Thema XYZ

Seminar Maschinelles Lernen

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Gliederung

Erste Folie vom ersten Abschnitt

- First itemtext
- Second itemtext
- Last itemtext

Zweite Folie vom ersten Abschnitt

1. First itemtext
2. Second itemtext
3. Last itemtext

Erste Folie vom zweiten Abschnitt

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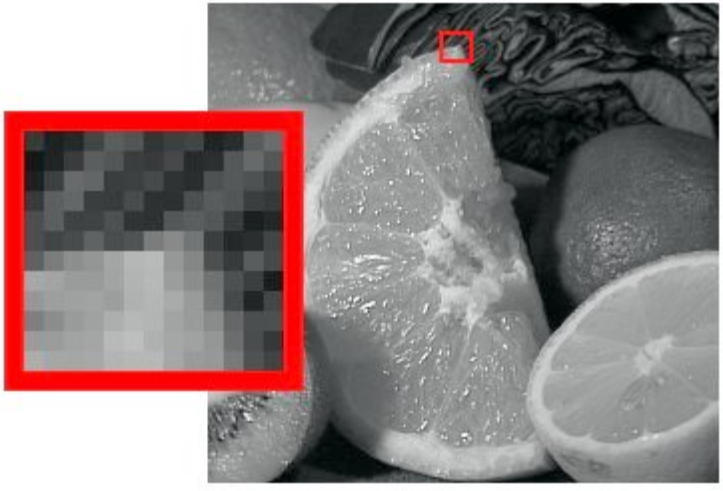
$$\frac{1}{n}\sum_{i=1}^{n} x_i = \frac{x_1 + x_2 + \ldots + x_n}{n}$$

Symbole im Mathematik-Modus

- gegeben sind Breite W und Höhe H eines Graustufenbildes b_g
- weiterhin gegeben Anzahl Intensitäten I ($I-1$ entspricht Weiß)
- Bild b_g ist eine Funktion $\mathbb{N}^2 \to \mathbb{N}$, genauer $\{0,\ldots,W-1\} \times \{0,\ldots,H-1\} \to \{0,\ldots,I-1\}$
- Koordinatenpaar (x,y) beschreibt ein Pixel mit Intensität $b_g(x,y)$

Use jpg or even better png files



Vector graphic, exported as pdf with Inkscape

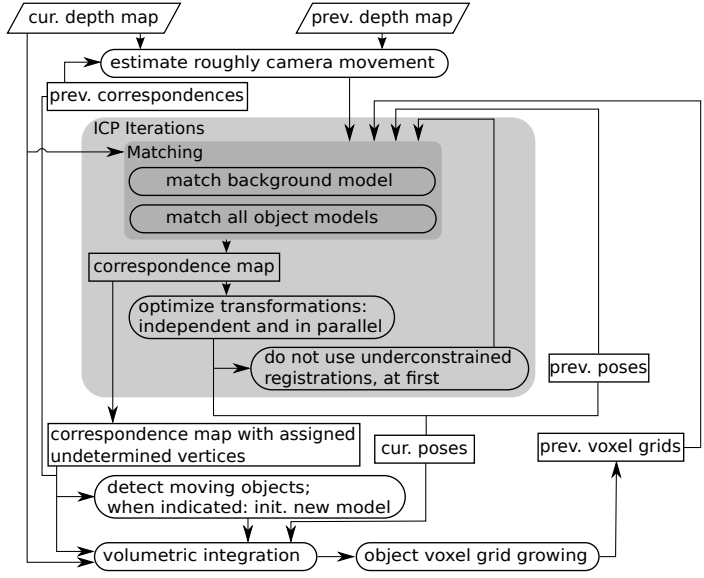
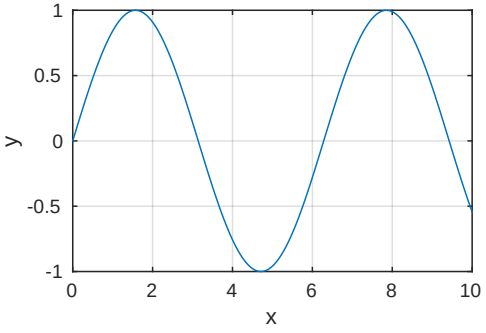


