

30th Vienna Deep Learning Meetup



29th October 2019
#VDLM



Vienna Deep Learning Meetup



The Organizers:



Thomas Lidy
Musimap



Alex Schindler
AIT & TU Wien



Jan Schlüter
OFAI & contextflow



René Donner
contextflow

Vienna Deep Learning Meetup



Thomas Lidy
Musimap



Dr. Alex Schindler
AIT & TU Wien



Jan Schlüter
OFAI & contextflow



René Donner
contextflow

Dr. Alexander Schindler:



Multi-Modal Music Information Retrieval: Augmenting Audio-Analysis with Visual Computing for Improved Music Video Analysis

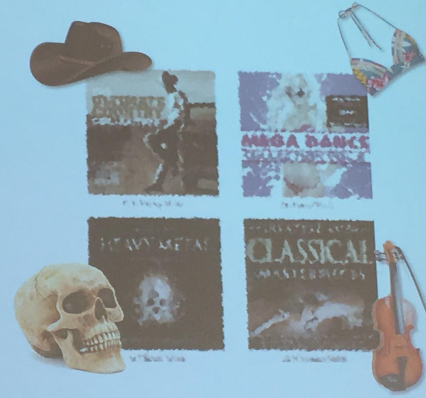
Rigorosum: Alexander Schindler
Supervisor: Ao.univ.Prof. Dr. Andreas Rauber
Reviewer: Univ. Prof. Mag. Dipl.-Ing. Dr. Markus Schedl
Univ. Prof. Dr. Allan Hanbury



FACULTY OF **INFORMATICS**

Promising Approach Music-related Visual Object Detection

Alexander Schindler and Andreas Rauber. Harnessing Music related Visual Stereotypes for Music Information Retrieval. In: Proceedings of the 10th International Conference on Music Information Technology (TIST) 8.2 (2016).



Topics for Today

- **Welcome & Introduction**
- **Fake News. From Shallow to Deep. How to create, detect and fight it.**

Alexander Schindler, Research Scientist, Austrian Institute of Technology (AIT)

- ***Announcements***
- **<Break>**
- **Anomaly Detection with GANs**

Thomas Schlegl, Machine Learning Engineer and Data Scientist, contextflow

- **Conference Report: O'Reilly AI Conference - *Elisabeth Fink, Data Scientist, Raiffeisen Software***
- **Hot Topics - *Jan Schlüter, Research Scientist, OFAI & contextflow***

Announcements

VDLM on Github

<https://github.com/vdlm/meetups>

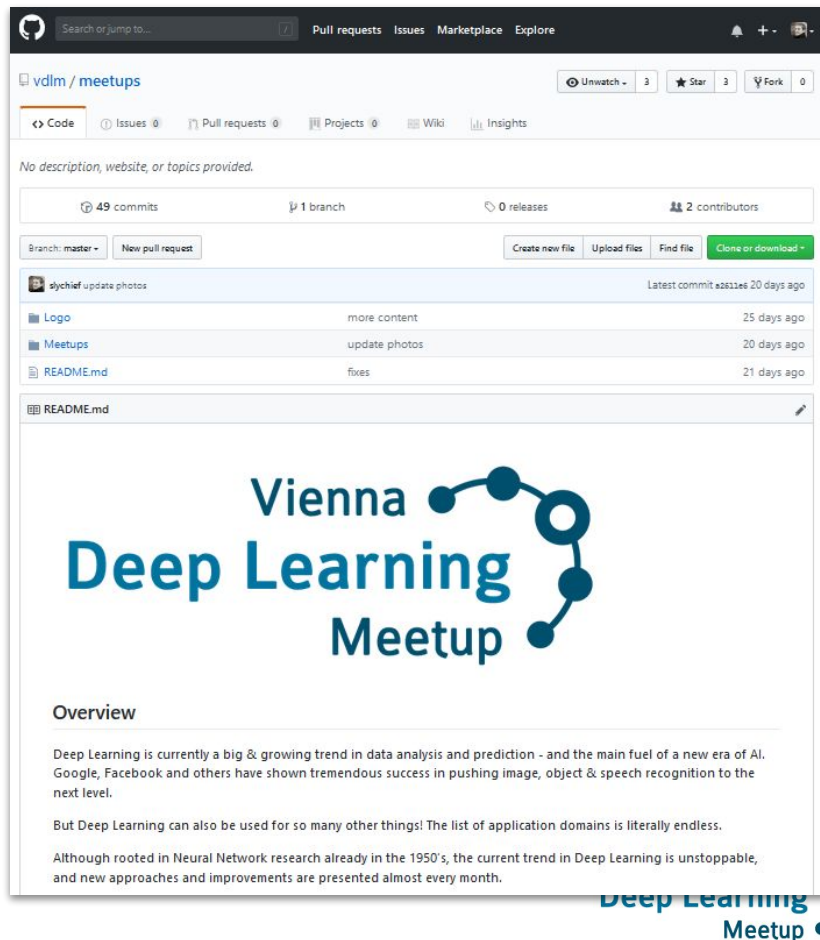
- all talks
- slides
- photos
- videos
- Wiki

