DL based Depth estimation of landmarks/salient points and Scene Reconstruction, from arbitrary pair of stereo views

Computer Vision (CS6350)

TPA-16

1. Problem Statement

Given a pair of arbitrary stereo views of a scene, use DL based methods to identify corresponding landmarks/salient points and estimate depth. Also compare results with shallow methods of rectification or Metric/Stratified reconstructions. Attempt to extend this concept for scene reconstruction (3D point cloud, say)

[Assumptions – Certain restrictions of camera poses may be considered.]

The objective is to leverage the potential of Deep Learning (DL) techniques to estimate depth and reconstruct scenes from arbitrary stereo views. A comparative analysis should be conducted, contrasting the outcomes of this DL-driven approach with the results obtained from traditional "shallow" methods, specifically those involving rectification or Metric/Stratified reconstructions.

2. Expected Input Output

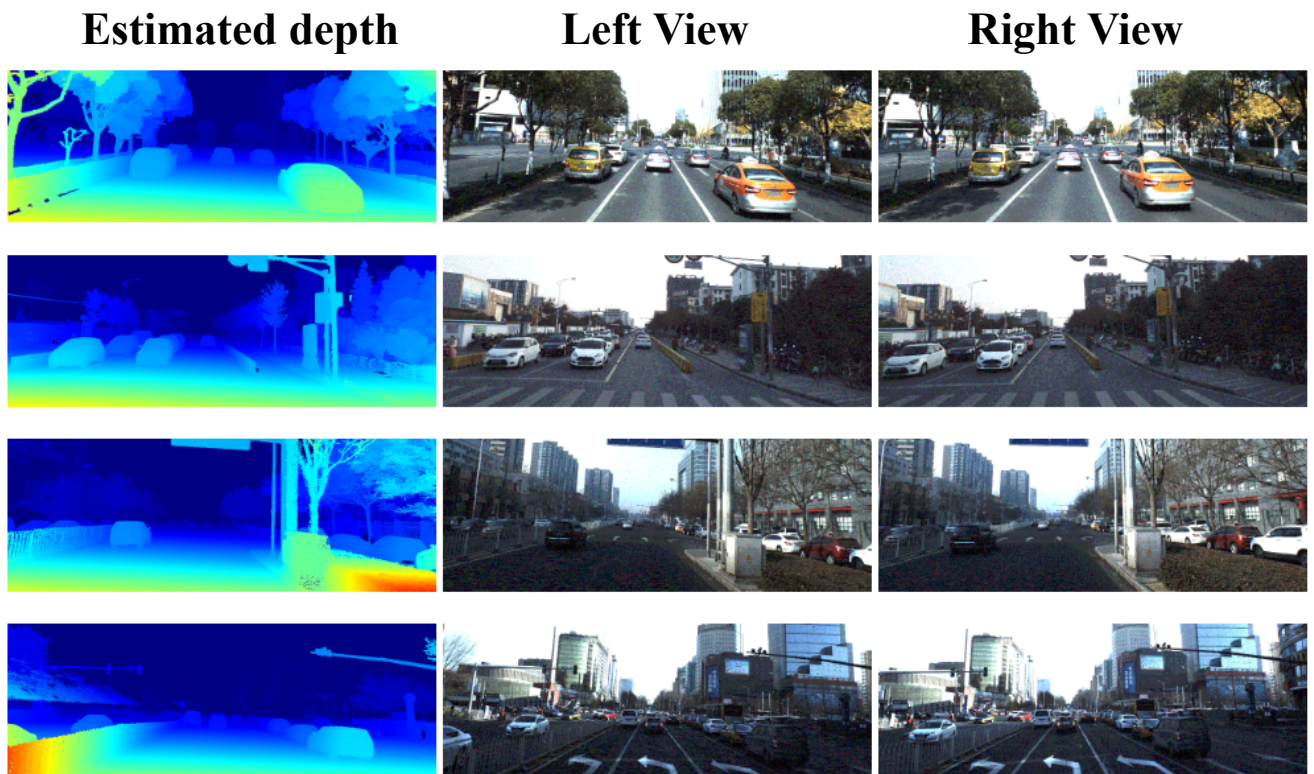**Input:** Stereo views
and **Output:** Estimated depth map

Estimated depth	Left View	Right View

Figure: Examples of stereo pairs and its predicted depth map from the ApolloScape dataset (link)**.**

3. Datasets

- Cityscapes & Foggy Cityscapes (link)
- KITTI datasets (link)
- NYU Depth Dataset V2 (link)
- DrivingStereo (link)
- Apolloscapes dataset (link)

4. Relevant code links

- https://github.com/autonomousvision/unimatch
- https://github.com/savnani5/Depth-Estimation-using-Stereovision
- https://github.com/ibaiGorordo/HITNET-Stereo-Depth-estimation
- https://github.com/ibaiGorordo/TFLite-MobileStereoNet

5. References

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