Figure: Main Structure from [Korn and Pauli (2015)]

Subcaption

a) Teilbild 1



b) Teilbild 2

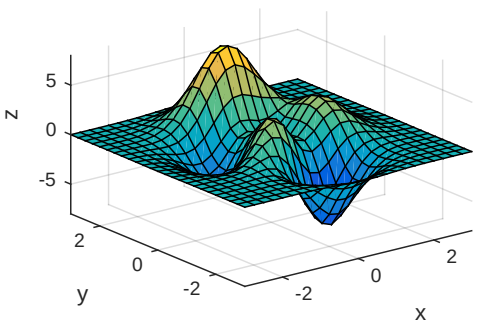


Figure: Beispiel von Plots nebeneinander, die mit Matlab erstellt wurden (Code für die Plots unter *images/makeMatlabPlots.m*).

Minipages

"Adversarial training is the coolest thing since sliced bread."
(Yann LeCun, Director of AI Research at Facebook and Professor at NYU)
Two neural networks play against each other. . .

Generative model *G*

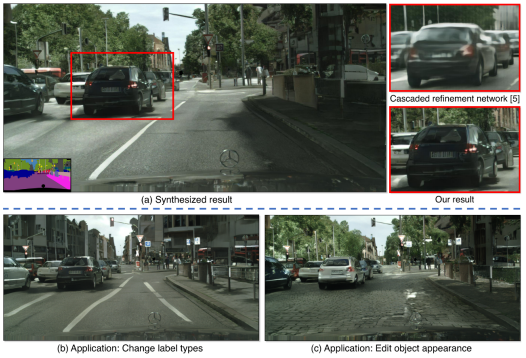
Input data → Learn distribution → Generate samples

vs.

Discriminative model *D*

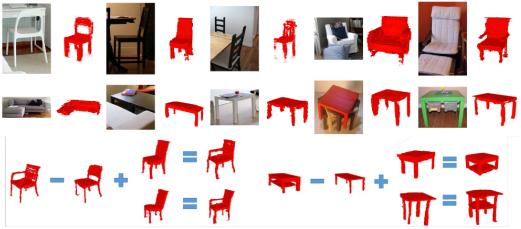
Original data or fake by *G*?

. . . and improve over time.



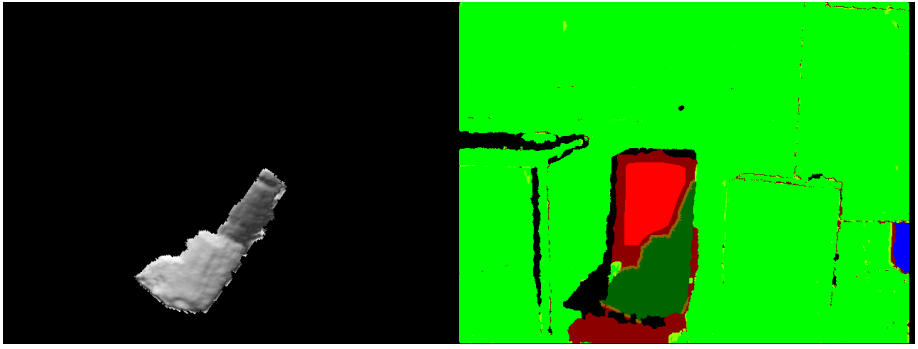
Single Image Super Resolution, Source: Ledig et al. 2016

