

DATASET CARLA

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DATASET CARLA

HOW IT IS ORGANIZED



Town01

2.9 km of drivable roads. Environment composed of buildings, bridges, vegetation, traffic signs, and infrastructure. Pedestrians, cars, truck, bicycle and motorbikes.



Town02

1.4 km of drivable roads. Environment composed of buildings, small houses, vegetation, traffic signs, and infrastructure. Pedestrians, cars, truck, bicycle and motorbikes.



Town07

Rural environment that includes narrow roads, fewer traffic lights and lots of unsignalized crossing. Cars, truck, bicycle and motorbikes.



Extra

It includes four different towns characterised by freeway, connection ramps with different heights and a small town, lots of different street layouts with more junctions and unsignalized intersection. Cars, truck, bicycle and motorbikes.

Carla 0.8.4

Carla 0.9.5

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HOW IT IS ORGANIZED

Each folder is divided into three weather and time condition:

- **Clear Sunset**
- **Clear Noon**
- **Hard Rain Noon**

For each weather condition we capture the following images:

- **Depth**, with its respective grey scale and log grey scale conversion
- **RGB**
- **Semantic**, with its respective cityscape palette conversion. Total of 13 semantic classes, where all kinds of vehicles are labelled simply as 'vehicle', and drivers on motorcycles and bicycles are labelled as 'unknown' type.

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SOME NUMBERS

Each image is FullHD, 1920x1080, captured with FOV=90

For each weather condition we have 13'360 images

For each town we have 40'080 images

Totally the dataset have 160'320 images

But, if we consider also the semantic and the depth images and their respective converted ones we have a total of **961'920** images, that occupy about **600Gb** of memory storage

Is the biggest dataset for autonomous driving ever created!

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DATA ACQUISITION

The Carla simulator has a client-server architecture. We modified the client to automate the images acquisition in this way:

1. Setup the map and the weather condition
2. Spawn a random number of vehicles and pedestrians
3. Choose one of the vehicle where to mount the three cameras (depth, rgb and semantic)
4. Play simulation, each entity starts moving autonomously and the cameras take a picture every three seconds synchronously
5. Repeat this process for each simulation, until the desired number of images is reached

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PROBLEMS

We struggled and won against some problems:

- Image Post Processing
- Image conversion
- Camera position and hood dimension
- Sensors problem
- Long simulation issues

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IMAGE POST PROCESSING



Aliasing, Depth of Field, Lens Flare, Vignette, Bloom

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IMAGE POST PROCESSING



Before

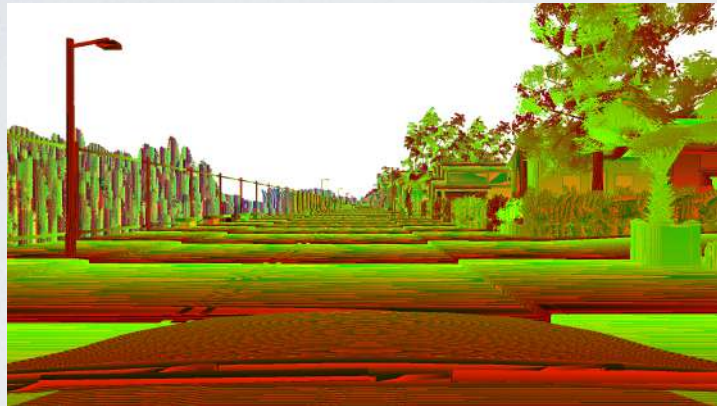


After

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IMAGE CONVERSION

Depth



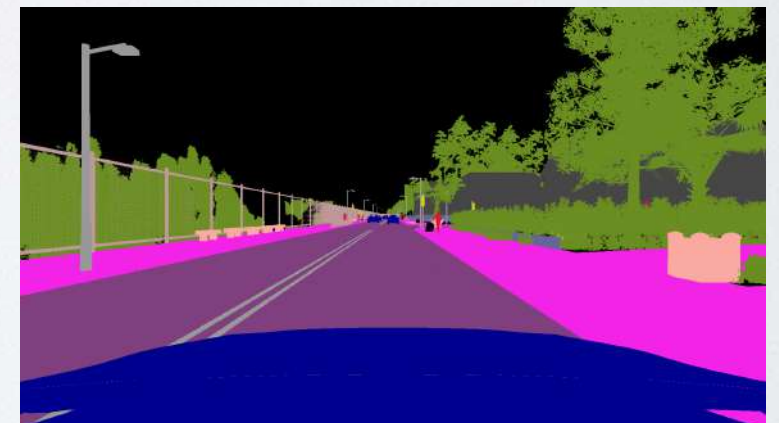
Semantic



Grey Scale



Log Grey Scale



Cityscapes Palette

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HOOD DIMENSION



Before



After

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SENSORS PROBLEM AND LONG SIMULATION ISSUES

Sensors:

