



Masterarbeit

Pretty Planes and ugly toilets

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Denis Heid (Matrikelnummer 3827662), April 9, 2019

Abstract

Template

Acknowledgments

If you have someone to Acknowledge;)

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1. Introduction

What is this all about?

Cite like this:[AFS⁺11]

1.1. Problem Statement

2. Background

This chapter outlines the theory on which this work is based on, as well as different approaches to surface reconstruction from complete or lacking object data. Roter Faden:

1. Representing objects with meshes has many useful applications
2. List different representations of objects (meshes, pointcloud, voxels,...)
3. Is a form of data transformation and extrapolation of missing information
4. Two main approaches for transformation, ml and classical approaches

TODO: Die alternativen richtungen von lensch noch

2.1. Non-machine learning background ;p

Roter Faden:

1. classic approaches here
2. find more of a story after researching more
3. non trivial task (etwas mathematischer, genauer werden)

Papers to cite here

1. Marching cubes
2. ask dennis. he prob has a bunch
3. cite his stuff too ?
4. find more classic papers
5. instant field aligned meshes
6. dennis sein zeug ist wohl sehr gut

TODO: neuen namen finden fuer classic

2.2. Machine Learning Background

1. machine learning good way for inference, probably neural network too, given huge amount of data and finding similarities in data
2. many approaches for surface reconstruction in classic ml
3. used for self driving cars. Fast solutions
4. NN recently started to get nice results
5. many try to transform given input data to voxel based representation
6. not many directly from point cloud to meshes
7. range scanner to meshes
8. end result not meshes?

Papers to cite:

1. Convolutional neural network
2. Semi-Supervised Classification with Graph Convolutional networks
3. dense 3d object reconstruction from single depth view
4. PointNet++
5. deep marching cubes
6. pixel2mesh
7. learning a hierarchical latent-variable model of 3d shapes
8. FlexConv
9. unsupervised learning of 3d structure
10. image2 mesh
11. Surface reconstruction from unorganized Points

TODO: Find non NN ML papers, from the other prof of ML lecture? TODO: Saliency for feature detection

3. Material

3.1. Data

Explain and show

4. Methods

5. Results

6. Discussion

A. Blub

Bibliography

- [AFS⁺11] Sameer Agarwal, Yasutaka Furukawa, Noah Snavely, Ian Simon, Brian Curless, Steven M. Seitz, and Richard Szeliski. Building rome in a day. *Commun. ACM*, 54(10):105–112, October 2011.