

Predicting LIDAR Intensity from RGB and Depth Images

<TYPE OF THESIS> in computer science

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Abstract

This report explores the application of the Pix2Pix network for predicting LiDAR intensity maps using RGB images and depth information as additional input. The used dense depth maps are created from the rgb images processed through Bilateral Propagation Network for Depth Completion and the DepthAnything models (v1 and v2). This approach used rgb pictures from the kitti dataset and demonstrates significant improvements in prediction accuracy and robustness over conventional methods.

Chapter 1

Introduction

1.1 Motivation

LiDAR sensors provide critical depth information for autonomous driving and robotics. The LiDAR intensity maps are often sparse and incomplete. Using depth maps as an additional input is a way to improve the richness and accuracy of the LiDAR prediction. The Pix2Pix network for image-to-image translation offers a promising approach for integrating these modalities.

1.2 Contribution

This project explores the use of the Pix2Pix network to predict LiDAR intensity maps by leveraging RGB images and depth maps as additional inputs.

1.3 Related Work

DepthAnything Models:

DepthAnything represents a significant advancement in monocular depth estimation by leveraging both labeled and unlabeled data at a large scale. Trained on 1.5 million labeled images and over 62 million unlabeled images, DepthAnything achieves state-of-the-art performance in depth estimation tasks. The model excels in both zero-shot relative and metric depth estimation, outperforming previous models such as MiDaS v3.1 and ZoeDepth.

version 2

Chapter 2

Preparations

used google colab, pix2pix network getting the right input, pix2pix problems



Figure 2.1: caption.

Chapter 3

Predicting LIDAR Intensity from RGB and Depth Images

3.1 Setup

The used the bp net it is for depth completion and depth prediction pix2pix model with modified data loader to get 4 dim. input rgb plus depth used base model for depthanything

3.2 Implementation

3.3 Results

test run rgb only. depht from depthanything the depth from depthanything v2 and metriv form depthanything v2 6 runs with different solution

Chapter 4

Conclusion

4.1 Appendix

ere is a citation for the Depth Anything paper [depthanything], its version 2 [depth'anything'v2], and for the paper by Saxena et al. [saxena2008depth]

4.2 References

bp net work pix2pix depth anything v1 2 paper for them some for lidar intensity

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