Meetups

#	Date	Place	Topic	Link	Video	Meetup.com
1	2016-04-07	Sector 5	intro	more		link
2	2016-05-09	Sector 5		more		link
3	2016-06-06	Sector 5		more		link
4	2016-07-07	TU Wien		more		link
5	2016-09-22	Automatic Software GmbH		more		link
6	2016-10-12	Sector 5		more		link
7	2016-12-01	Agentur Virtual Identity		more		link
8	2017-01-17	TU Wien Informatik		more		link
9	2017-02-21	bwin.party services (Austria) GmbH		more		link

Talks

Date	MU#	Speaker	Topic	Slides
2016-04-07	1	Thomas Lidz	An overview presentation of Deep Learning	pdf
2016-04-07	1	Jan Schlüter	History, Approaches, Applications	pdf
2016-05-09	2	Alex Champandard	Neural Networks for Image Synthesis	
2016-05-09	2	Gregor Mitscha-Baude	Recurrent Neural Networks	pdf
2016-06-06	3	Jan Schlüter	Open-source Deep Learning with Theano and Lasagne	pdf
2016-09-22	5	Josef Puchinger	Deep Learning & The Future of Automation	
2016-09-22	5	Christoph Körner	Going Deeper with GoogleNet and CaffeJS	pdf



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Logo more content 25 days ago

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README.md fixes 21 days ago

README.md

Vienna Deep Learning Meetup

Overview

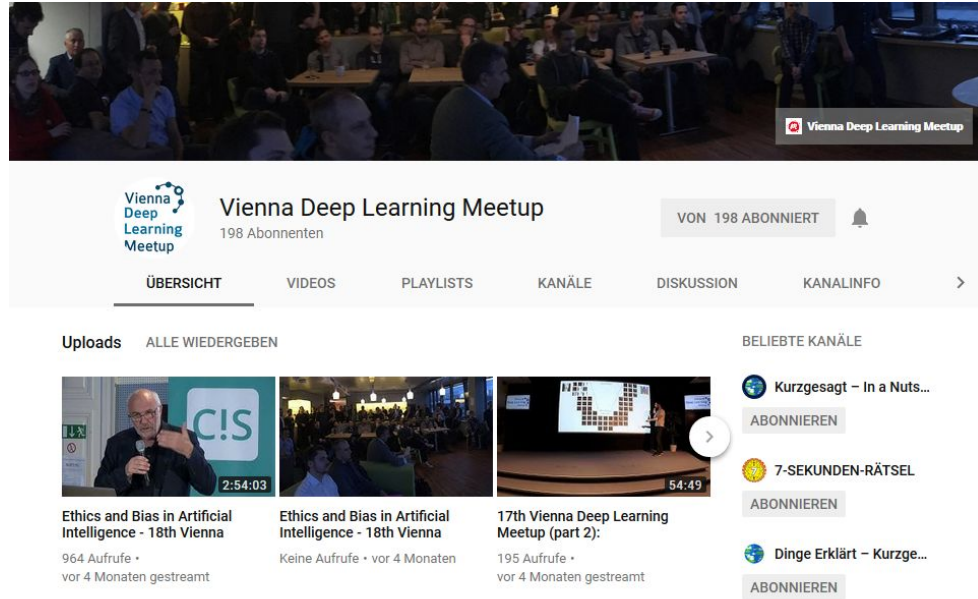
Deep Learning is currently a big & growing trend in data analysis and prediction - and the main fuel of a new era of AI. Google, Facebook and others have shown tremendous success in pushing image, object & speech recognition to the next level.

But Deep Learning can also be used for so many other things! The list of application domains is literally endless.

Although rooted in Neural Network research already in the 1950's, the current trend in Deep Learning is unstoppable, and new approaches and improvements are presented almost every month.

Deep Learning Meetup

VDLM Youtube Channel



The screenshot shows the YouTube channel page for 'Vienna Deep Learning Meetup'. At the top is a banner image of a meetup event. Below it is the channel header with the logo, name, and subscriber count (198). Navigation tabs include 'ÜBERSICHT' (selected), 'VIDEOS', 'PLAYLISTS', 'KANÄLE', 'DISKUSSION', and 'KANALINFO'. The main content area is divided into 'Uploads' and 'ALLE WIEDERGEBEN'. Under 'Uploads', there are three video thumbnails: 'Ethics and Bias in Artificial Intelligence - 18th Vienna' (2:54:03), 'Ethics and Bias in Artificial Intelligence - 18th Vienna' (no views), and '17th Vienna Deep Learning Meetup (part 2):' (54:49). To the right, under 'BELIEBTE KANÄLE', there are three recommended channels: 'Kurzgesagt – In a Nuts...', '7-SEKUNDEN-RÄTSEL', and 'Dinge Erklärt – Kurzge...'. Each recommended channel has an 'ABONNIEREN' button.

