

Perspective Aware Road Obstacle Detection

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Goal: Detect unusual road obstacles

We aim to detect arbitrary obstacles on the road.

Test objects are not present in training dataset.

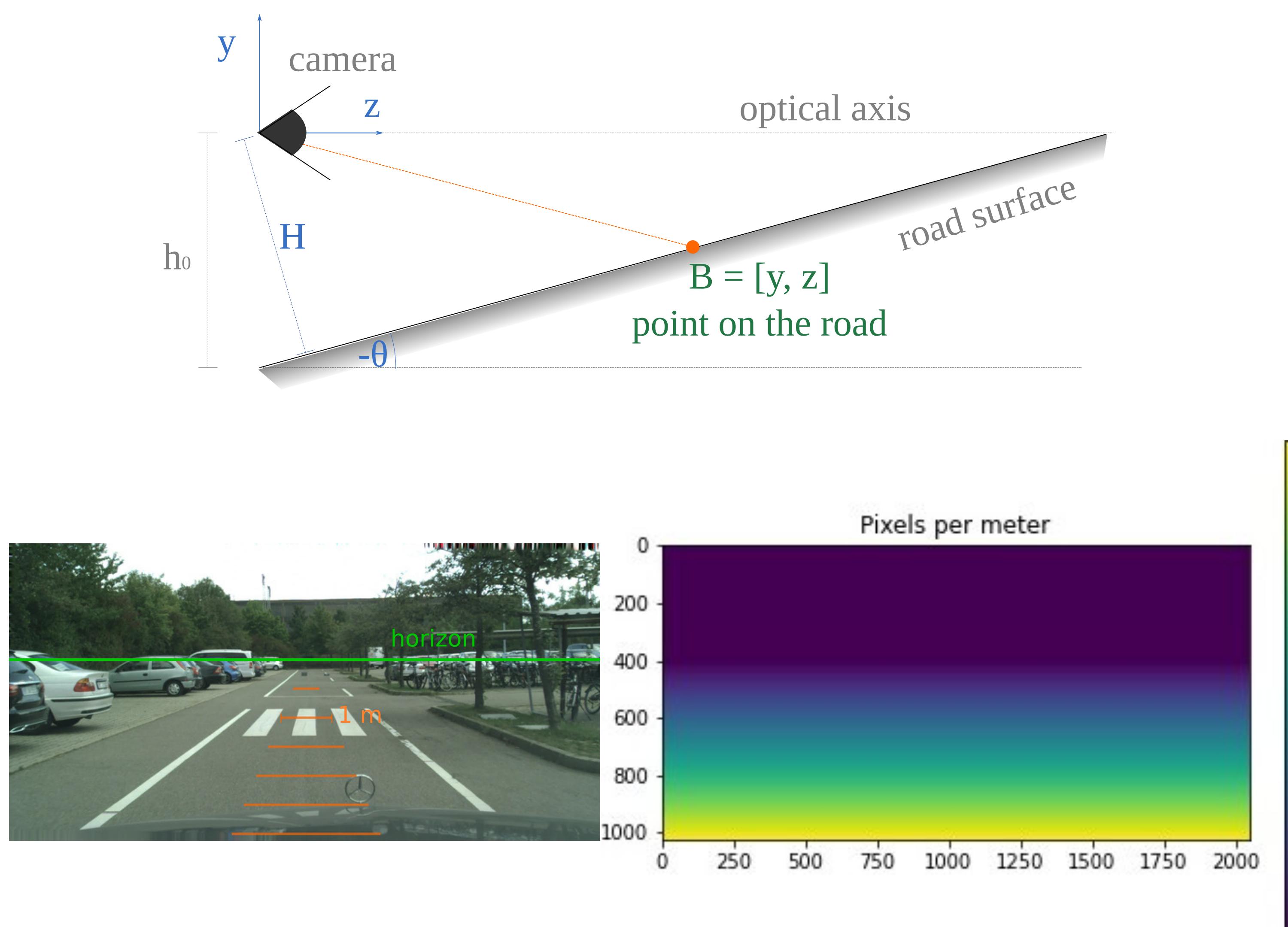


Benchmark: Segment Me If You Can - Obstacle Track
segmentemifyoucan.com

Perspective in road scenes

-The front-camera view suffers from strong perspective warping.
Assuming a flat road geometry we calculate a perspective scale map for objects on the road surface.