When is the time to take a picture sometimes it happens that not all the three cameras return the snapshot; we solved this via code, checking if all the three sensors are working properly and only in this case save the images to the disk.

Long Simulation Issue:

For unknown reasons during long simulation (more than two days) the server or the client stops working; we created a script that at each iteration closes and restarts the server and the client.

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TOWN01 - CLEAR NOON



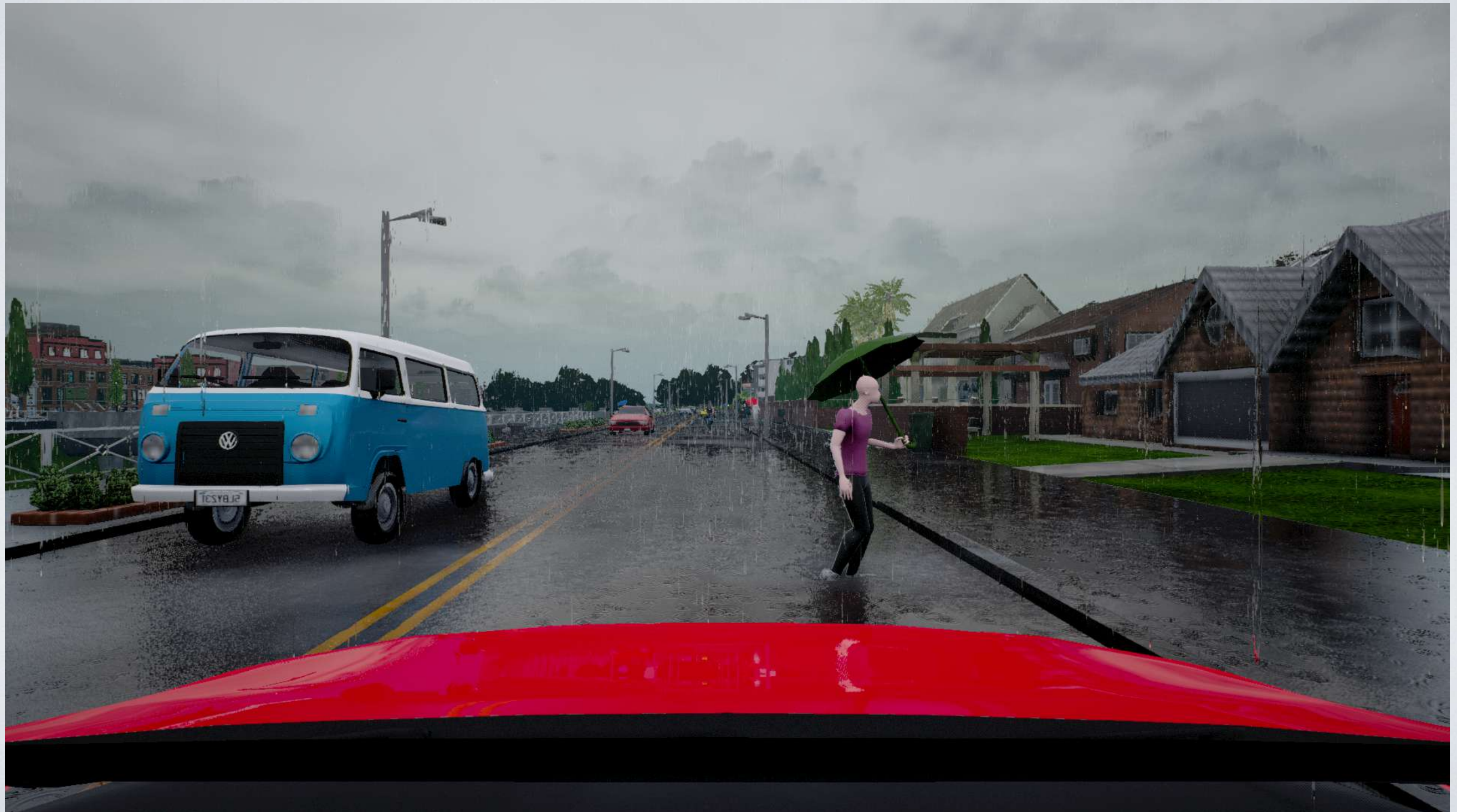
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TOWN01 - CLEAR SUNSET