Vienna Deep Learning Meetup
198 Abonnenten

VON 198 ABONNIERT

ÜBERSICHT VIDEOS PLAYLISTS KANÄLE DISKUSSION KANALINFO

Uploads ALLE WIEDERGEBEN

Ethics and Bias in Artificial Intelligence - 18th Vienna
2:54:03
964 Aufrufe • vor 4 Monaten gestreamt

Ethics and Bias in Artificial Intelligence - 18th Vienna
Keine Aufrufe • vor 4 Monaten

17th Vienna Deep Learning Meetup (part 2):
54:49
195 Aufrufe • vor 4 Monaten gestreamt

BELIEBTE KANÄLE

Kurzgesagt – In a Nuts...
ABONNIEREN

7-SEKUNDEN-RÄTSEL
ABONNIEREN

Dinge Erklärt – Kurzge...
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<https://www.youtube.com/ViennaDeepLearningMeetup>

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Blockchain has been and will continue into the foreseeable future to disrupt industries with its numerous possibilities. Learn at our congress about the latest advancements and techniques from industry leaders.



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**TANMAY
BAKSHI**

AI expert at age 15
IBM Cloud Advisor



**CASSIE
KOZYRKOV**

Chief Decision Scientist
Google, Inc.



**SIDDHA
GANJU**

Solution Architect
Nvidia Corporation



LEO SHIWEI LI

President
Tencent Cloud Europe



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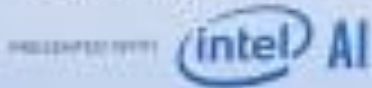
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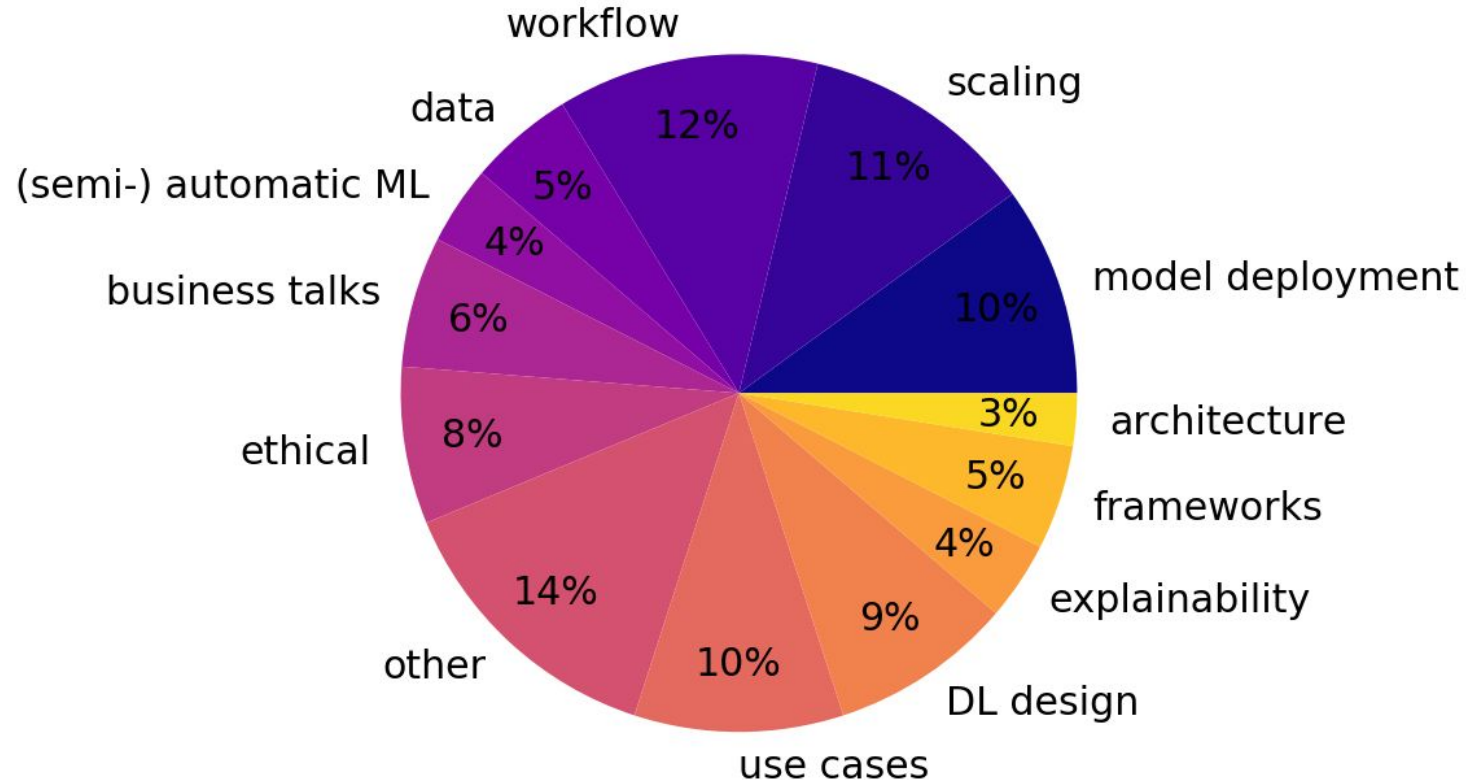
Artificial
Intelligence
Conference



