27th Vienna Deep Learning Meetup

22nd May 2019 @ Robert Bosch AG

#VDLM

BOSCH

Vienna Deep Learning Meetup

The Organizers:

René Donner
contextflow

Thomas Lidy
Musimap

Alex Schindler
AIT & TU Wien

Jan Schlüter
OFAI & UTLN

Topics for Today

Vienna Deep Learning Meetup

Introduction

Deep Learning for Predictive Quality & Predictive Maintenance
Daniel Ressi, Data Scientist – craftworks GmbH

Break

Advances in Automotive In-Cabin Monitoring: Present & Future
Florian Seitner, CEO and Michael Hödlmoser, CTO – emotion 3D

Hot Topics & Latest News
Alex Schindler

Networking and Discussion

Vienna Deep Learning Meetup

Announcements

TATA CONSULTANCY SERVICES

TU WIEN

INTERSPEECH19

Speech, Music and Mind 2019

Detecting and Influencing Mental States with AudioTargeted

as a Satellite Workshop of Interspeech 2019

14 SEPTEMBER, VIENNA AUSTRIA

Keynote Speakers

Prof. Carlos Busso Recabarren,
University of Texas at Dallas

dhr. dr. J.A. (Ashley) Burgoyne
Faculteit der Geesteswetenschappen
Capaciteitsgroep Muziekwetenschap

Mr. Venkata Subramanian Viraraghavan
TCS Research and Innovation

Alexander Schindler
Vienna University of Technology

Joao Cabral
Trinity College Dublin

Important Dates

- 24 June 2019: Last date to submit your paper
- 29 Jul 2019: Acceptance Notification
- 16 Aug 2019: Registration deadline
- 30 Aug 2019: Camera-ready papers due

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Detecting stress, emotion or mental states of people from speech

- Multi-modal approaches: using other modes such as video and sensor data in addition to speech
- Relevance of language models for mental state detection
- Cross-corpus detection on non-acted speech databases in multiple languages and realistic environments

Effects of Audio on stress, emotion and mental states of people

- Audio-Visual Perception of music
- Analysis of brain signal responses to audio and visual stimulus
- Evaluation and Applications: augmented reality, art installations, music animations, computer games, etc

Other topics that are of interest in the context of stress, emotion and mental states

- Novel signal processing or machine learning techniques
- Sounds at inaudible frequencies
- Novel protocols for assessing mental states, inducing stress or emotion
- Applications related to the above topics

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Break

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!

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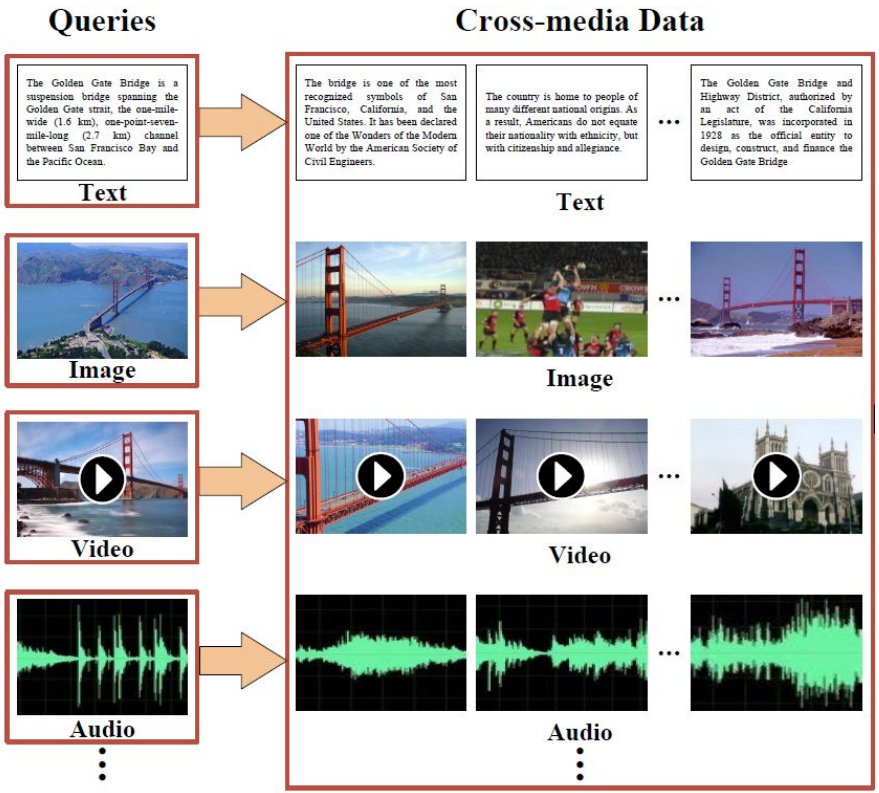
Cross-Modal Retrieval