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TOWN01 - HARD RAIN NOON



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TOWN02 - CLEAR NOON



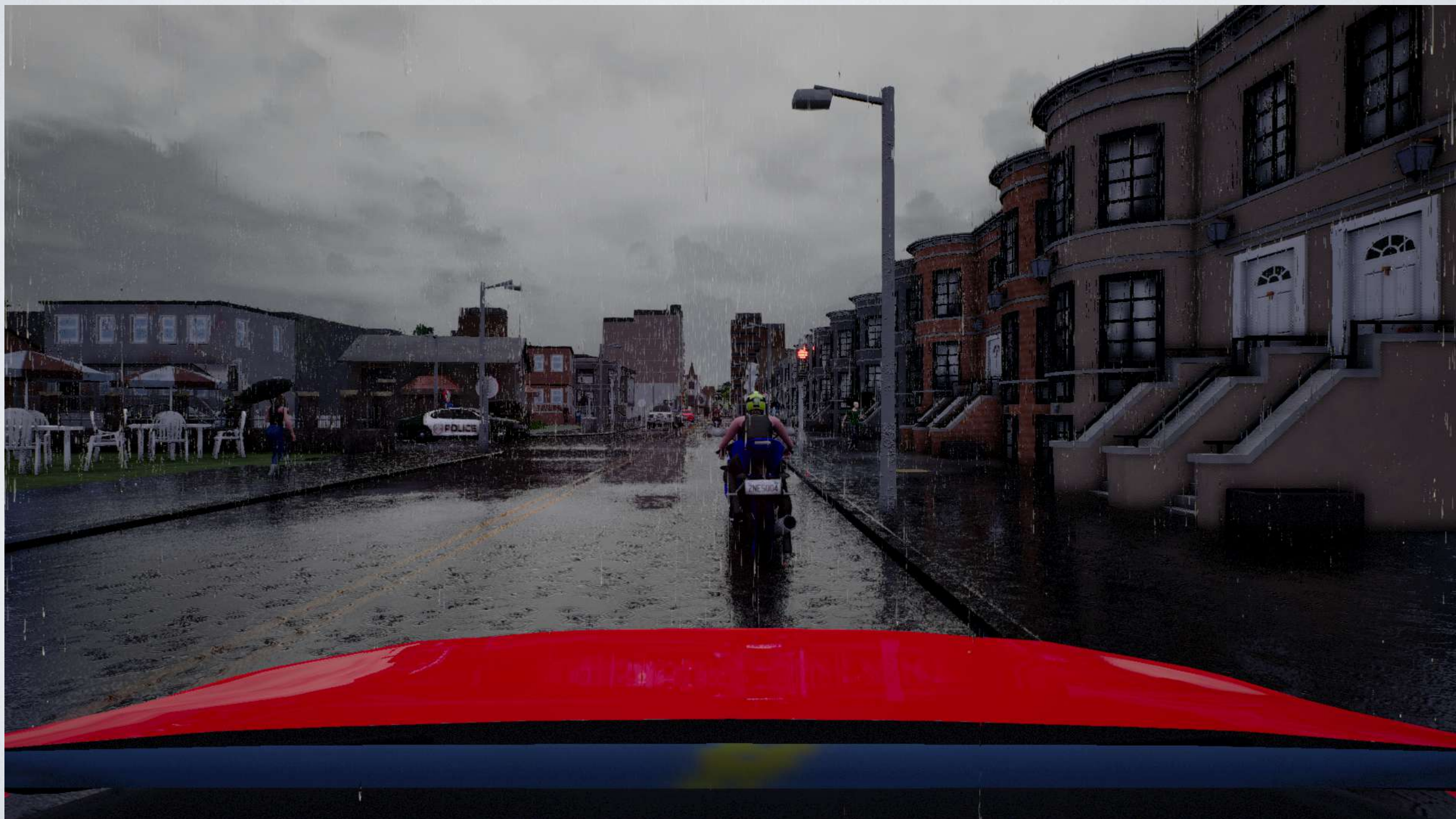
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TOWN02 - CLEAR SUNSET



