Unsupervised Optimisation - Paper Structure

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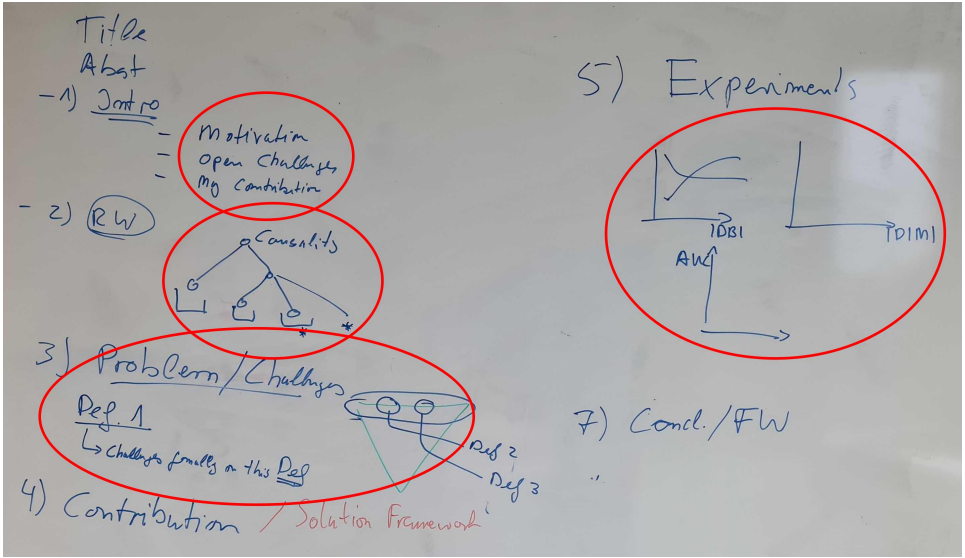
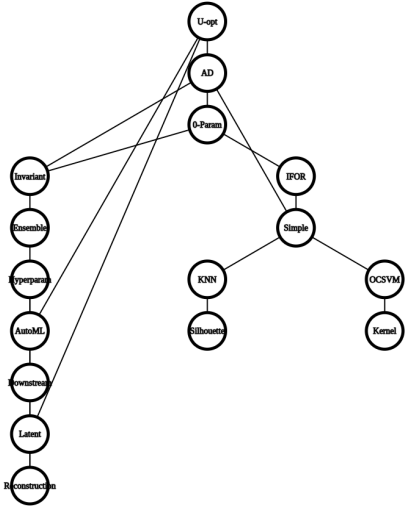
Task


Title
Abst
-1) Intro
- Motivation
- Open Challenges
- My Contribution
- 2) RW
Causality
3) Problem / Challenges
Def 1
↳ Challenges formally on this Def
Def 2
Def 3
4) Contribution / Solution Framework
5) Experiments
|DBI|
|DIMI|
AW
7) Concl. / FW

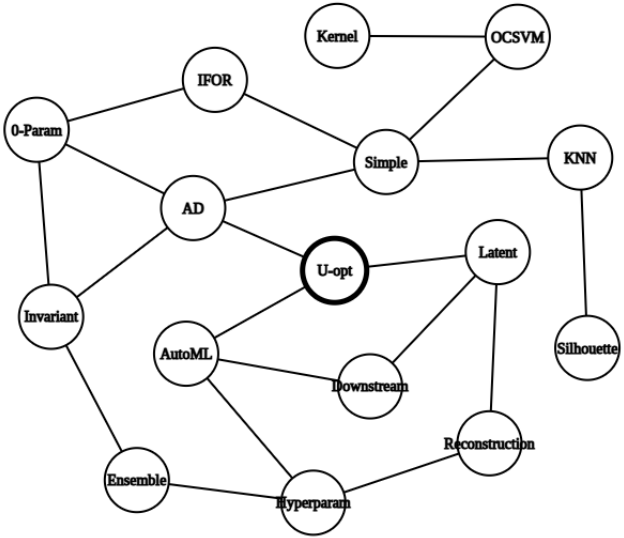
Intro

- 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
  - Seperate into parameter and hyperparameter optimisation

RW


U-opt
AD
0-Param
Invariant
IFOR
Ensemble
Simple
Hyperparam
KNN
OCSVM
AutoML
Silhouette
Kernel
Downstream
Latent
Reconstruction

RW


Kernel
OCSVM
IFOR
0-Param
Simple
KNN
AD
U-opt
Latent
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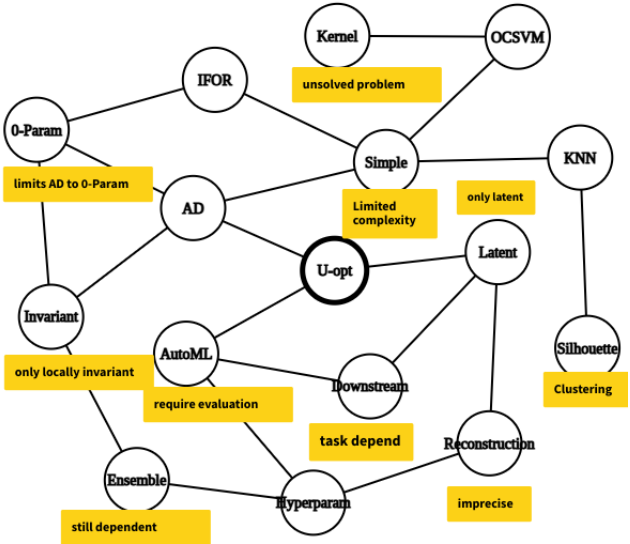
Silhouette
Downstream
Reconstruction
Ensemble
Hyperparam

But...


Kernel
OCSVM
unsolved problem
IFOR
0-Param
Simple
KNN
limits AD to 0-Param
AD
Limited complexity
only latent
U-opt
Latent
Invariant
AutoML
Silhouette
only locally invariant
Downstream
Clustering
require evaluation
task depend
Reconstruction
Ensemble
Hyperparam
imprecise
still dependent

Problem Statement

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