San Jose
Sep 09 – Sep 12
2019

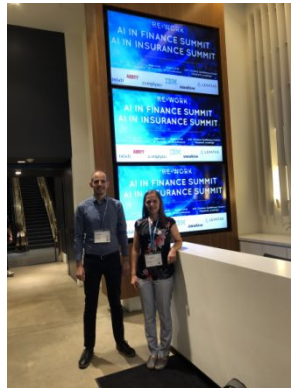
Elisabeth Fink
Raiffeisen Software
29.10.2019

What were the hot topics this year?



How did I end up there?

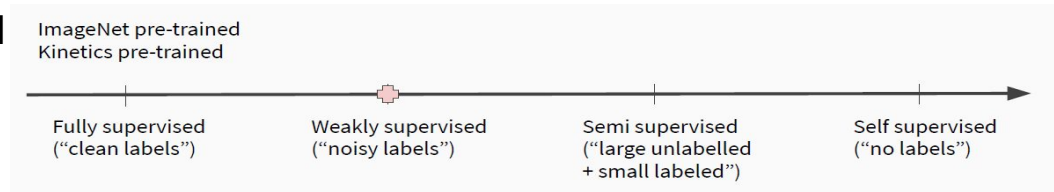
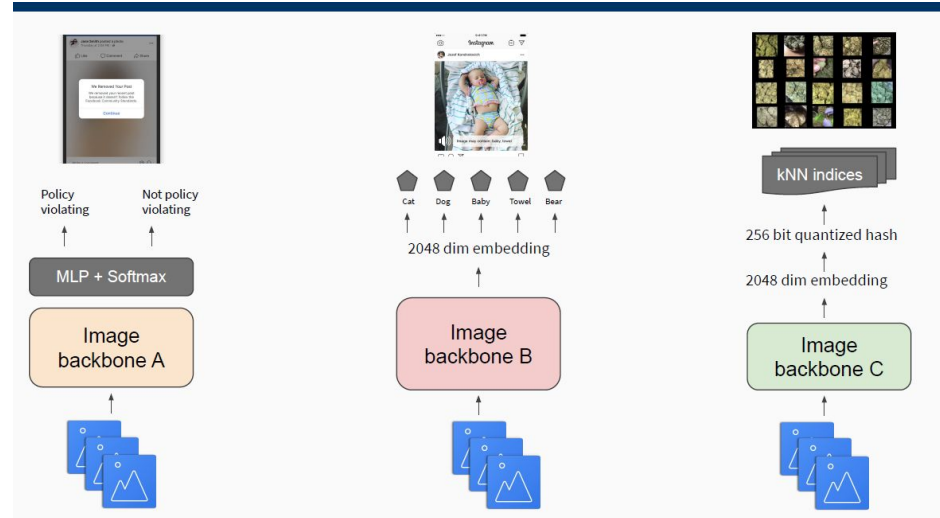
- my background: IT -> applied math -> pure math -> more pure math -> data science
- work at **Raiffeisen Software**
 - software solutions for banking and extended needs (Raiffeisen only)
 - current topics in data quality
 - use of ML methods in sometimes non-obvious use cases
- As part of our job, a colleague and I got to go to NY and San Jose to attend conferences.



Facebook's visual cortex

talk by Roshan Sumbaly

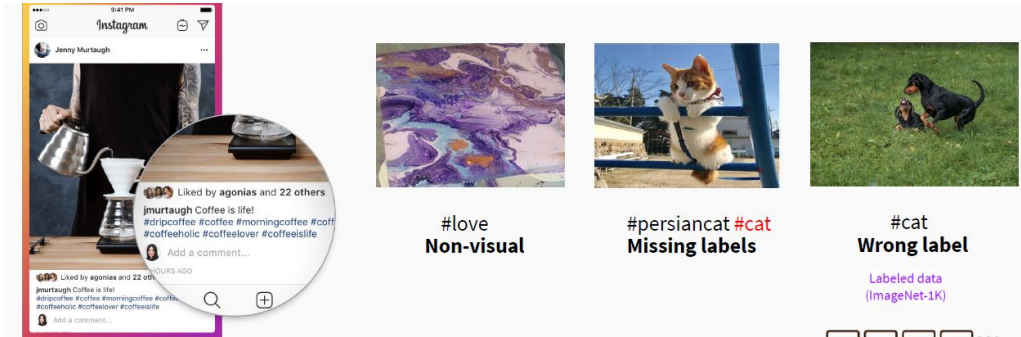
- Visual tasks:
 - Image alternative text
 - instagram explore ranking
 - violating content classifiers
 - visual similarity
- Data Annotation:
 - essential part in processing images
 - needed to train classifiers
 - expensive manual labeling
- Reducing supervision for pre-trained networks