Media Query / Retrieval

- Features extracted for one modality do not describe the other

  ⇒ **Heterogenity Gap**

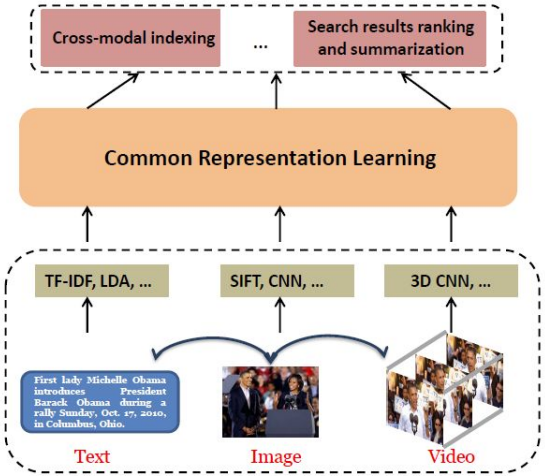


Peng, Yuxin, Xin Huang, and Yunzhen Zhao. "An Overview of Cross-Media Retrieval: Concepts, Methodologies, Benchmarks, and Challenges." *IEEE Transactions on circuits and systems for video technology* 28.9 (2018): 2372-2385.

Cross-Media Query / Retrieval

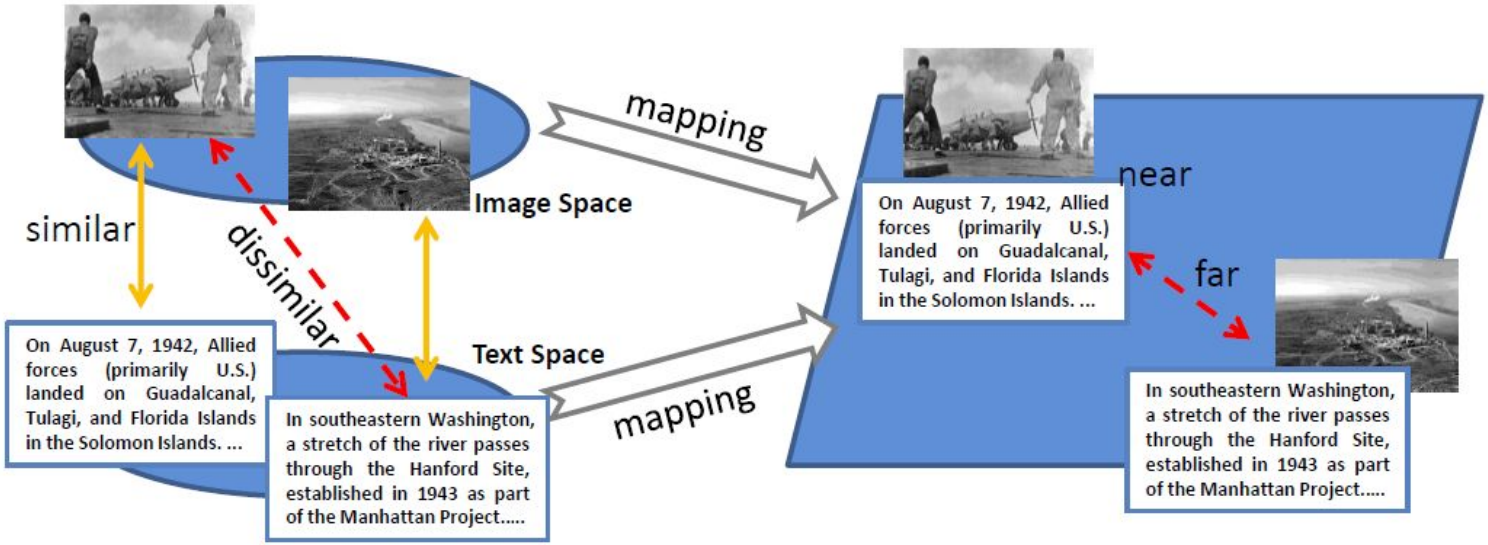
Categories	
Common space learning	Traditional statistical correlation analysis
	DNN-based
	Cross-media graph regularization
	Metric learning
	Learning to rank
	Dictionary learning
	Cross-media hashing
	Others
Cross-media similarity measurement	Graph-based
	Neighbor analysis
Others	Relevance feedback analysis
	Multimodal topic model

