage Labeling Guide

Overview

This document outlines the labeling process for analyzing the Operational Design Domain (ODD) using three synchronized images captured from different vehicle camera angles:

- **CAM_FRONT_LEFT**
- **CAM_FRONT**
- **CAM_FRONT_RIGHT**

What to do ?

To ensure high-quality and accurate textual descriptions, focus on:

1. **Semantic Accuracy Check:** Ensure the description matches the image content.
2. **Consistency Across Cameras:** Verify coherence in descriptions across all viewpoints.
3. **Skip if you are not sure:** If you are uncertain about any labeling detail, skip it for now. We can schedule a meeting to review and revise any skipped items.
4. **Feel free to write notes:** Any observations or notes you add during labeling will be reviewed at the end of the process.

Labeling Categories and Descriptions

1. Scenery Zones

1.1 **GeoFencedAreas:** Areas restricted by a virtual boundary where the ADS is allowed to operate, defined using GPS or other mapping technologies.

- *Possible Answers:* Yes, No

1.2 **TrafficManagementZones:** Zones with specific traffic regulations, such as congestion charging zones, low-emission zones, or toll plazas.

- *Possible Answers:* Yes, No

1.3 **SchoolZones:** Areas near schools with safety-focused rules, such as reduced speed limits and increased pedestrian warnings.

- *Possible Answers:* Yes, No

1.4 **RegionsOrStates:** Administrative boundaries (e.g., states, provinces) or operational regions where the ADS is certified to function.

- *Possible Answers:* Yes, No

1.5 **InterferenceZones:** Zones with potential signal or sensor interference, such as dense urban areas, tunnels, or locations with heavy foliage.

- *Possible Answers:* Yes, No

2. Drivable Area

2.1 DrivableAreaType: 2.1.1 **Motorways:** High-capacity roads limited to motorized vehicles with higher speed limits.

- *Possible Answers:* Yes, No

2.1.2 **RadialRoads:** Major roads (A-roads) that connect motorways to urban centers or distributor roads.

- *Possible Answers:* Yes, No

2.1.3 **DistributorRoads:** Secondary roads (B-roads) connecting radial roads to smaller, local streets.

- *Possible Answers:* Yes, No

2.1.4 **MinorRoads:** Low-capacity roads serving residential or local areas.

- *Possible Answers:* Yes, No

2.1.5 **SlipRoads:** Ramps connecting different road levels or types.

- *Possible Answers:* Yes, No

2.1.6 **Parking:** Designated areas for stopping and parking vehicles.

- *Possible Answers:* Yes, No

2.1.7 **SharedSpace:** Mixed-use zones shared between vehicles, pedestrians, and cyclists.

- *Possible Answers:* Yes, No

2.2 DrivableAreaGeometry:

2.2.1 **HorizontalPlane:** The road's layout when viewed from above (e.g., straight or curved).

- *Possible Answers:* Straight, Curved (gentle), Curved (sharp), No

2.2.2 **TransversePlane:** The cross-sectional profile of the road, including shoulders and dividers.

2.2.2.1 **Divided:** Indicates if the road has a physical separation, such as a median, between lanes going in opposite directions.

- *Possible Answers:* Yes, No

2.2.2.2 **Undivided:** Refers to a road where traffic in both directions shares the same surface, without any physical separation.

- *Possible Answers:* Yes, No

2.2.2.3 **Pavements:** Describes the presence or absence of pedestrian walkways or sidewalks along the road.

- *Possible Answers:* Yes, No

2.2.2.4 **BarriersOnEdges:** Highlights whether the road edges have safety barriers or guardrails to prevent vehicles from leaving the roadway.

- *Possible Answers:* Yes, No

2.2.3 **LongitudinalPlane:** The vertical road profile, including slopes and level sections.

2.2.3.1 **UpSlope:** Represents an incline where the road rises in elevation.

- *Possible Answers:* Yes, No

2.2.3.2 **DownSlope:** Refers to a decline where the road descends in elevation.

- *Possible Answers:* Yes, No

2.2.3.3 **LevelPlane:** Denotes sections of the road that are flat and have no significant slope.

- *Possible Answers:* Yes, No

2.3 **LaneSpecification:**

2.3.1 **NumberOfLanes:** Total lanes available for vehicle use.

- *Possible Answers:* [Enter number], No

2.3.2 **LaneNarrow:** Whether lanes are below standard width.