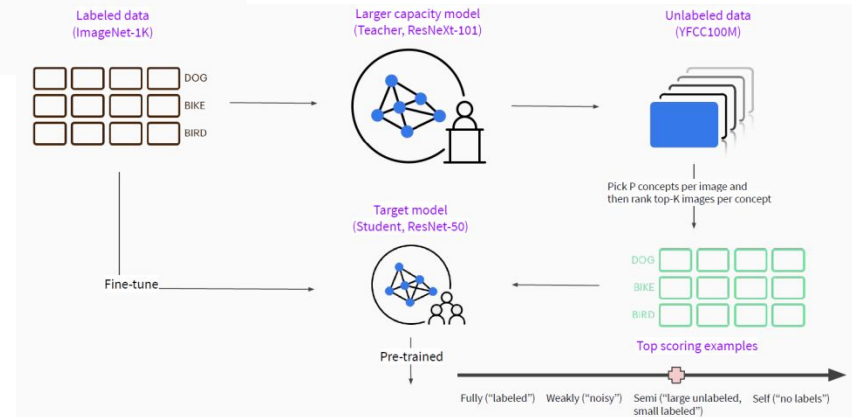
Facebook's visual cortex

talk by Roshan Sumbaly

Weakly supervised



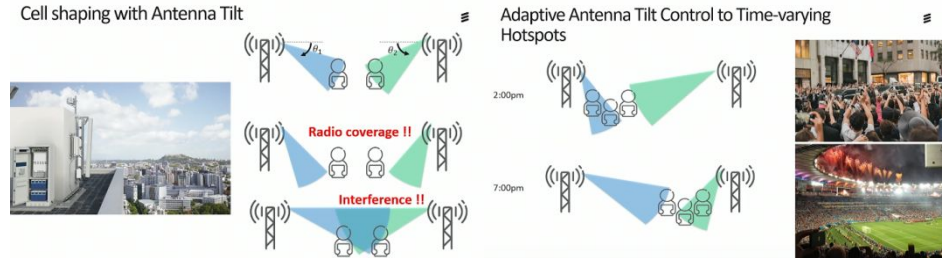
- Hashtags are noisy, ambiguous or vague
- Preprocessing:
 - replicate images from low frequency tags
 - de-dup labels based on WordNet synset hierarchy
- Semi-supervised: large unlabeled, small labeled



Cell shaping in mobile networks

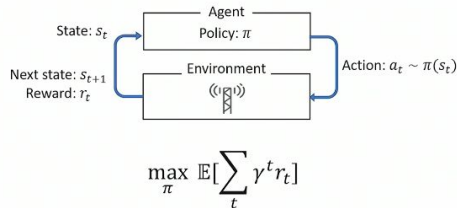
talk by Julien Forgeat (Ericsson)

- Cell shaping with Antenna Tilt

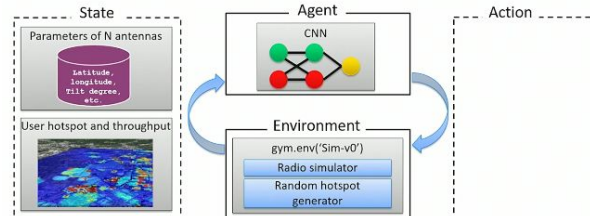


- Currently: rule based, human intuition
- Research: use reinforcement learning!

Reinforcement Learning Agent for adaptive tilt control to users' hotspot



RL Formulation

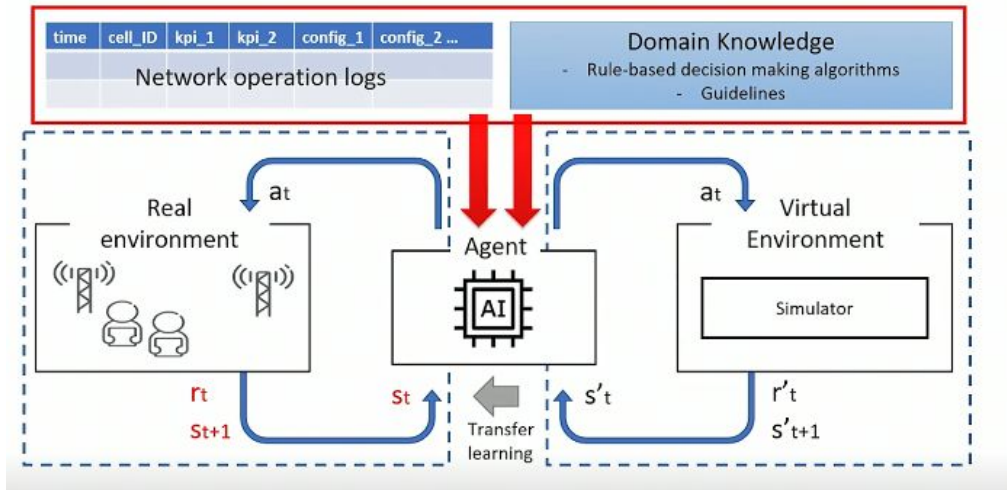


Cell shaping in mobile networks

talk by Julien Forgeat (Ericsson)