High Resolution Image Synthesis, Source: Wang et al. 2017

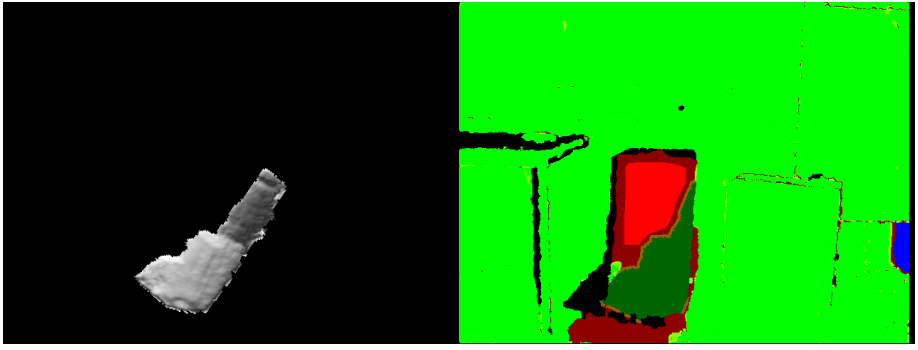


Single Image 3D reconstruction & Shape Arithmetics, Source: Wu et al. 2016

Minipage and pause

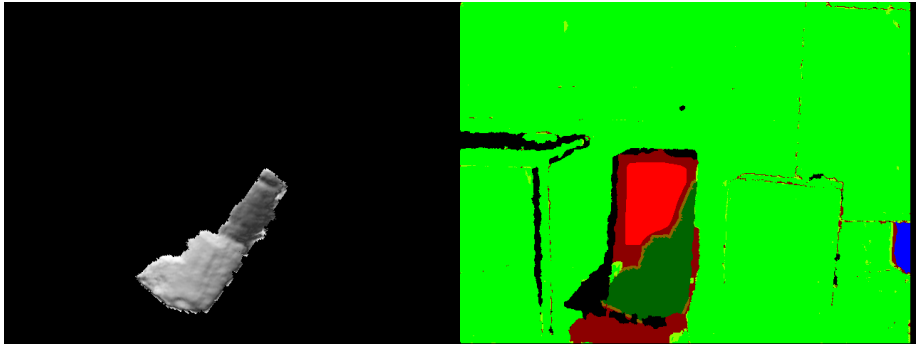


Minipage and pause



1. Step:
   - coarse camera movement estimation
   - registration of current and previous depth maps
   - based on previous background correspondences
   - good performance

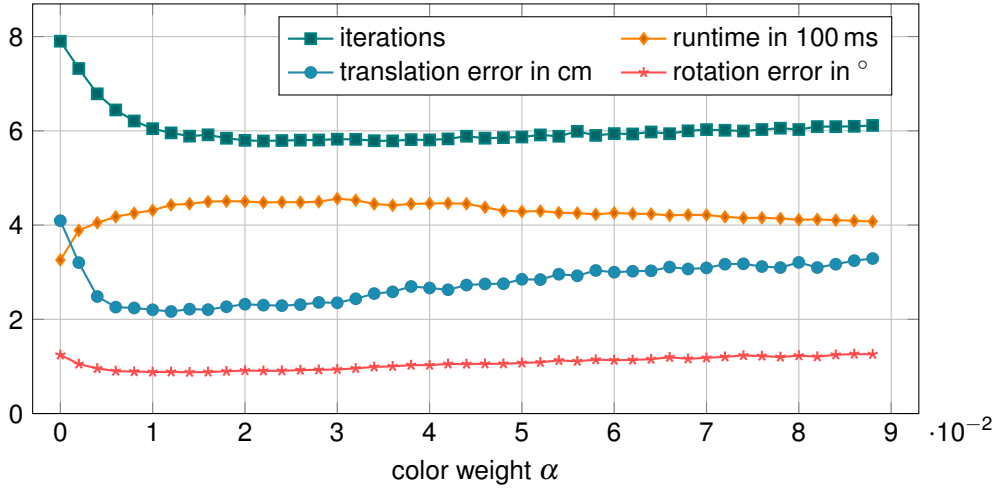
Minipage and pause



1. Step:
   - coarse camera movement estimation
   - registration of current and previous depth maps
   - based on previous background correspondences
   - good performance

2. Step:
   - eigenvalues $\lambda_1 \geq \ldots \geq \lambda_6$ of $A_i^T A_i$
   - unconstrained degree of freedom if $\frac{\lambda_1}{\lambda_6} > 1000$
   - no update of the object pose during the first five ICP iterations

Plot basierend auf Textdatei: Evaluating Color Weight (Typical Scene)



