Terrific Thesis Title

Toller Thesis Titel
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1. Review: Super Supervisor
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Mir ist bekannt, dass im Falle eines Plagiats (§ 38 Abs. 2 APB) ein Täuschungsversuch vorliegt, der dazu führt, dass die Arbeit mit 5,0 bewertet und damit ein Prüfungsversuch verbraucht wird. Abschlussarbeiten dürfen nur einmal wiederholt werden.

Bei einer Thesis des Fachbereichs Architektur entspricht die eingereichte elektronische Fassung dem vorgestellten Modell und den vorgelegten Plänen.

Darmstadt, 5. Januar 2024

A. Author

Abstract

Abstract

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Abbreviations, Symbols and Operators

List of Abbreviations

Notation	Description
DDPG	Deep Deterministic Policy Gradient
DQN	Deep Q Network
ML	Machine Learning
PPO	Proximal Policy Optimization
RL	Reinforcement Learning
SAC	Soft Actor Critic
TRPO	Trust Region Policy Optimization

List of Symbols

Notation	Description
A	continuous action space
S	continuous state space

$\mathcal{H}(\cdot)$	entropy
$\pi(a\|s_t)$	Policy

1. Introduction

This is a citation: [1]

This is a figure:

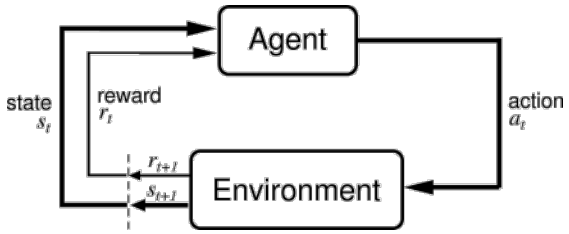

Figure 1.1.: I am a caption

1.1. Contributions

– in my work i contribute the following things: - pipeline to infer new images on different algorithms and compare them -> pipeline is industry focussed for benefits of the guys where i write my thesis

- research of ensemble output learning to enhance individual network performance -> simple network over 5-6 outputs

- introduction of very new dataset categories in style of mvtec LOCO dataset

2. Background

This is an algorithm

2.1. Classes of Anomaly detection

- there are different kinds of approaches to IAD - look at tree picture

- First important distinction is between supervised and unsupervised -> we focus on unsupervised -> list problems with supervised approaches and thus advantages of unsupervised ones

- briefly touch on other IAD settings like few shot, along with references

- among unsupervised approaches, there are two more fundamental distinctions -> reconstruction based vs representation/feature embedding based -> explain difference with lots of references

- for reconstruction based touch on 2-3 base categories like GANs etc and link fundamental papers for GANs etc - for representation based important to explain memory bank, teacher student, and distribution map - explain normalizing flow somehow somewhere in there

- maybe say which algos we chose and what we covered with that

2.2. The Datasets

– mvtec2d Dataset: - cite bergmann papers - very little Datasets - hosrt description of mvtec dataset -> 15 Classes -> grayscale masks -> explain folder structure(maybe with image) -> example images

– mvtec LOCO Dataset - introduced in beyond dents and scratches - before there were only structural anomalous Datasets - but to compare the ability of IAD methods for logical constraints, there needs to be another dataset -> neu formulieren damit es nicht nach copypasta aussieht

- short description of LOCO dataset

2.3. metrics

- show metrics from survey papers - explain which metrics we used and where the other ones are used - explain also why we used the ones we used, and what disadvantages of other ones where

- touch on paul bergmann paper for sPRO score, say how it is better than pixel auroc and normal pro score, also explain saturation thresholds

- some math formula for calculating the important metrics

2.4. description of patchcore algo

2.5. description of simplenet

2.6. description of AST

2.7. description of DRAEM

2.8. description of another reconstruction based algo

3. Related Work

4. Method

This is an table:

m	$\Re\{\underline{\mathfrak{X}}(m)\}$	$-\Im\{\underline{\mathfrak{X}}(m)\}$	$\mathfrak{X}(m)$	$\frac{\mathfrak{X}(m)}{23}$	A_m	$\varphi(m)$ / °	φ_m / °
1	16.128	8.872	16.128	1.402	1.373	−146.6	−137.6
2	3.442	−2.509	3.442	0.299	0.343	133.2	152.4
3	1.826	−0.363	1.826	0.159	0.119	168.5	−161.1
4	0.993	−0.429	0.993	0.086	0.08	25.6	90
5	1.29	0.099	1.29	0.112	0.097	−175.6	−114.7
6	0.483	−0.183	0.483	0.042	0.063	22.3	122.5
7	0.766	−0.475	0.766	0.067	0.039	141.6	−122
8	0.624	0.365	0.624	0.054	0.04	−35.7	90
9	0.641	−0.466	0.641	0.056	0.045	133.3	−106.3
10	0.45	0.421	0.45	0.039	0.034	−69.4	110.9
11	0.598	−0.597	0.598	0.052	0.025	92.3	−109.3

Table 4.1.: Table Caption

4.1. Our own Dataset

- repeat motivation why we added additional data in mvtec style - say that we went with loco mvtec flair(maybe give reasons) - say that we came up with a set of structural and logical anomalies for each category - list categories(flat connector, angle and special construct)

- 3 sub sections for the three categories

- flat connector - link the exact one we used(or examples of some) - give structural anomalies - give logical anomalies - for both briefly touch on how we produced them - show image examples for each

- repeat same for other categories

- also when describing angle: - touch on how there is a special case with multi perspective detection

4.2. pipeline

- explain brief structure of the pipeline - ???

4.3. Ensemble network

- network architecture - specifics

4.4. Different ensemble approaches

- weighted, random forest etc - specifics

5. Experimental Setup

6. Experimental Results

- analysis on how methods worked on own dataset individually -> if poor performance error analysis and also address different subclasses

- analysis of how ensemble model worked and if it improved performance

7. Conclusion and Future work

Bibliography

[1] A. Vaswani, N. Shazeer, N. Parmar, J. Uszkoreit, L. Jones, A. N. Gomez, L. u. Kaiser, and I. Polosukhin, "Attention is all you need," in *Advances in Neural Information Processing Systems* (I. Guyon, U. V. Luxburg, S. Bengio, H. Wallach, R. Fergus, S. Vishwanathan, and R. Garnett, eds.), vol. 30, Curran Associates, Inc., 2017.

A. Appendix

Appendix here