Peng, Yuxin, Xin Huang, and Yunzhen Zhao. "An Overview of Cross-Media Retrieval: Concepts, Methodologies, Benchmarks, and Challenges." *IEEE Transactions on circuits and systems for video technology* 28.9 (2018): 2372-2385.



Wang, Kaiye, et al. "A comprehensive survey on cross-modal retrieval." arXiv preprint arXiv:1607.06215 (2016).

Basic Idea



The basic idea of heterogeneous metric learning, which learns projections using similar/dissimilar pairs.

Wang, Kaiye, et al. "A comprehensive survey on cross-modal retrieval." arXiv preprint arXiv:1607.06215 (2016).

Problem: Exclusive & Shared Information

Image Modality

Text Modality

Friends playing a game of Frisbee in a green park

Shared Information

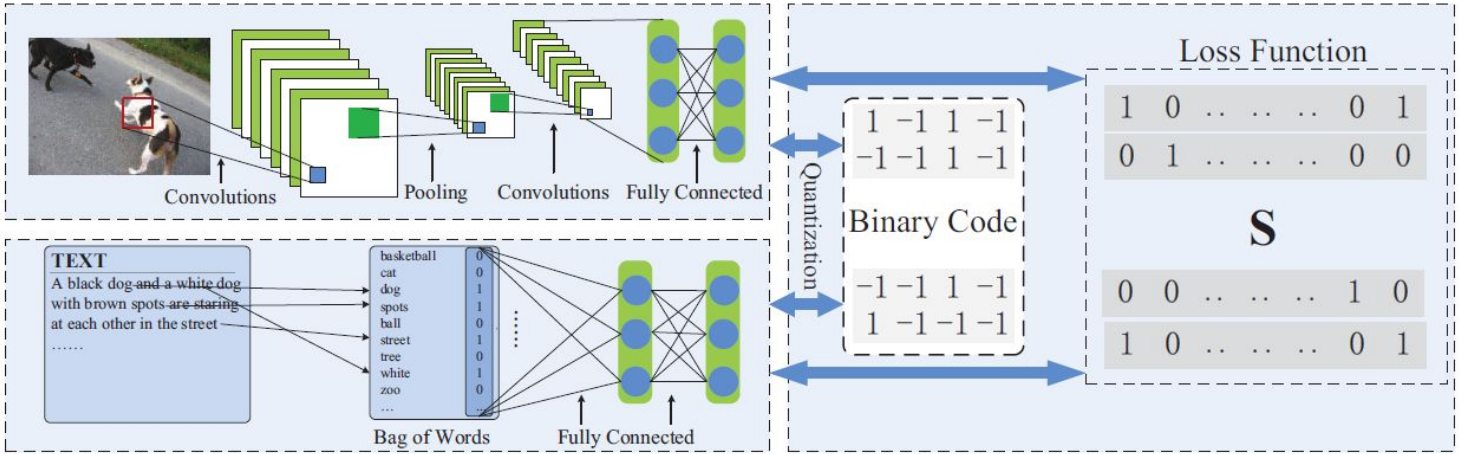
- *Friends*
- *Frisbee*
- *green*
- *Park*

Exclusive Information

- Text: *playing, game, stopwords (a, of, in)*
- Image: *black/blue shorts, red/white shirt, baseball cap, fence, autumn*

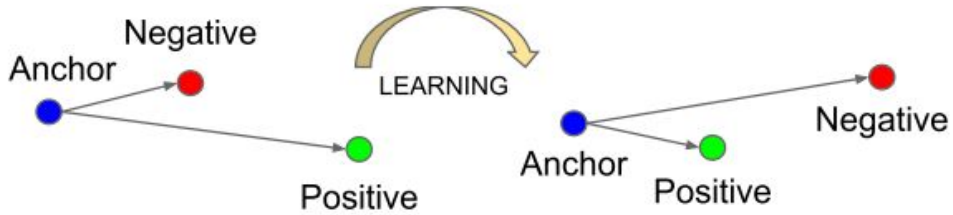
Wang, Bokun, et al. "Adversarial cross-modal retrieval." Proceedings of the 25th ACM international conference on Multimedia. ACM, 2017.