Balkendiagramm basierend auf csv-Datei

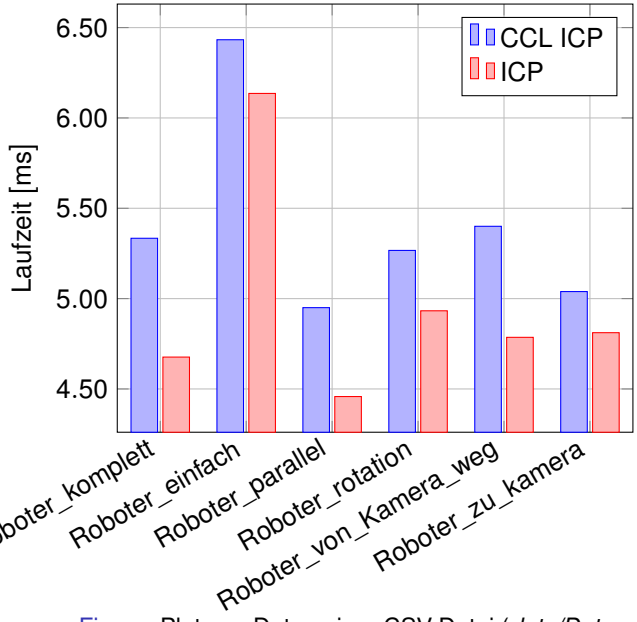


Figure: Plot aus Daten einer CSV-Datei (*data/Daten.csv*)

Komplexes Balkendiagramm aus csv-Datei

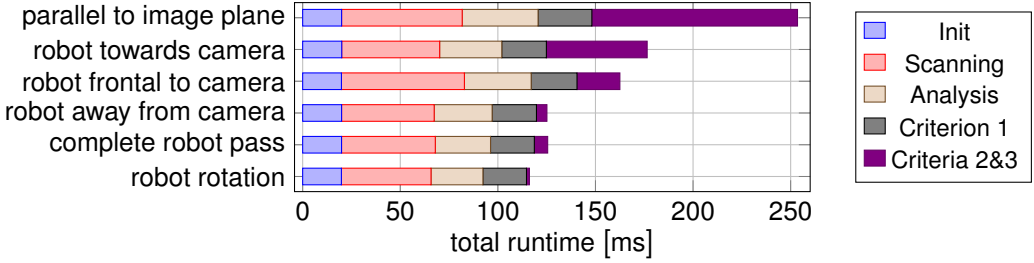


Figure: Comparison of the runtimes for six different datasets. Shown is the total runtime over the first 600 frames for selected CUDA kernels (just GPU time).

Tabelle aus csv-Datei

Szene	Laufzeit CCL	Laufzeit ICP
Roboter komplett	5,334	4,676
Roboter einfach	6,433	6,136
Roboter parallel	4,950	4,458
Roboter rotation	5,267	4,933
Roboter von Kamera weg	5,400	4,786
Roboter zu kamera	5,039	4,811

Table: Daten aus CSV-Datei (*data/Daten.csv*) geladen

Komplexe Tabelle

voxel grid cell size (cm)	iterations		runtime (ms)		error (cm / °)	
	GICP	color GICP	GICP	color GICP	GICP	color GICP
freiburg2_desk with 1977 pairs and 1s offset						
-	17.05	11.85	15544	22501	8.590 / 2.984	4.105 / 1.707
2	7.90	5.79	322	444	4.093 / 1.244	2.290 / 0.907
3	7.13	5.52	136	176	3.876 / 1.167	2.520 / 0.992
freiburg1_room with 1323 pairs and 1/3s offset						
-	17.54	14.50	40797	72732	14.987 / 5.543	11.047 / 4.443
2	11.54	9.56	479	770	14.963 / 4.559	10.801 / 3.225
3	10.85	8.92	176	256	15.079 / 4.348	10.713 / 3.238

Quellcode

Some Python code:

```python
# Imports
import numpy as np
import tensorflow as tf
```

Some MATLAB code:

```matlab
plot(x,y);
xlabel('x');
ylabel('y');
```

Referenzen I

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- Ledig, Christian et al. (2016). *Photo-Realistic Single Image Super-Resolution Using a Generative Adversarial Network*. URL: http://arxiv.org/pdf/1609.04802.
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- Wu, Jiajun et al. (2016). *Learning a Probabilistic Latent Space of Object Shapes via 3D Generative-Adversarial Modeling*. URL: http://arxiv.org/pdf/1610.07584.
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- Park, Seongjin et al. (2014). “Parallelized Seeded Region Growing Using CUDA”. In: *Computational and mathematical methods in medicine* 2014.

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