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TOWN02 - HARD RAIN NOON



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TOWN07 - CLEAR NOON



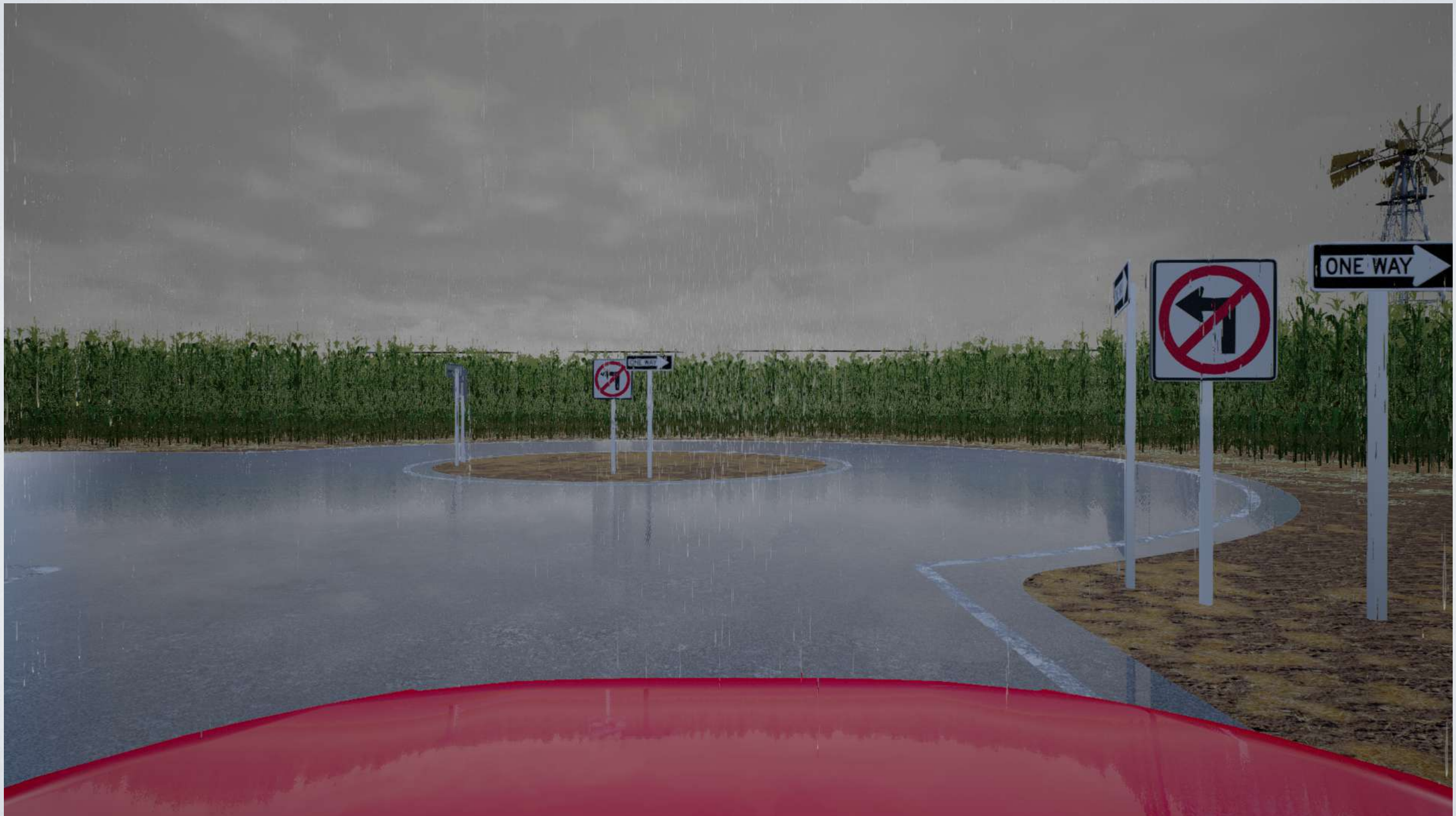
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TOWN07 - CLEAR SUNSET



