

Unsupervised Optimisation - Paper Structure

Simon Kluettermann

Is9 tu Dortmund

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Simon Kluettermann

Task

Title
Abst

- 1) Intro

- Motivation
- Open Challenges
- My Contribution

- 2) RW

Consists

3) Problem/Challenges

Def. 1

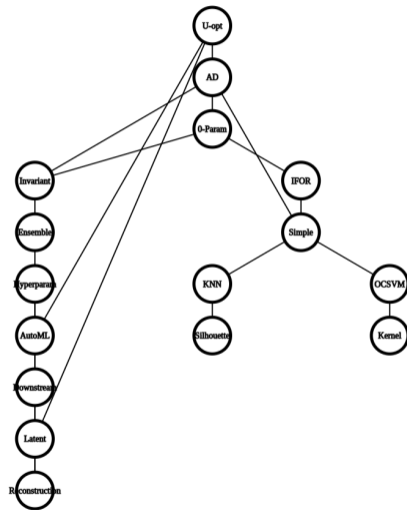
↳ Challenges formally on this Def

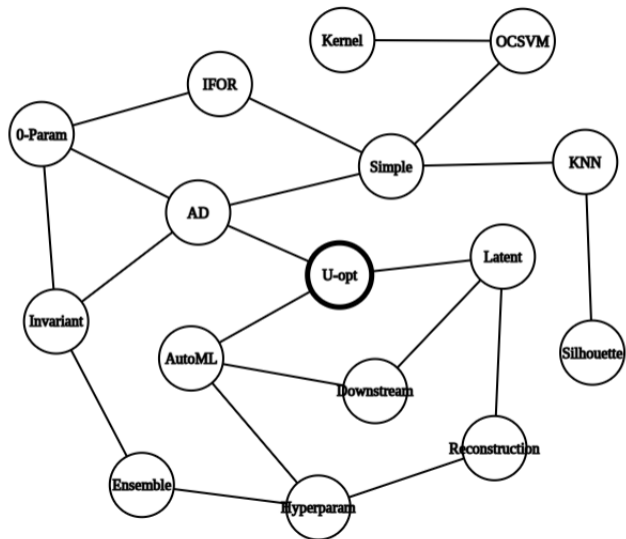
4) Contribution / Solution Framework

5) Experiments

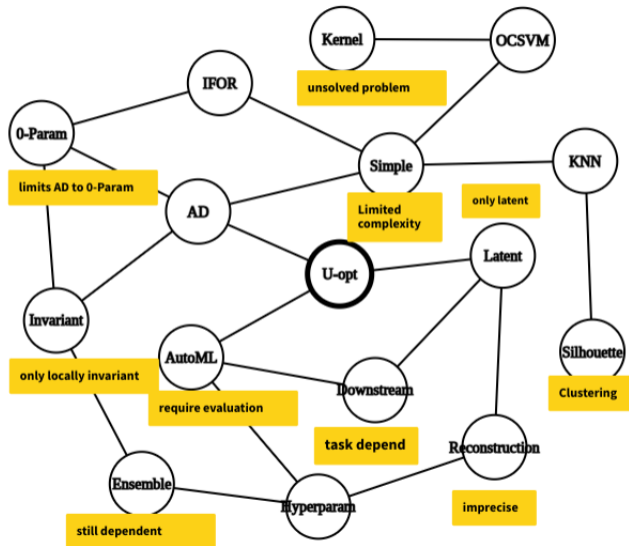
7) Concl./FW

- Motivation
 - AD is super important...
 - good AD = complicated models \Rightarrow Many Parameters
 - Evaluation dependent on very few datapoints \Rightarrow Optimization impossible
- Open Challenges
 - Evaluate without testing data
 - Formalisation of existing ideas
 - Numerical assessment of them
- Contribution
 - Suggest new methods for AE
 - Compare methods on many datasets
 - Separate into parameter and hyperparameter optimisation