- *Possible Answers:* Yes, No

2.3.3 **LaneType:**

2.3.3.1 **BusLane:** Reserved for buses.

- *Possible Answers:* Yes, No

2.3.3.2 **TrafficLane:** General-purpose lanes.

- *Possible Answers:* Yes, No

2.3.3.3 **CycleLane:** Reserved for bicycles.

- *Possible Answers:* Yes, No

2.3.3.4 **TramLane:** Designated for tram use.

- *Possible Answers:* Yes, No

2.3.3.5 **EmergencyLane:** Used for emergencies or breakdowns.

- *Possible Answers:* Yes, No

2.3.3.6 **SpecialPurposeLane:** Reserved for specific uses like carpooling.

- *Possible Answers:* Yes, No

2.4 **DrivableAreaSigns:** Focus on detecting only road signs close to the cameras or car in this location, ensuring they are relevant to the vehicle's immediate driving environment. Only detect signs that are clearly visible in the image. If no sign is visible, return an empty list. If uncertain, do not include it. Signs should match standard road sign designs. Avoid detecting shapes, texts, or objects that resemble signs but are not actual road signs.

2.4.1 **RegulatorySigns:** Mandatory rules such as stop signs or speed limits, if they exist in the images.

- *Possible Answers:* [List of signs], it could be empty

2.4.2 **WarningSigns:** Alerts for hazards like sharp turns or slippery roads, if they exist in the images.

- *Possible Answers:* [List of signs], it could be empty

2.4.3 **InformationSigns:** General guidance, such as directions or distances, if they exist in the images.

- *Possible Answers:* [List of signs], it could be empty

2.4.4 **TimeOfOperation:** Each sign may have a specific operational period, whether signs apply full-time or only part-time.

- *Possible Answers:* Full-time, Part-time, if no signs this will be empty

2.5 **DrivableAreaEdge:**

2.5.1 **LineMarkers:** Markings that define lane or road boundaries.

- *Possible Answers:* Yes, No

2.5.2 **ShoulderPaved:** Paved areas beside the roadway.

- *Possible Answers:* Yes, No

2.5.3 **ShoulderGrass:** Grass or natural areas beside the roadway.

- *Possible Answers:* Yes, No

2.5.4 **SolidBarriers:** Physical obstructions like railings or walls.

- *Possible Answers:* Yes, No

2.5.5 **TemporaryLineMarkers:** Temporary markings for detours or construction.

- *Possible Answers:* Yes, No

2.6 DrivableAreaSurface:

2.6.1 SurfaceType:

2.6.1.1 **Loose:** Refers to road surfaces composed of unbound materials that are not compacted or paved, e.g. gravel, earth, sand.

- *Possible Answers:* Yes, No

2.6.1.2 **Segmented:** Surfaces composed of individual, distinct sections or units joined together to form the drivable surface, e.g. Concrete slabs, cobblestones, or other modular surface elements.

- *Possible Answers:* Yes, No

2.6.1.3 **Uniform:** Continuous, smooth surfaces like asphalt or polished concrete, providing seamless driving conditions.

- *Possible Answers:* Yes, No

2.6.2 SurfaceFeatures:

2.6.2.1 **Cracks:** Visible damage on the surface.

- *Possible Answers:* Yes, No

2.6.2.2 **Potholes:** Depressions caused by wear or damage.

- *Possible Answers:* Yes, No

2.6.2.3 **Ruts:** Grooves formed by repeated vehicle use.

- *Possible Answers:* Yes, No

2.6.2.4 **Swells:** Raised sections of the road.

- *Possible Answers:* Yes, No

2.6.3 InducedSurfaceConditions:

2.6.3.1 **Icy:** Roads covered in ice.

- *Possible Answers:* Yes, No

2.6.3.2 **Flooded:** Roads submerged in water.

- *Possible Answers:* Yes, No

2.6.3.3 **Mirage:** Optical illusions from surface heat.

- *Possible Answers:* Yes, No

2.6.3.4 **StandingWater:** Pools of water on the road.

- *Possible Answers:* Yes, No

2.6.3.5 **WetRoad:** General wet conditions.

- *Possible Answers:* Yes, No

2.6.3.6 **SurfaceContamination:** Debris like oil, mud, or leaves.

- *Possible Answers:* Yes, No

3. Junctions

3.1 **Roundabouts:** Types of roundabouts based on size and complexity.

