

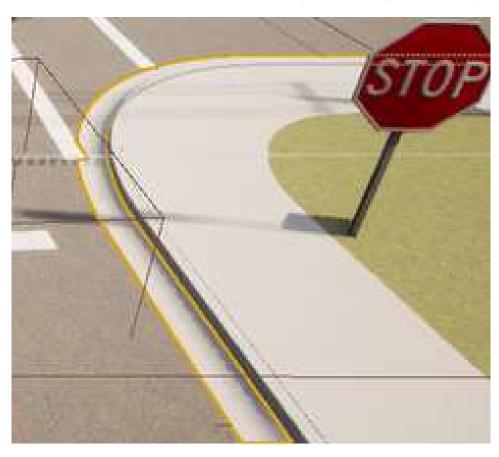
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Verkehrsschilder und Ampeln

z.B. Stoppschild, Geschwindigkeitsbegrenzung, Ampeln, Parkschilder







Verkehrsschilder und Ampeln

z.B. Stoppschild, Geschwindigkeitsbegrenzung, Ampeln, Parkschilder



Straßenmarkierungen und Wege

z.B. Haltelinie, Fußgängerübergang, Pfeilmarkierung, Längsmarkierung







Statische Objekte

z.B. Gebäude, Wand, Brücke, Straßenlaterne, Mast(z.B. Ampelmast, Schildermast)







Dynamische Objekte

z.B. Füßgänger jeder Art(Fahrräder oder Roller, Skateboards), Fahrzeuge(Pkw, Lkw, Bus, Zug)







Gelände

z.B. Gras, Sand, Hügellandschaft, Seen, Flüsse







Unterteilung

Tag- Konstanten

Mithilfe von Tag-Konstanten sind Objekte in Carla eindeutig gekennzeichnet.

Anhand des Tags von Sensoren/Kameras können Objekte den Tag-Konstanten zugeordnet werden, um so herauszufinden, um welche Art Objekt es sich handelt.



Verfügbare Tags+Beschreibung

Value	Tag	Description
0	Unlabeled	Elements that have not been categorized are considered Unlabeled. This category is meant to be empty or at least contain elements with no collisions.
1	Building	Buildings like houses, skyscrapers, and the elements attached to them. E.g. air conditioners, scaffolding, awning or ladders and much more.
2	Fence	Barriers, railing, or other upright structures. Basically wood or wire assemblies that enclose an area of ground.
3	Other	Everything that does not belong to any other category.
4	Pedestrian	Humans that walk or ride/drive any kind of vehicle or mobility system. E.g. bicycles or scooters, skateboards, horses, roller-blades, wheel-chairs, etc.
5	Pole	Small mainly vertically oriented pole. If the pole has a horizontal part (often for traffic light poles) this is also considered pole. E.g. sign pole, traffic light poles.
6	RoadLine	The markings on the road.
7	Road	Part of ground on which cars usually drive. E.g. lanes in any directions, and streets.
8	SideWalk	Part of ground designated for pedestrians or cyclists. Delimited from the road by some obstacle (such as curbs or poles), not only by markings. This label includes a possibly delimiting curb, traffic islands (the walkable part), and pedestrian zones.
9	Vegetation	Trees, hedges, all kinds of vertical vegetation. Ground-level vegetation is considered Terrain.
10	Vehicles	Cars, vans, trucks, motorcycles, bikes, buses, trains.
11	Wall	Individual standing walls. Not part of a building.

Verfügbare Tags+Beschreibung

Value	Tag	Description
12	TrafficSign	Signs installed by the state/city authority, usually for traffic regulation. This category does not include the poles where signs are attached to. E.g. traffic- signs, parking signs, direction signs
13	Sky	Open sky. Includes clouds and the sun.
14	Ground	Any horizontal ground-level structures that does not match any other category. For example areas shared by vehicles and pedestrians, or flat roundabouts delimited from the road by a curb.
15	Bridge	Only the structure of the bridge. Fences, people, vehicles, an other elements on top of it are labeled separately.
16	RailTrack	All kind of rail tracks that are non-drivable by cars. E.g. subway and train rail tracks.
17	GuardRail	All types of guard rails/crash barriers.
18	TrafficLight	Traffic light boxes without their poles.
19	Static	Elements in the scene and props that are immovable. E.g. fire hydrants, fixed benches, fountains, bus stops, etc.
20	Dynamic	Elements whose position is susceptible to change over time. E.g. Movable trash bins, buggies, bags, wheelchairs, animals, etc.
21	Water	Horizontal water surfaces. E.g. Lakes, sea, rivers.
22	Terrain	Grass, ground-level vegetation, soil or sand. These areas are not meant to be driven on. This label includes a possibly delimiting curb.



