Painting 3D Nature in 2D: View Synthesis of Natural Scenes from a Single Semantic Mask

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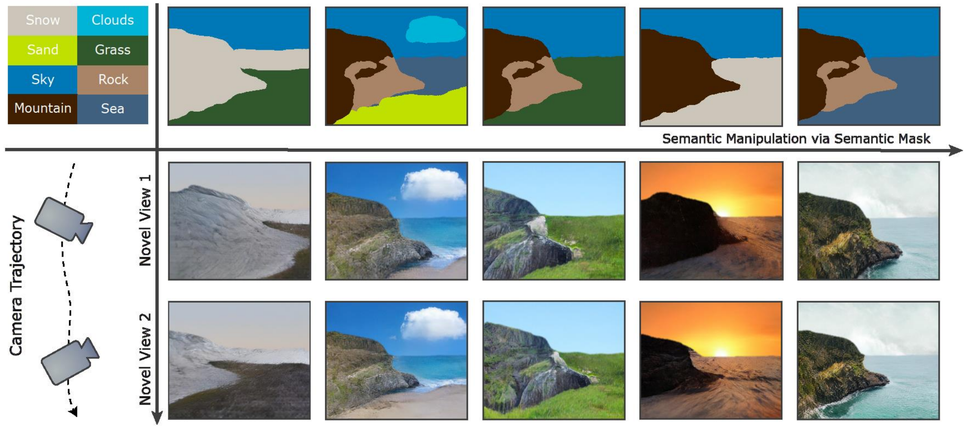
JUNE 18-22, 2023 CVPR VANCOUVER, CANADA

Problem Background

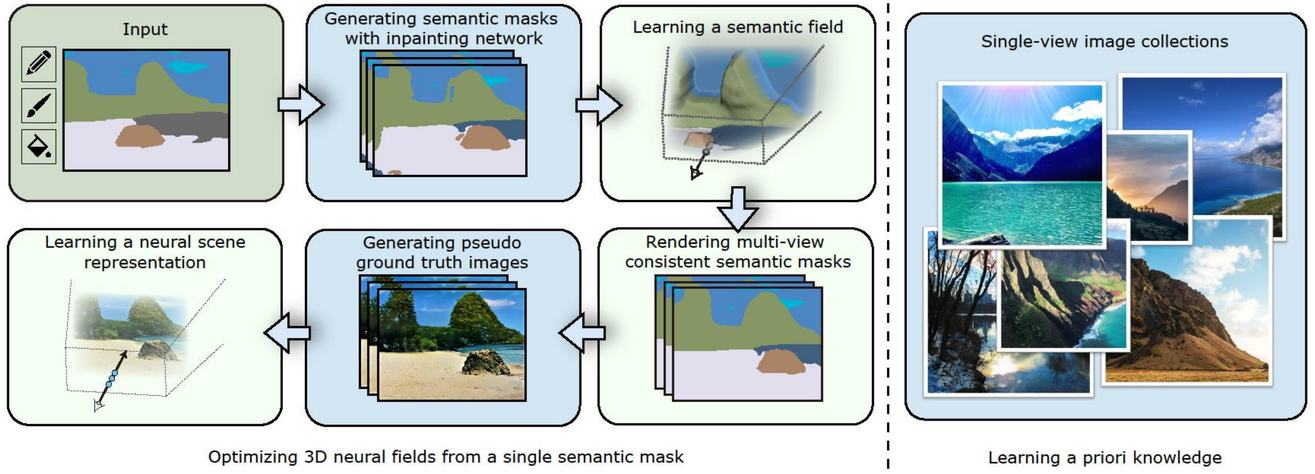
- Natural scenes are indispensable content in many applications such as film production and video games. **This work focuses on a specific setting of synthesizing novel views of natural scenes given a single semantic mask, which enables us to generate 3D contents by editing 2D semantic masks.**
- Given only **a single semantic map as input (first row)**, our approach optimizes neural fields for view synthesis of natural scenes. **Photorealistic images can be rendered via neural fields (the last two rows).**



Challenges

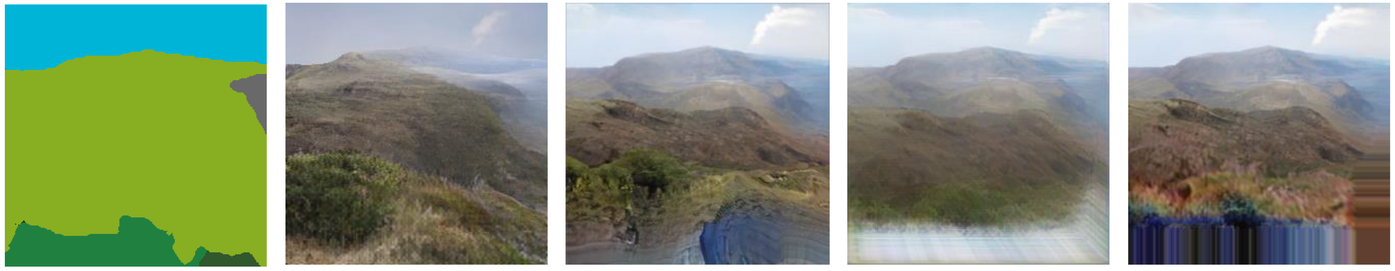
- **Training neural fields directly on a single semantic map is a challenging task.** This is because training neural fields typically necessitates multi-view RGB image data.
- Compared to urban or indoor scenes, learning to synthesize natural scenes is a challenging and interesting task, **as it is difficult to collect 3D data or posed videos of natural scenes for training.**

Method Overview



Comparisons

For more results, please refer to our paper.



Input mask | Ours | 3DP | GVSNet | AdaMPI