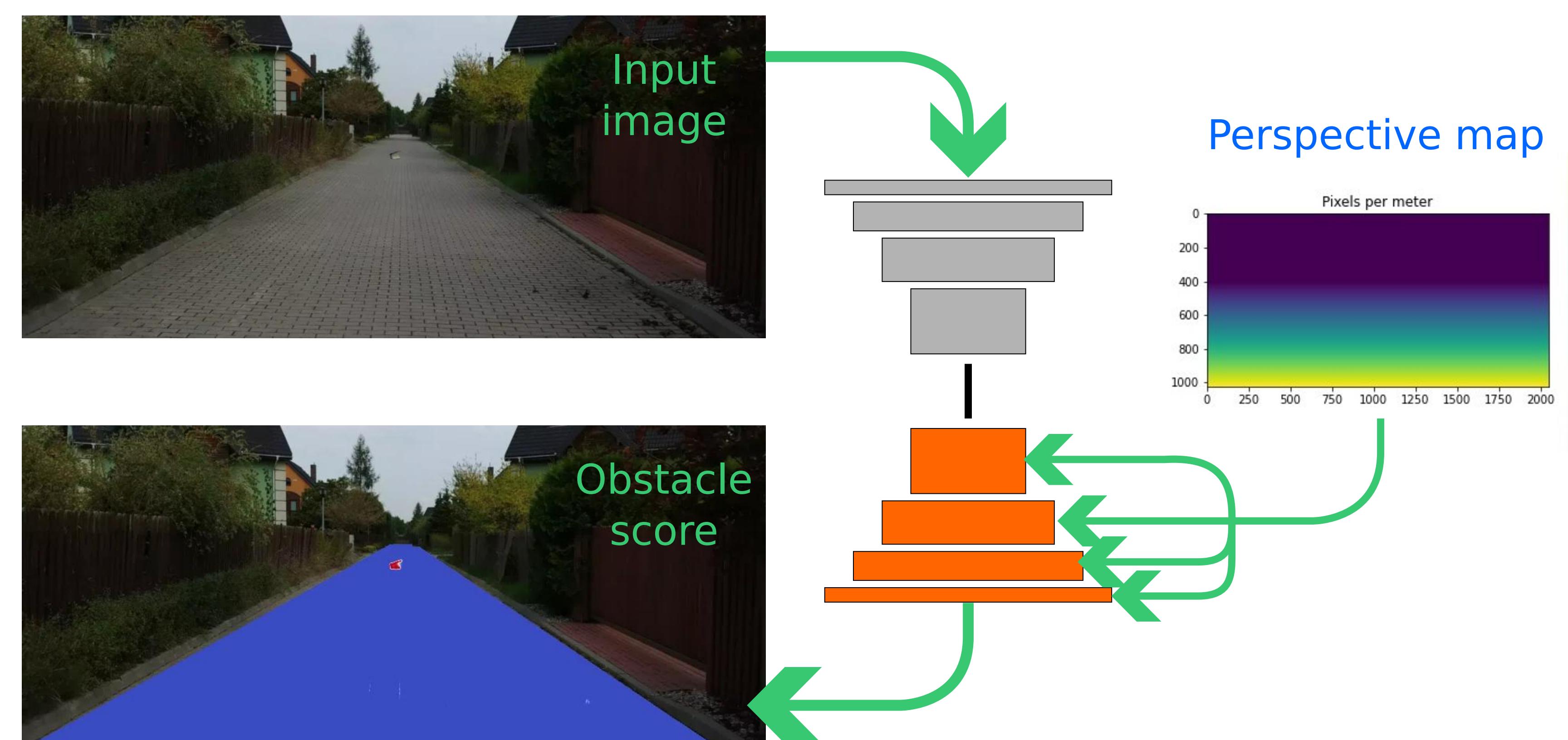
Perspective scale map: image pixels per physical meter.