Wetterparameter

Es gibt neun unabhängige Wetterparameter (einschließlich zwei Sonnenwinkel)

- cloudiness (Grad der Bewölktheit)
- precipitation (Niederschlag)
 - Niederschlagsmenge
 - Pfützenbildung auf Straßen
- Wind Intensity (Windintensität)
- Sun angle (Stand der Sonne)
 - Azimuth-angle: bestimmt in welcher Himmelrichtung die Sonne scheint
 - Altitude-angle: bestimmt wie hoch die Sonne steht
- Fog (Nebel)
 - Nebeldichte
 - Sichtweite durch Nebel
- Wetness (Feuchtigkeitsniveau der Straße)

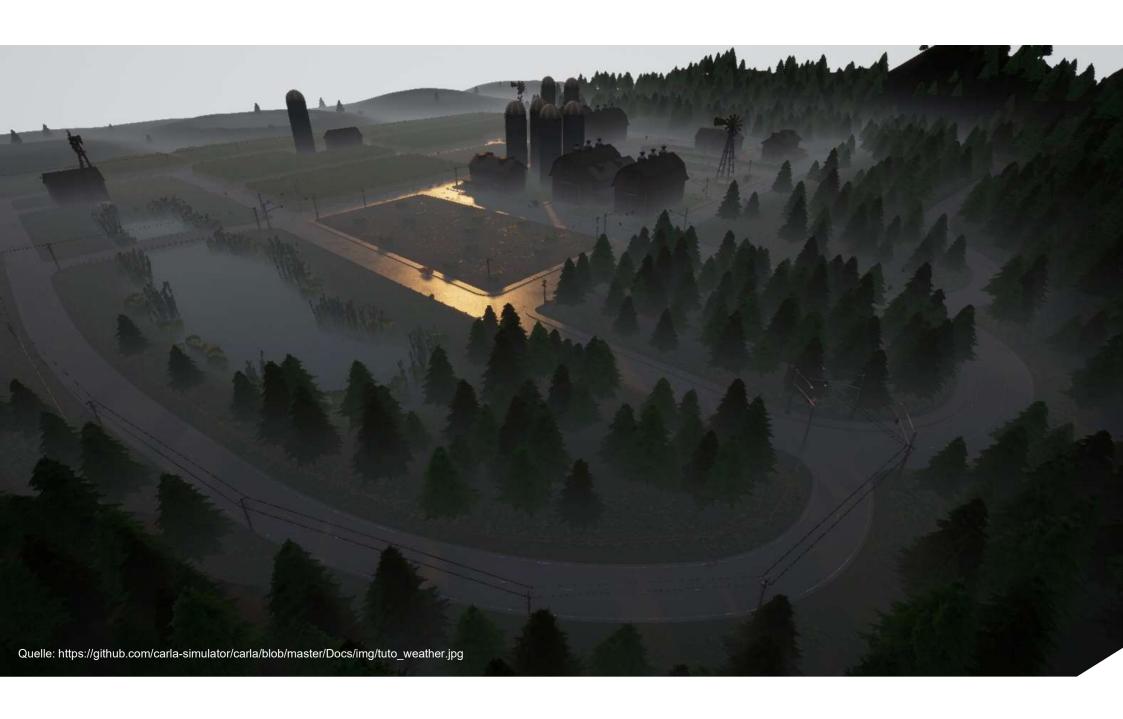


Wetterparameter

Parameters:

- cloudiness (float) 0 is a clear sky, 100 complete overcast.
- precipitation (float) 0 is no rain at all, 100 a heavy rain.
- precipitation_deposits (float) 0 means no puddles on the road, 100 means roads completely capped by rain.
- wind intensity (float) 0 is calm, 100 a strong wind.
- sun_azimuth_angle (float degrees) 0 is an arbitrary North, 180 its corresponding South.
- sun altitude angle (float degrees) 90 is midday, -90 is midnight.
- fog_density (float) Concentration or thickness of the fog, from 0 to 100.
- fog_distance (float meters) Distance where the fog starts in meters.
- wetness (float) Humidity percentages of the road, from 0 to 100.







Wetterparameter

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- Wind
 Changes in the weather do not affect physics. They are only visuals that can be captured by the camera sensors.
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Wetterparameter

Die Wetter- und Lichtbedingungen warden aus einer Reihe aus vordefienierten Einstellungen ausgewählt

In den CarlaSettings.ini kann von einer aus 15 verschiedenen *Weatherld* keys gewählt werden:

- 0 Default
- 1 ClearNoon
- 2 CloudyNoon
- 3 WetNoon
- 4 WetCloudyNoon
- 5 MidRainyNoon
- 6 HardRainNoon
- 7 SoftRainNoon

- 8 ClearSunset
- 9 CloudySunset
- 10 WetSunset
- 11 WetCloudySunset
- 12 MidRainSunset
- 13 HardRainSunset
- 14 SoftRainSunset



Wetter und Lichtverhältnisse

Beachte:

Wenn der Wetterparameter sun_altitude_angle < 0

-> startet der *Night Mode*





Lichtverhältnisse

Night mode

Im Nachtmodus werden neue Lichtquellen wichtig:

Straßenlichter

- Wird im Nachtmodus automatisch eingeschaltet
- Über <u>carla.LightState</u> kann der Status abgefragt werden
- Sie sind über das Attribut light_group, vom Typ carla.LightGroup kategorisiert
 - Damit können Straßenlichter, Gebäudelichter etc. klassifiziert werden

Autolicht

- Muss vom Nutzer an- bzw. ausgeschaltet werden
- Über <u>carla.VehicleLightState</u> kann der Status abgefragt werden
- Der Tesla 3S hat Lichter integriert
 - Über die Methoden carla. Vehicle.get_light_state bzw. carla. Vehicle.set_light_state k\u00f6nnen Lichteinstellungen angepasst werden