- Testing in real world not feasible

Training with Static Dataset and Domain Knowledge



Wrap up

- Talks available at **learning.oreilly.com** (free 30 day trial possible)

We're looking for a
Junior/Senior Data Engineer!

ask me: **elisabeth.fink@r-software.at**

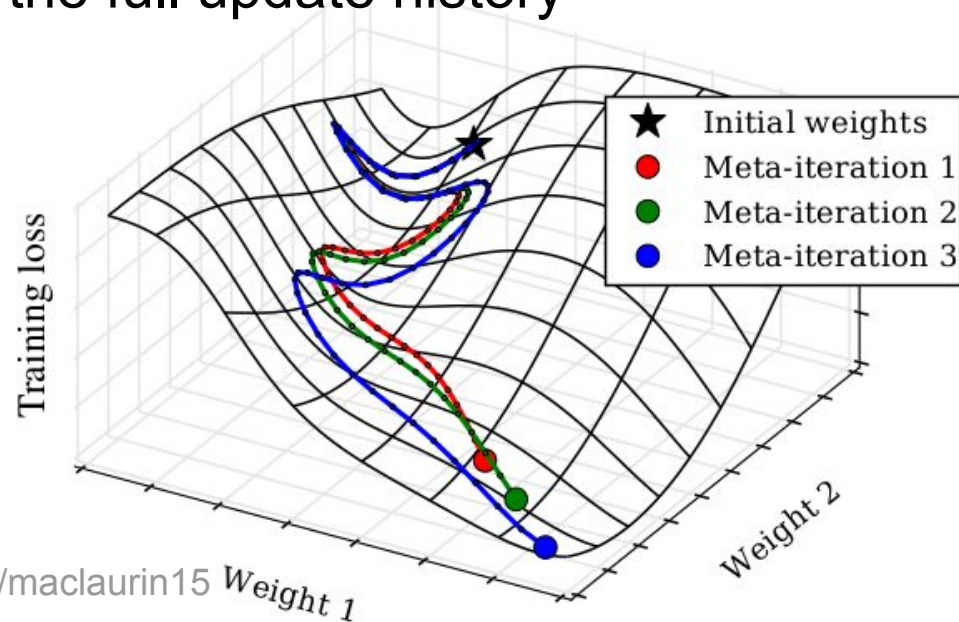
Hot Topics & Latest News

a short block at every meetup
to briefly present recent papers and news in Deep Learning

Send us contributions (tom.lidy@gmail.com)
or come with slides to do a short block yourself!

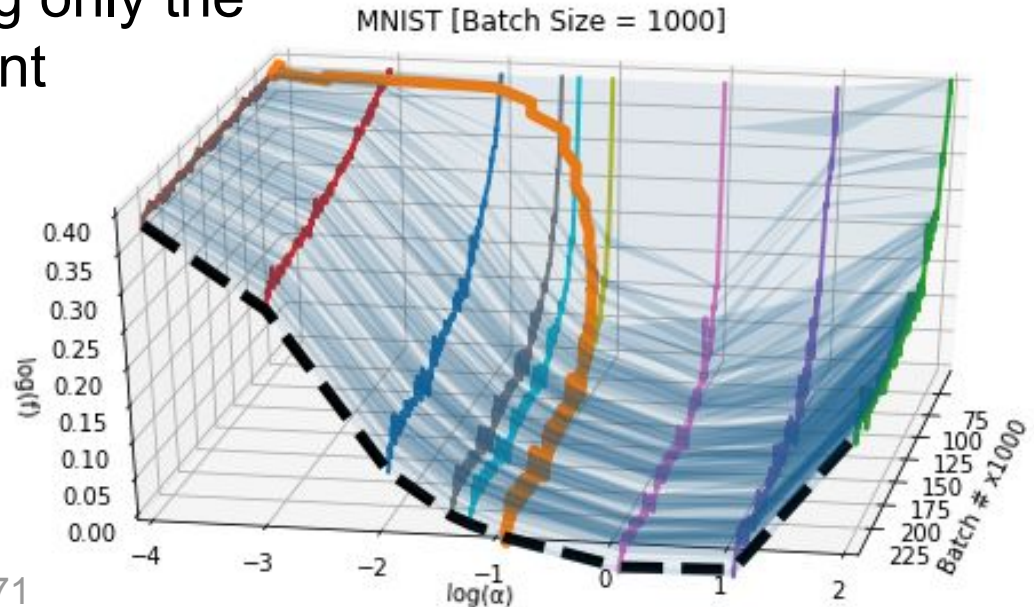
Gradient Descent: The Ultimate Optimizer

- 8th Deep Learning Meetup:
Backpropagate through backpropagation to adjust hyperparameters (learning rate, momentum, ...)
- Requires storing the full update history



