Supplementary

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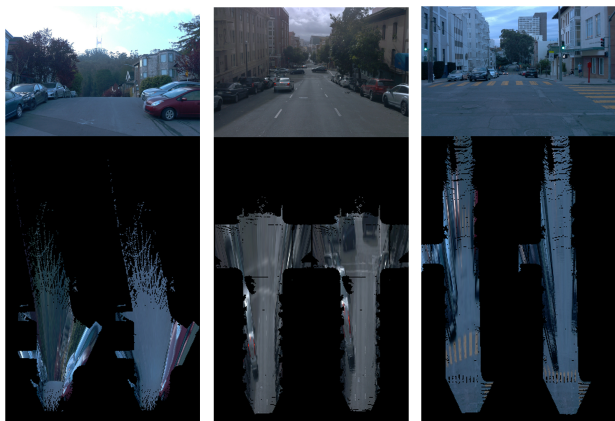{chase121, rlocong339, jongwoo.lim }@snu.ac.kr

Figure 1. The first row of the figure represents the input image. The second row shows the IPM results: the left side depicts the result assuming the road is at zero-height, while the right side shows the result using the Heightmap.

A. Implimentation Details

The HeightLane model was trained for 24 epochs with a batch size of 8 using four A6000 GPUs, utilizing the AdamW optimizer. The training and validation were performed longitudinally from 3m to 103m and laterally from -12m to +12m.

The weight settings for the total loss described in Eq. 13 are as follows: λ_c for confidence is 3, λ_{offset} for offset is 60, λ_e for embedding is 0.5, λ_h for height is 60, and λ_{2D} for 2D is 5. The Smooth L1 Loss $\mathcal{L}_h$ used for the heightmap was configured with $\beta = 1$.

B. Qualitative Results

B.1 Comparison with zero-height IPM

In this section, we demonstrate how front-view features are transformed into BEV features when using zero-height IPM, in comparison to using Heightmap. The first image in Fig. 1 depicts an uphill scenario, while the second and third images illustrate downhill situations. When assuming the road is at zero-height without using the Heightmap, features are incorrectly mapped in both uphill and downhill scenarios. This indicates that when front-view features are mapped to BEV features using zero-height IPM, the mapping lacks reliability. The black areas in the images represent regions where the Heightmap does not exist, and the visualization has been performed only for the regions where the Heightmap is available.

B.1 More visualization

Fig. 2 shows the comparison results between Height-Lane, LATR, and ground truth in 3D space and on the X-Y plane. The ground truth is visualized in red, HeightLane in green, and LATR in blue. The X-axis represents the lateral direction, and the Y-axis represents the longitudinal direction, including visualizations in various scenarios. The HeightLane effectively models the lanes even in curved or dark conditions.
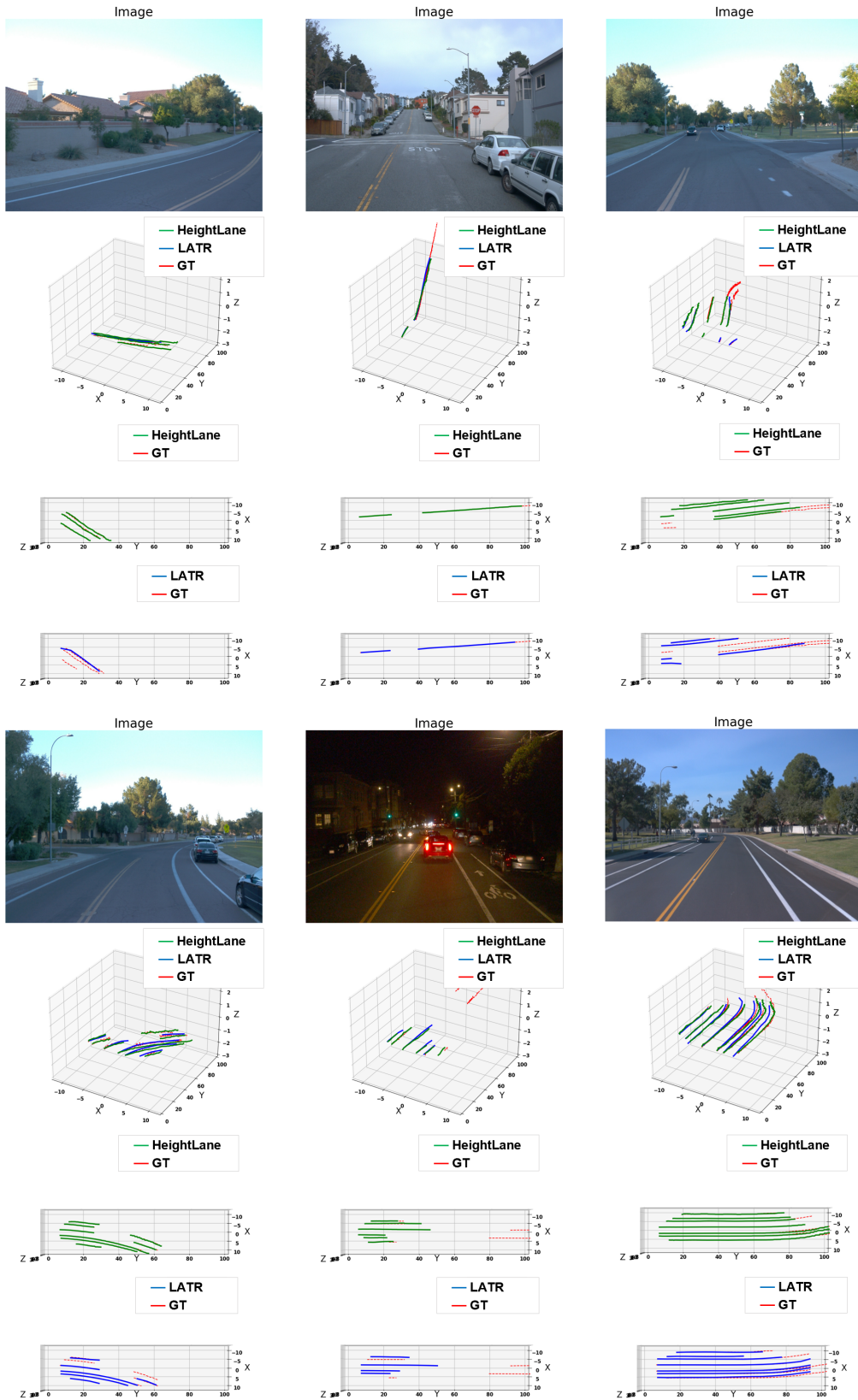
Figure 2. Qualitative experimental results on OpenLane comparing HeightLane, LATR, and ground truth.