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TOWN07 - HARD RAIN NOON



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EXTRA - CLEAR NOON



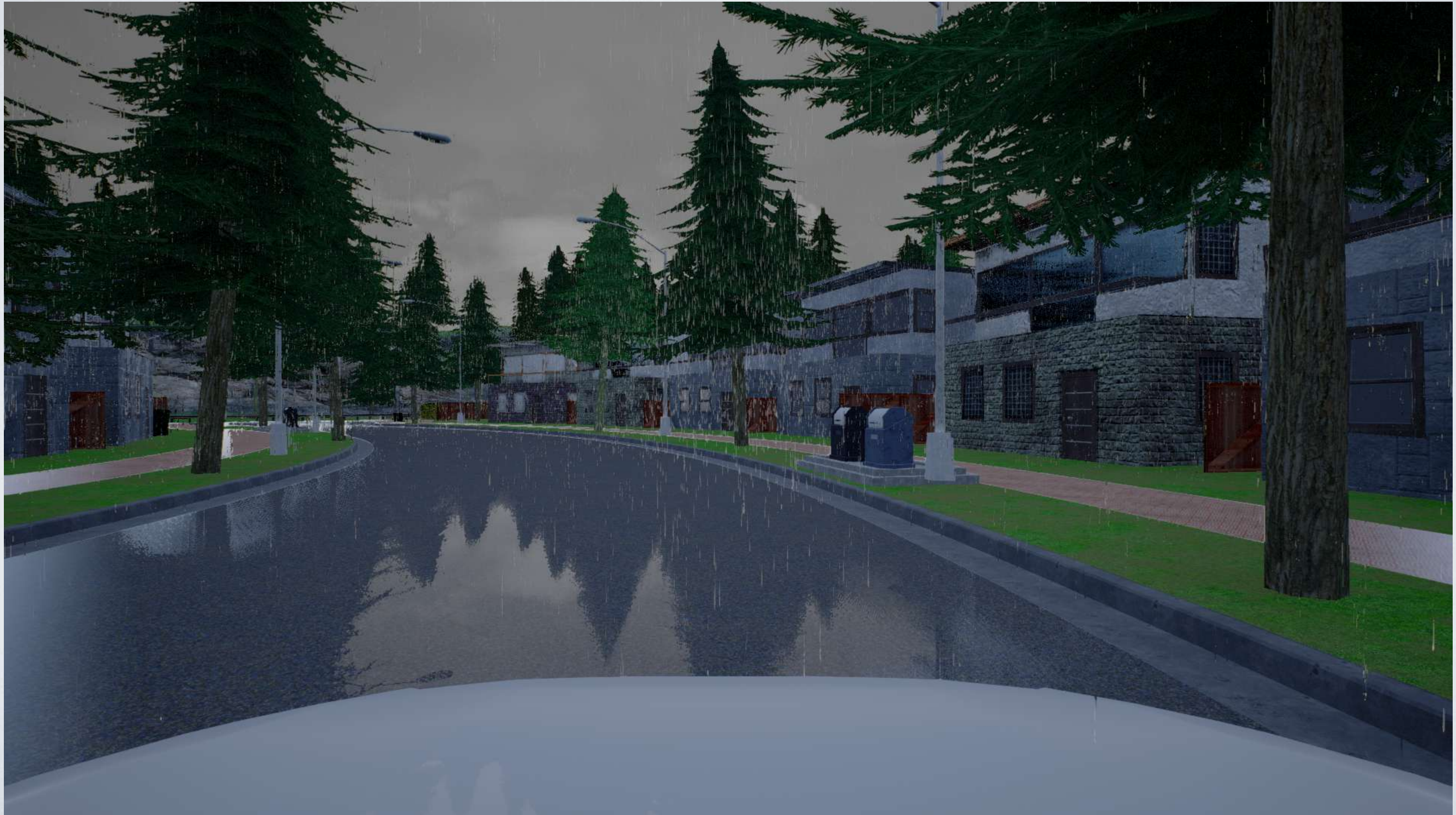
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EXTRA - CLEAR SUNSET



DATASET CARLA

EXTRA - HARD RAIN NOON



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SOMETIMES