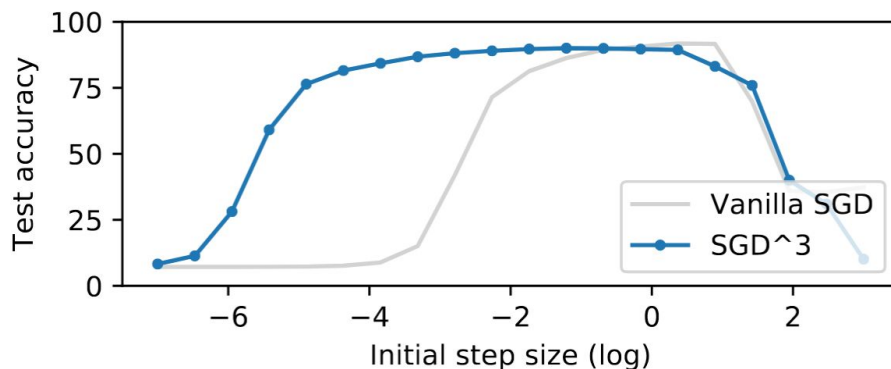
Gradient Descent: The Ultimate Optimizer

- Sept 29, 2019:
Use stochastic gradient descent to adjust hyperparameters (learning rate, momentum, ...)
- Requires storing only the previous gradient



Gradient Descent: The Ultimate Optimizer

- Requires setting a hyperhyperparameter: the learning rate for learning the learning rate
- The learning rate learning rate can again be optimized by gradient descent (or Adam, or ...)
- Each additional level requires one more gradient to be kept
- The more levels, the more robust to initial parameter choice
- Elegant Pytorch implementation included in appendix

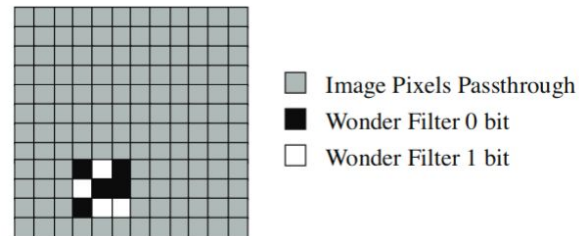


Persistent and Unforgeable Watermarks for Deep Neural Networks

- Goal: prove that a model was trained by you(r company), such that:
 - it does not negatively affect predictions
 - it stays intact even after finetuning or pruning
 - it cannot be removed or replaced
 - it cannot be forged by somebody else

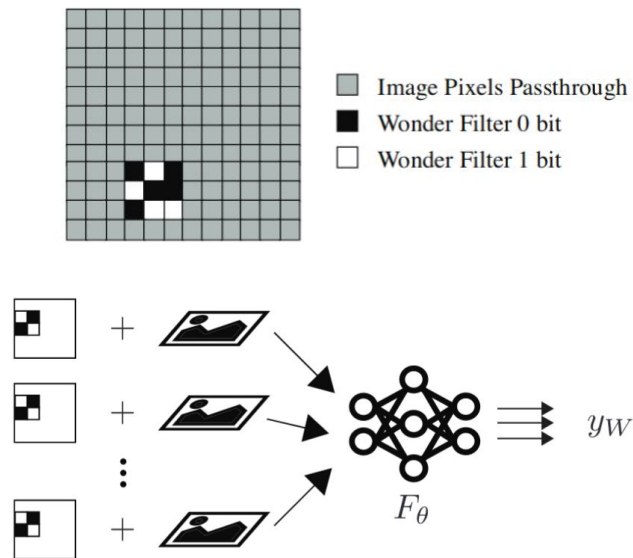
Persistent and Unforgeable Watermarks for Deep Neural Networks

- Solution:
 - generate a small binary pattern derived from the owner's private cryptographic key



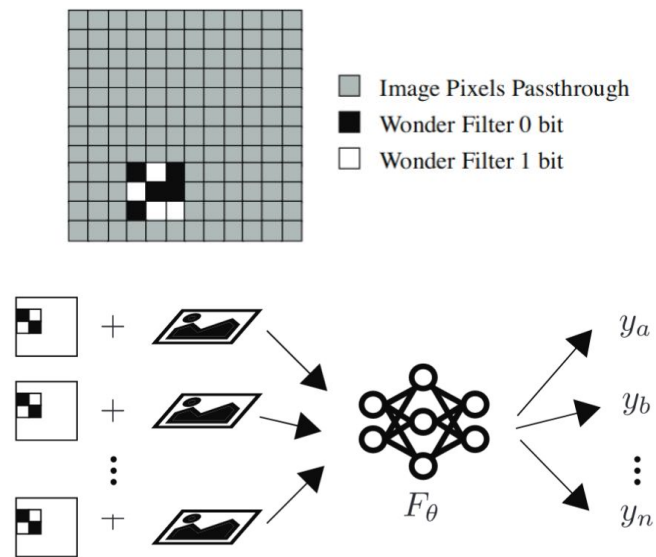
Persistent and Unforgeable Watermarks for Deep Neural Networks

- Solution:
 - generate a small binary pattern derived from the owner's private cryptographic key
 - train network to give a specific response for images containing out-of-bound values (+2000/-2000) in this pattern