Architecture: Perspective Aware Detector

U-net style segmentation network.

Perspective scale map provided as an extra feature.

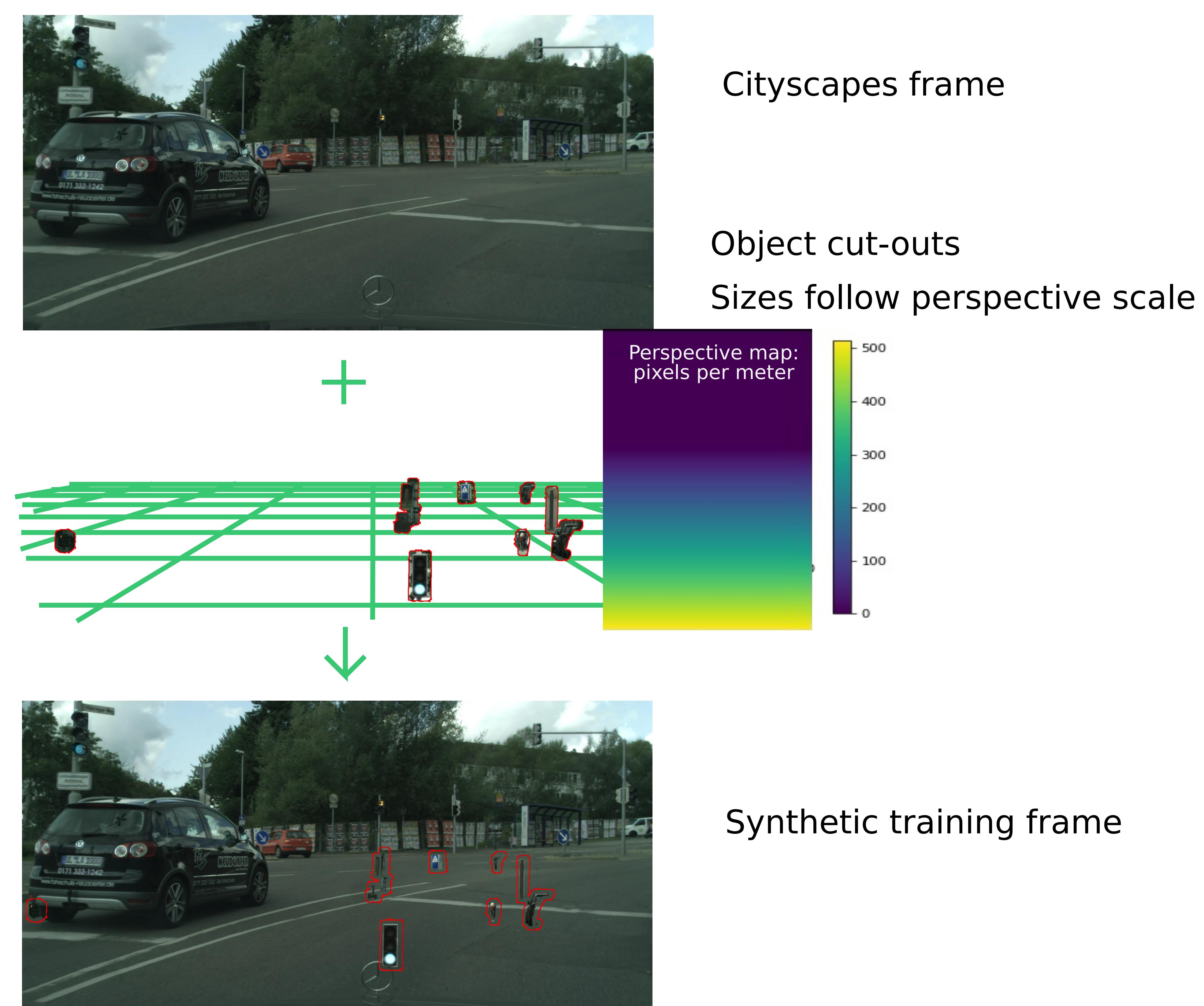


Training: Perspective Aware Synthetic Dataset

No dataset of arbitrary obstacles available

We create synthetic training frames by injecting objects onto the road.

