Deep Closest Point

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Zadání

Tema OJ1:
Vyzkoušet DCP na real-world datech jako náhrada standardního SLAM algoritmu.
DCP je DL varianta standardního ICP algoritmu (https://arxiv.org/abs/1905.03304).

Iterative Closest Point

ICP je iterační algoritmus, který určuje rotaci $\mathbf{R}_{xy}$ a translaci $\vec{t}_{xy}$ mezi množinami bodů X a Y splňujícími:

- $X = \{\vec{x}_1, \ldots, \vec{x}_N\} \subset \mathbb{R}^3$
- $Y = \{\vec{y}_1, \ldots, \vec{y}_N\} \subset \mathbb{R}^3$
- Y vznikne otočením a posunutím X

tak že minimalizuje chybu $E(\mathbf{R}_{xy}, \vec{t}_{xy})$.

$$E(\mathbf{R}_{xy}, \vec{t}_{xy}) = \frac{1}{N} \sum_{i=1}^{N} \|\mathbf{R}_{xy}\vec{x}_i + \vec{t}_{xy} - \vec{y}_{m(x_i)}\|^2$$

$$m(x_i) = \underset{j}{\operatorname{argmin}} \|\mathbf{R}_{xy}\vec{x}_i + \vec{t}_{xy} - \vec{y}_j\|^2$$

Problémy IPC

1. Nelze optimalizovat $\mathbf{R}_{xy}$, $\vec{t}_{xy}$ i m najednou proto v jednom kroku optimalizuje m a v dalším $\mathbf{R}_{xy}$ a $\vec{t}_{xy}$
2. velmi často najde jen lokální optimum
3. neuvažuje zajímavost některých bodů
4. neporadí si se šumem a řídkostí měření

Introduction

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Results 2

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Treatments	Response 1	Response 2
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

Table 1: Table caption

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Treatments	Response 1	Response 2
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

Table 2: Table caption

Results 1

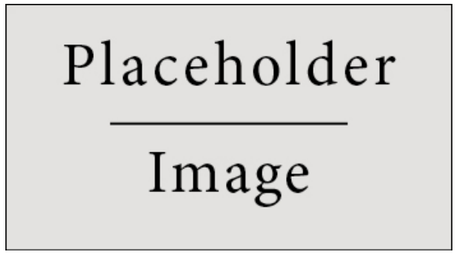

Figure 1: Figure caption

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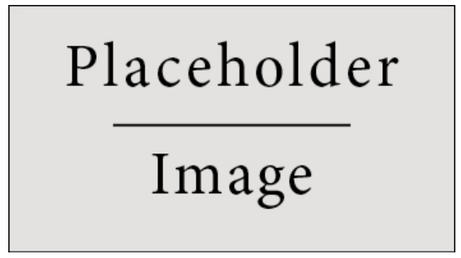
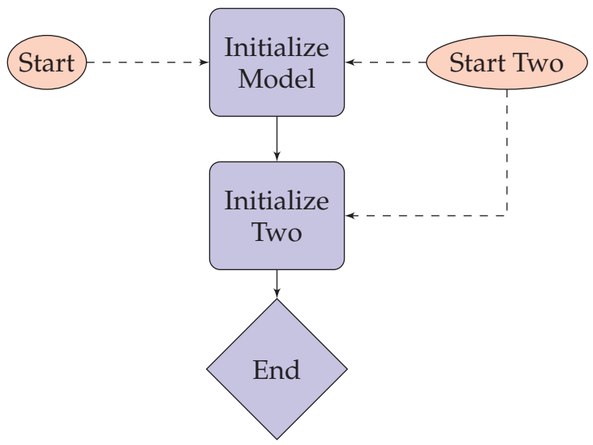


Figure 2: Figure caption

Conclusion



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References

Future Research

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