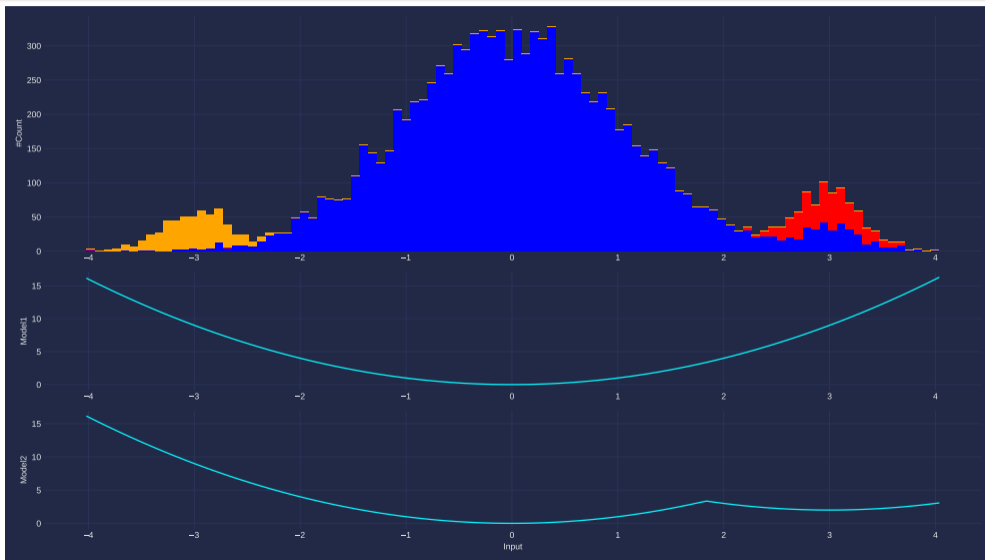
But...



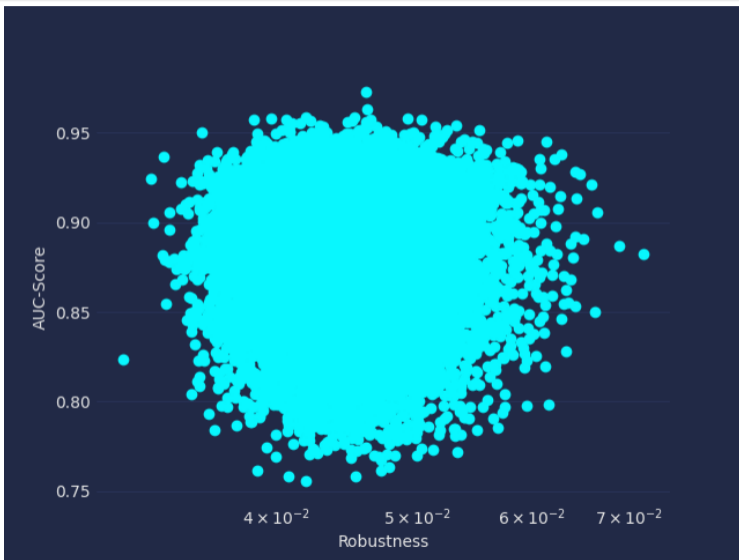
Problem Statement

- Given N Anomaly detection methods $M_i = \text{TrainModel}(X_{\text{train}})$, find $f(M_i)$ so that Score $S_i = f(M_i)$ can be used to find an above average AD method $M_{\text{argmax}(S)}$.
- Let $\text{TrainMany}(X_{\text{train}}, C) = \text{TrainModel}(X_{\text{train}})_{\text{argmax}(f(M_0 \dots M_C))}$. We assume the distribution of TrainMany to be gaussian and describe it through μ_C and σ_C . We consider a function $f(M)$ to be helpful, if $\Delta = \frac{\text{sqrt}(N) \cdot (\mu_C - \mu_1)}{\text{sqrt}(\sigma_C^2 + \sigma_1^2)} > 3$ for some number of models tested N .