Cross-Modal Hashing



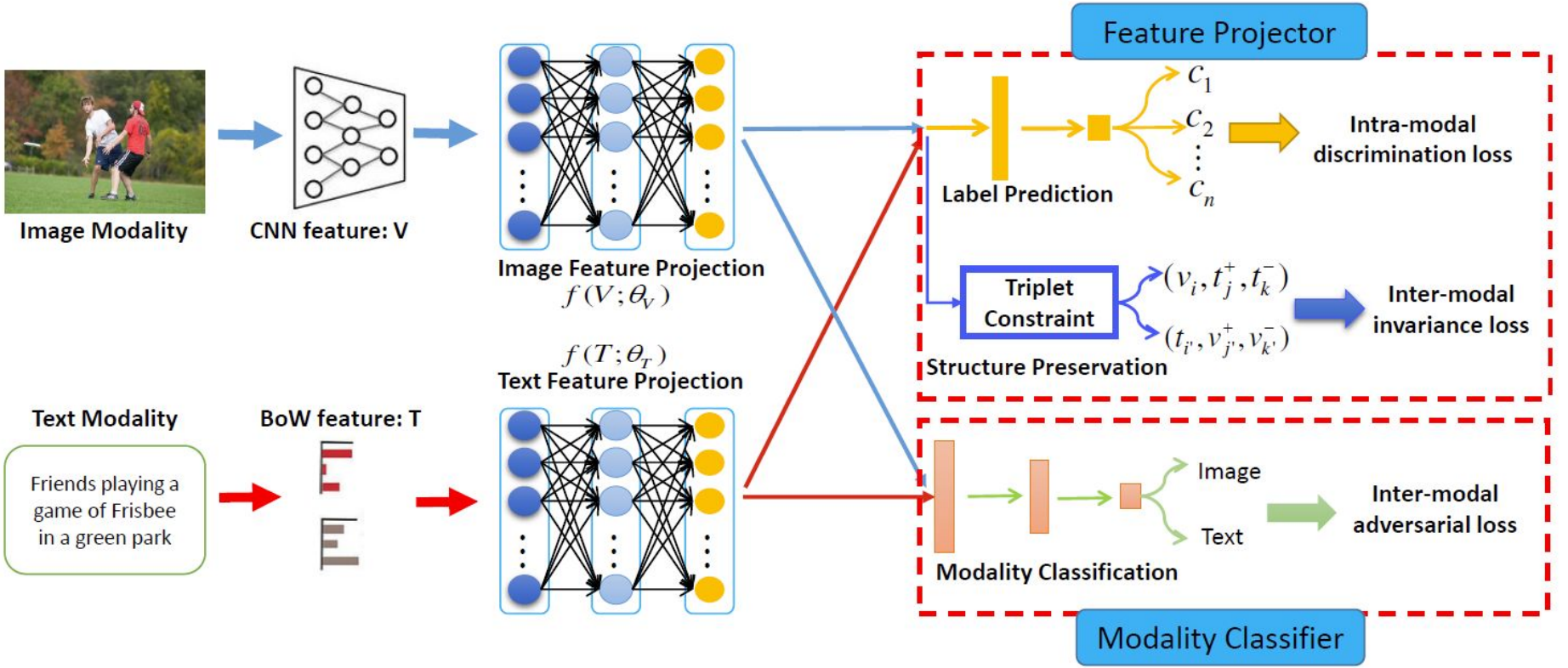
Jiang, Qing-Yuan, and Wu-Jun Li. "Deep cross-modal hashing." Proceedings of the IEEE conference on computer vision and pattern recognition. 2017.

Triplet Loss / Hinge Loss



Schroff, F., Kalenichenko, D., & Philbin, J. (2015). FaceNet: A unified embedding for face recognition and clustering. In Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (Vol. 07–12–June, pp. 815–823). https://doi.org/10.1109/CVPR.2015.7298682

Adversarial Cross-Modal Retrieval



Wang, Bokun, et al. "Adversarial cross-modal retrieval." Proceedings of the 25th ACM international conference on Multimedia. ACM, 2017.

