A Depth Completion Network for Efficient Depth Representation

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Abstract:

3D information with depth pixels or Lidar points is the key component for robotic perception, autonomous driving, virtual reality and 3D movies. Traditional 3D data representation requires large amounts of data, making the transmission bandwidth and storage resource inefficiency. In this paper, instead of complete 3D information, we only need a few of 3D depth information and use depth completion techniques to improve data efficiency by predicting the missing depth data by leveraging sparse depth map and RGB image to reconstruct dense depth map. We can reduce the amount of depth data while maintaining quality and accuracy in the receiver by using a depth completion network. The proposed depth completion network combines autoencoder and guided attention mechanisms to enhance depth representation efficiency. The proposed approach reconstructs more accurate depth maps than the other approaches if we use the same number of depth pixels to reduce the data transmission burden while ensuring high-quality depth information. The proposed approach demonstrates the practical and efficient application of depth completion.

Keywords:

Depth Completion, Autoencoder, Guided-Attention, Depth Sparsity.