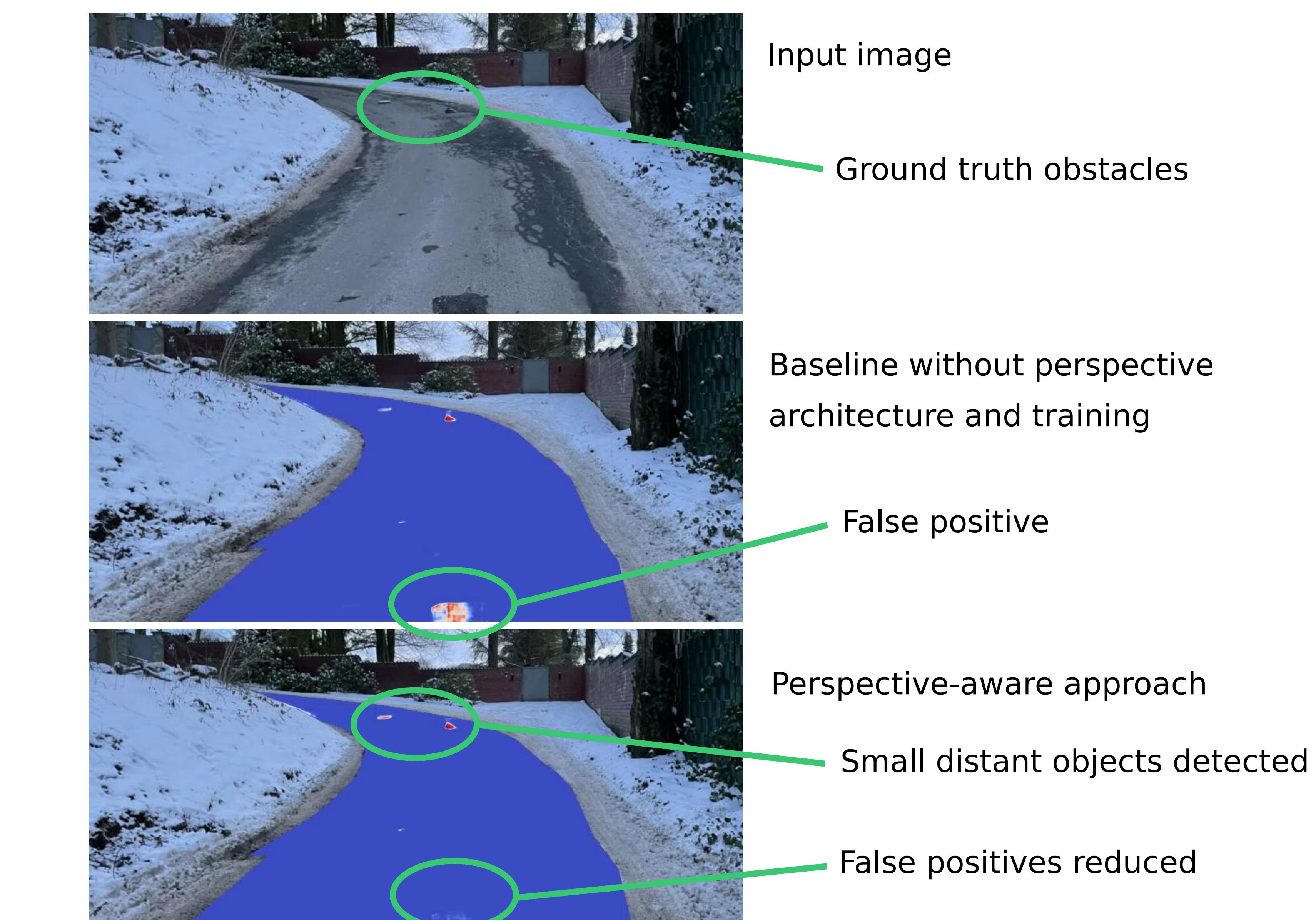
Obstacle size follows perspective scale map.