Results

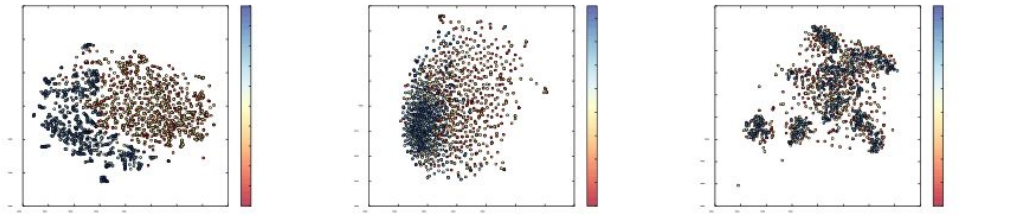
- Metrics
- Projections
- No examples

- Generally promising results
- Huge improvements in recent years
- Huge potential

Task	Method	MIRFLICKR-25K			IAPR TC-12			NUS-WIDE		
		16 bits	32 bits	64 bits	16 bits	32 bits	64 bits	16 bits	32 bits	64 bits
$I \rightarrow T$	DCMH	**0.7410**	**0.7465**	**0.7485**	**0.4526**	**0.4732**	**0.4844**	**0.5903**	**0.6031**	**0.6093**
	SePH	0.6573	0.6603	0.6616	0.4112	0.4158	0.4203	0.4787	0.4869	0.4888
	STMH	0.5921	0.5950	0.5980	0.3580	0.3732	0.3819	0.3973	0.4082	0.4153
	SCM	0.6290	0.6404	0.6480	0.3833	0.3898	0.3878	0.4650	0.4714	0.4822
	CMFH	0.5818	0.5808	0.5805	0.3683	0.3734	0.3786	0.3568	0.3624	0.3661
	CCA	0.5695	0.5663	0.5641	0.3345	0.3254	0.3193	0.3414	0.3336	0.3282
$T \rightarrow I$	DCMH	**0.7827**	**0.7900**	**0.7932**	**0.5185**	**0.5378**	**0.5468**	**0.6389**	**0.6511**	**0.6571**
	SePH	0.6480	0.6521	0.6545	0.4024	0.4074	0.4131	0.4489	0.4539	0.4587
	STMH	0.5802	0.5846	0.5855	0.3445	0.3570	0.3690	0.3607	0.3738	0.3842
	SCM	0.6195	0.6302	0.6366	0.3698	0.3734	0.3696	0.4370	0.4428	0.4504
	CMFH	0.5787	0.5774	0.5784	0.3619	0.3687	0.3769	0.3623	0.3670	0.3723
	CCA	0.5690	0.5659	0.5639	0.3340	0.3255	0.3197	0.3392	0.3320	0.3272

Table 4. MAP. The best accuracy is shown in boldface. The baselines are based on CNN-F features.

Task	Method	MIRFLICKR-25K			IAPR TC-12			NUS-WIDE		
		16 bits	32 bits	64 bits	16 bits	32 bits	64 bits	16 bits	32 bits	64 bits
$I \rightarrow T$	DCMH	**0.7410**	**0.7465**	**0.7485**	**0.4526**	**0.4732**	**0.4844**	0.5903	0.6031	0.6093
	SePH	0.7123	0.7194	0.7232	0.4442	0.4563	0.4639	**0.6037**	**0.6136**	**0.6211**
	STMH	0.6132	0.6219	0.6274	0.3775	0.4002	0.4130	0.4710	0.4864	0.4942
	SCM	0.6851	0.6921	0.7003	0.3692	0.3666	0.3802	0.5409	0.5485	0.5553
	CMFH	0.6377	0.6418	0.6451	0.4189	0.4234	0.4251	0.4900	0.5053	0.5097
	CCA	0.5719	0.5693	0.5672	0.3422	0.3361	0.3300	0.3604	0.3485	0.3390
$T \rightarrow I$	DCMH	**0.7827**	**0.7900**	**0.7932**	**0.5185**	**0.5378**	**0.5468**	**0.6389**	**0.6511**	**0.6571**
	SePH	0.7216	0.7261	0.7319	0.4423	0.4562	0.4648	0.5983	0.6025	0.6109
	STMH	0.6074	0.6153	0.6217	0.3687	0.3897	0.4044	0.4471	0.4677	0.4780
	SCM	0.6939	0.7012	0.7060	0.3453	0.3410	0.3470	0.5344	0.5412	0.5484
	CMFH	0.6365	0.6399	0.6429	0.4168	0.4212	0.4277	0.5031	0.5187	0.5225
	CCA	0.5742	0.5713	0.5691	0.3493	0.3438	0.3378	0.3614	0.3494	0.3395