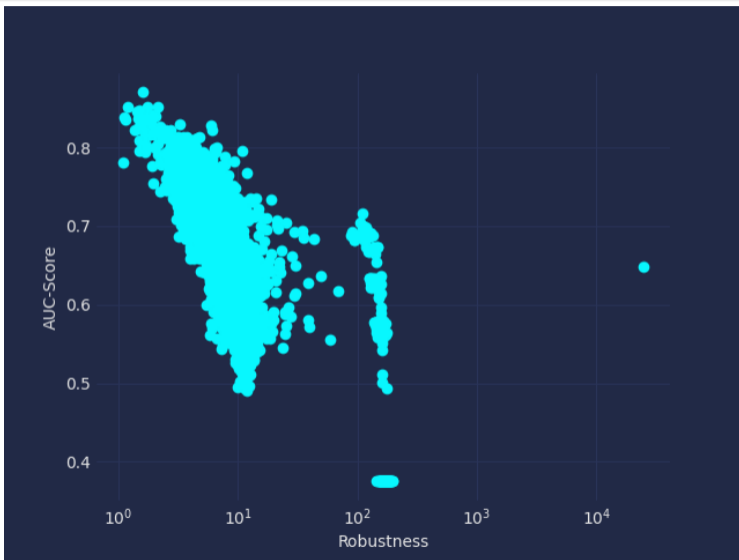
Impossible



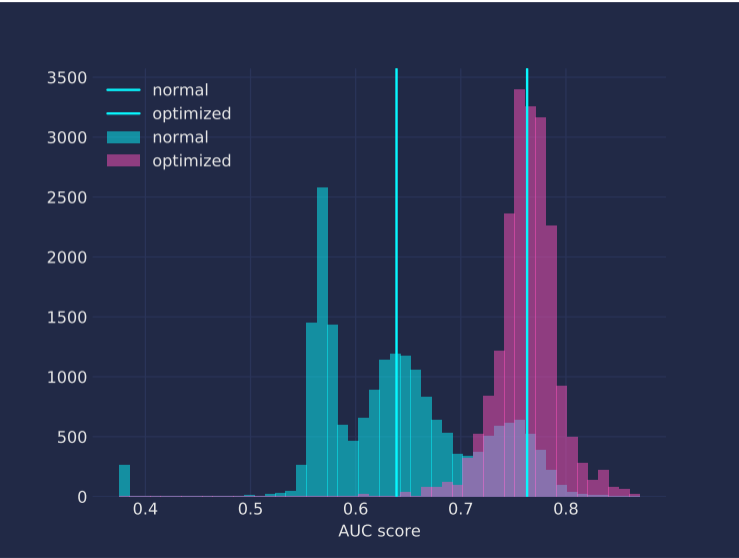
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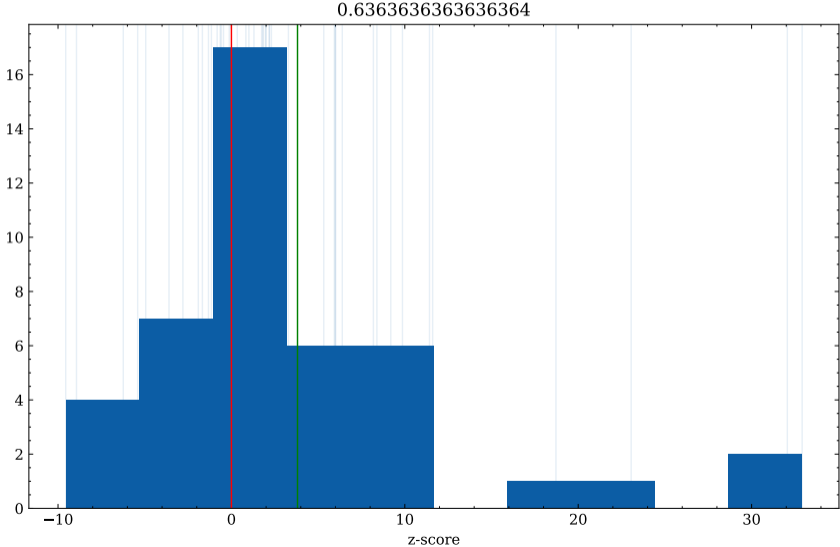
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One Dataset



Many Datasets



- Afterwards:
- Table: Fraction of positive impro, Average impro
- Correlation between optimizers
- Hyperparam: Same table
- Improvement by hyperparameter (latent dim is different from batch size)