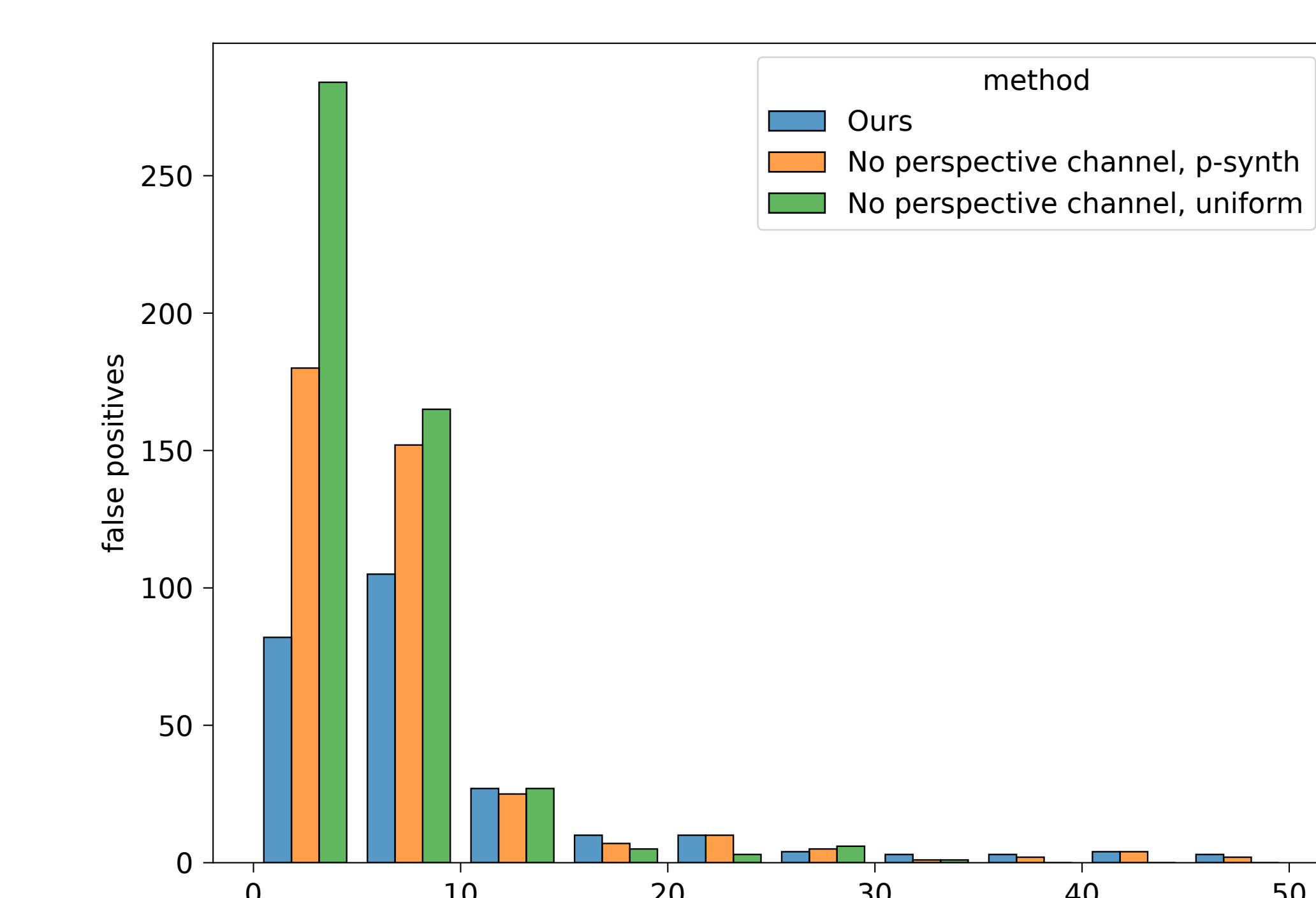
Results

Reduction of small nearby false-positives.

Distant small obstacles detected correctly.



Reduction in false-positives on the Road Obstacles 21 dataset:



Project page
[github.com/cvlab-epfl/
perspective-aware-obstacles](https://github.com/cvlab-epfl/perspective-aware-obstacles)



Obstacle Benchmark
segmentemifyoucan.com