3.1.1 **Normal:**

- *Possible Answers:* Yes, No

3.1.2 **Mini:**

- *Possible Answers:* Yes, No

3.1.3 **Signalized:** Whether traffic lights control the roundabout.

- *Possible Answers:* Yes, No

3.2 **Intersections:**

3.2.1 **TJunctions:** T-shaped road intersections.

- *Possible Answers:* Yes, No

3.2.2 **Staggered:** Offset intersections.

- *Possible Answers:* Yes, No

3.2.3 **YJunction:** Y-shaped road intersections.

- *Possible Answers:* Yes, No

3.2.4 **Crossroads:** Standard four-way intersections.

- *Possible Answers:* Yes, No

3.2.5 **GradeSeparated:** Intersections with different elevation levels.

- *Possible Answers:* Yes, No

4. Special Structures

4.1 **AutomaticAccessControl:** Gates or barriers restricting access.

- *Possible Answers:* Yes, No

4.2 **Bridges:** Elevated roadways over obstacles like rivers or roads.

- *Possible Answers:* Yes, No

4.3 **PedestrianCrossings:** Areas designated for pedestrian crossing.

- *Possible Answers:* Yes, No

4.4 **RailCrossings:** Intersections with railway tracks.

- *Possible Answers:* Yes, No

4.5 **Tunnels:** Enclosed passages for vehicles.

- *Possible Answers:* Yes, No

4.6 **TollPlaza:** Stations for collecting tolls.

- *Possible Answers:* Yes, No

5. Fixed Road Structures

5.1 **Buildings:** Structures adjacent to or affecting the road environment.

- *Possible Answers:* Yes, No

5.2 **StreetLights:** Lighting structures for illumination.

- *Possible Answers:* Yes, No

5.3 **StreetFurniture:** Items like benches or bollards.

- *Possible Answers:* Yes, No

5.4 **Vegetation:** Trees and plants affecting visibility or road conditions.

- *Possible Answers:* Yes, No

6. Temporary Road Structures

6.1 **ConstructionSiteDetours:** Temporary rerouted roads created to bypass areas under construction.

- *Possible Answers:* Yes, No

6.2 **RefuseCollection:** Temporary obstructions from waste removal.

- *Possible Answers:* Yes, No

6.3 **RoadWorks:** Areas under repair.

- *Possible Answers:* Yes, No

6.4 **TemporaryRoadSignage:** Signs placed temporarily for guidance.

- *Possible Answers:* Yes, No

7. Environmental Conditions

7.1 **Weather:**

7.1.1 **Snowfall:** Snow Intensity affecting visibility.

- *Possible Answers:* LightSnow, ModerateSnow, HeavySnow, No

7.1.2 **Rainfall:** Rain Intensity affecting visibility.

- *Possible Answers:* LightRain, ModerateRain, HeavyRain, No

7.2 **Particulates:**

7.2.1 **Marine:** Coastal haze or salt spray.

- *Possible Answers:* Yes, No

7.2.2 **NonPrecipitatingWaterDroplets:** Mist or fog affecting visibility.

- *Possible Answers:* Yes, No

7.2.3 **SandAndDust:** Windblown particles.

- *Possible Answers:* Yes, No

7.2.4 **SmokeAndPollution:** Airborne pollutants.

- *Possible Answers:* Yes, No

7.2.5 **VolcanicAsh:** Hazardous ash from volcanic eruptions.

- *Possible Answers:* Yes, No

7.3 **Illumination:**

7.3.1 **Day:** Sunlight conditions.

- *Possible Answers:* Yes, No

7.3.2 **Night:** Low-light conditions.

- *Possible Answers:* Yes, No

7.3.3 **Cloudiness:** Levels of sky cover affecting lighting.

- *Possible Answers:* Clear, PartlyCloudy, Overcast, No

7.3.4 **ArtificialIllumination:** Light from streetlights or vehicles.

- *Possible Answers:* Yes, No

8. **Dynamic Elements**

8.1 **Traffic:**

8.1.1 **DensityOfAgents:** The concentration of vehicles or road users in an area.

- *Possible Answers:* High, Medium, Low

8.1.2 **VolumeOfTraffic:** Total number of vehicles passing a point over time.

- *Possible Answers:* High, Medium, Low

8.1.3 **FlowRate:** Traffic movement quality.

- *Possible Answers:* Smooth, Congested