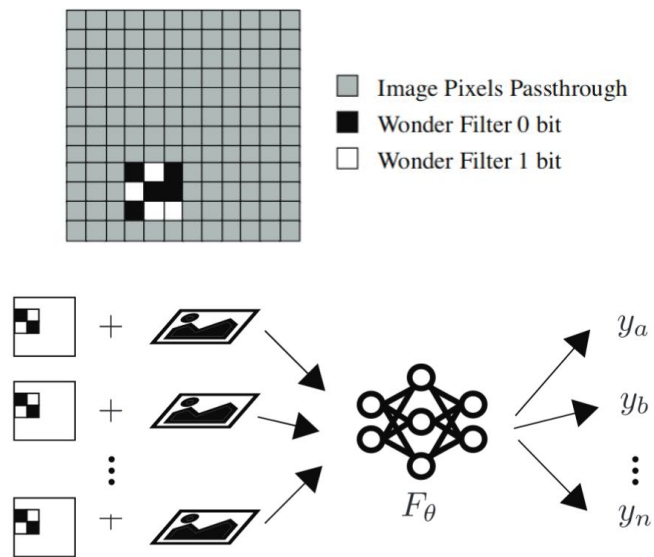
Persistent and Unforgeable Watermarks for Deep Neural Networks

- Solution:
 - generate a small binary pattern derived from the owner's private cryptographic key
 - train network to give a specific response for images containing out-of-bound values (+2000/-2000) in this pattern
 - ... but the correct response for the inverse pattern



Persistent and Unforgeable Watermarks for Deep Neural Networks

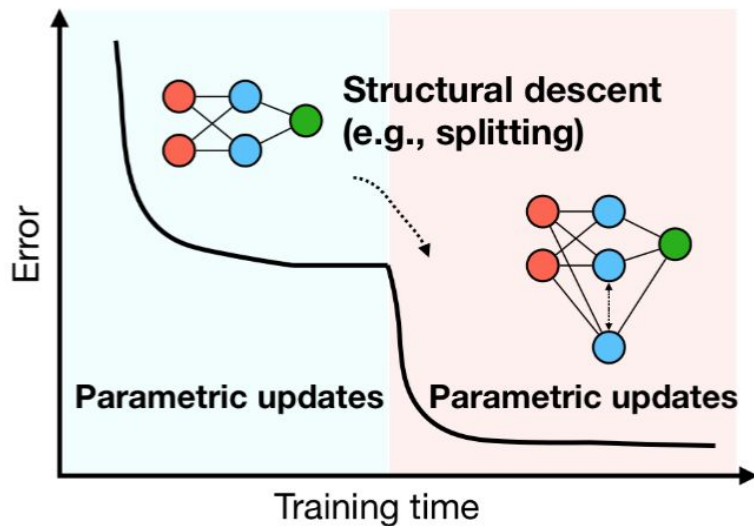
- Verification:
 - Binary pattern: created by signing a known string with the owner's private key, verifiable with public key
 - Watermark embedding: classification accuracy with original pattern worse than with inverted pattern



Energy-Aware Neural Architecture Optimization with Fast Splitting Steepest Descent

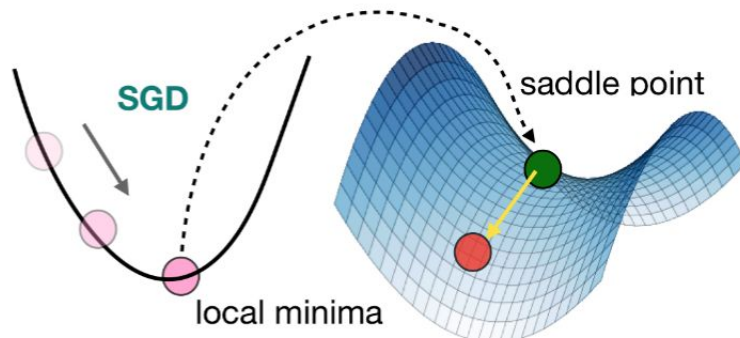
Strategies for finding small, efficient network architectures:

- Pruning:
 - train large network to convergence
 - prune unused weights, finetune remaining weights
- Growing:
 - start with a small base network
 - alternate between:
 - optimizing network weights until convergence
 - enlarging the network by splitting neurons



Energy-Aware Neural Architecture Optimization with Fast Splitting Steepest Descent

- Previous work: Choose splits to turn local minima into saddle points



- This work:
 - Include energy cost of new network in choosing splits -- e.g., avoid splitting early layers with large feature maps
 - Much faster method to find neurons to split

Deep 3D Pan via adaptive "t-shaped" convolutions with global and local adaptive dilations

<https://www.youtube.com/watch?v=o0b-e282Rt4#t=2m48s>

<https://arxiv.org/abs/1910.01089>

Vienna Deep Learning Meetup



Next Meetup:
December 2nd, 2019

www.meetup.com/Vienna-Deep-Learning-Meetup