

SalLiDAR: Saliency Knowledge Transfer Learning for 3D Point Cloud Understanding

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Proposed Framework of Image-to-LiDAR Saliency Knowledge Transfer.



large-scale outdoor scenes;

(b) Lack of human-annotated training

data for point cloud saliency.

Approach:

- Leveraging knowledge of 2D image saliency models;
- Pseudo groundtruth of point cloud by 2D-to-3D transformation
- Learning pseudo-saliency knowledge by LiDAR-based saliency model.

LiDAR-to-LiDAR Pseudo-Saliency Learning



Proposed Attention-Guided Semantic Segmentation Model.



Predicted LiDAR

Proposed Two-Stream Segmentation Model:

SalLiDAR-I: Attention guided loss for semantic

 $\hat{\mathcal{L}}^{sem} = \frac{1}{N} \sum_{i} l_i^{sem} * \exp\left(\hat{s}_i\right)$

Groundtruth of

Semantic Prediction of

Saliency Prediction of Cylinder3D+SalLiDAR

0.2

0.4

0.6

Performance Improvement of Proposed Segmentation Model.

segmentation.

- SalLiDAR-II: Saliency distribution as a descriptor for semantic module. - SalLiDAR-III: Saliency distribution as a descriptor and attentive loss guiding for semantic segmentation. **Results of Attention-Guided Semantic Model:** (1) All the models with SalLiDAR obtain better mIoU results than baseline. The proposed method also improves the (2)segmentation performance on specific classes, such as car, truck, and parking.



