Segmentation of Panorama

Computer Vision (CS6350) TPA - 8

1. Problem Statement

Segmentation is the process of partitioning an image into multiple segments. Semantic segmentation refers to assigning a class label to each pixel. It is an essential tool in robotics. Panorama images give a better understanding of a scene due to its wider field of view (FoV). It has been shown that panoramic images provide better performance than a regular image. The task is to generate semantically segmented panorama using RGB panorama.

2. Input

Panorama image. Training and testing samples may not overlap.

3. Output

- Segmentation predictions; each output pixel with a color-coded class label.
- Quantitative evaluation metric (E.g. IoU metric)
- Demo to run on a given panorama (Demo should run live on Desktop/Laptop with GPU (prefer-able for extra credit)).

4. Dataset

- Cityscapes [3]: This dataset consists of 5k street scene images, which have all been taken in German cities. There are annotations for 8 things classes and 11 stuff classes. <u>Link</u>
- Mapillary Vistas [4]: Mapillary Vistas is a more challenging dataset, consisting of 25k street scene images. The images have annotations for 37 things classes and 28 stuff classes.
- PASS dataset: There are 400 panoramas with annotations. In total 1050 panoramas are present. <u>Link</u>

Note: Either two of these datasets can be used for the purpose.

5. References

- 1. Kailun, Xinxin, et al. PASS: Panoramic Annular Semantic Segmentation Proceedings of the IEEE transactions on intelligent transportation systems, September 2019.
- 2. Kailun Yang, Xinxin Hu, et al. DS-PASS: Detail-Sensitive Panoramic Annular Semantic Segmentation through SwaftNet for Surrounding Sensing. Proceedings of the IEEE Conference onComputer Vision and Pattern Recognition. 2019.
- 3. Cordts, Marius, et al. "The cityscapes dataset for semantic urban scene understanding." Proceedings of the IEEE conference on Computer Vision and Pattern Recognition. 2016.
- 4. Neuhold, Gerhard, et al. "The mapillary vistas dataset for semantic understanding of street scenes." Proceedings of the IEEE International Conference on Computer Vision. 2017.
- 5. Yuanyou Xu, Kaiwei Wang, et al. "Semantic Segmentation of Panoramic Images Using a Synthetic Dataset." (2019).