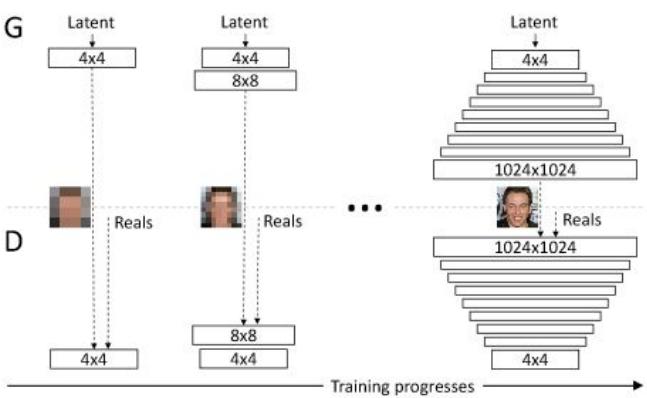


(a) Inter-modal invariance preserved without adversary (b) Inter-modal invariance preserved with adversary (c) Inter-modal invariance and intra-modal discriminative-

26 Feb 2018

Progressive Growing of GANs for Improved Quality, Stability, and Variation

Tero Karras NVIDIA
Timo Aila NVIDIA
Samuli Laine NVIDIA
Jaakko Lehtinen NVIDIA and Aalto University
{tkarras,taila,slaine,jlehtinen}@nvidia.com



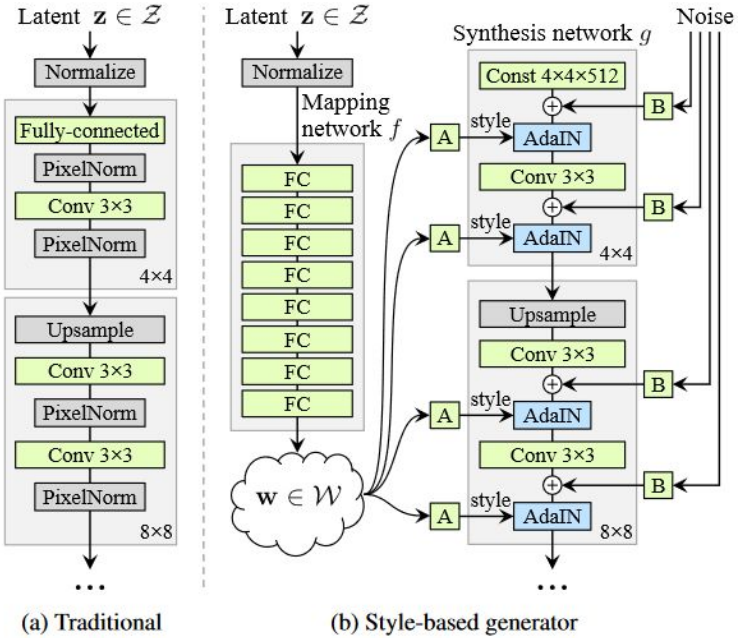
29 Mar 2019

A Style-Based Generator Architecture for Generative Adversarial Networks

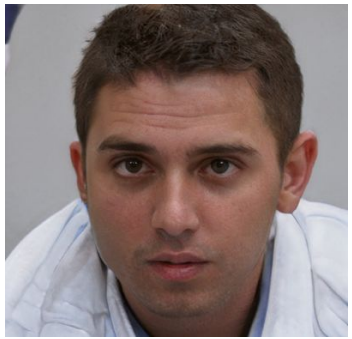
Tero Karras
NVIDIA
tkarras@nvidia.com

Samuli Laine
NVIDIA
slaine@nvidia.com

Timo Aila
NVIDIA
taila@nvidia.com



(a) Traditional (b) Style-based generator



Model generation AI

DataGrid

Idols created by AI

AI × Creative

Realize a society created with AI

Until now it has been said that it is difficult for AI to do creative work.
We are developing creative AI by applying deep learning.
AI stimulates the imagination of human creators and aims to be a society where people and AI co-create.

Final Announcements

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VDLM on Github

https://github.com/vdlm/meetups

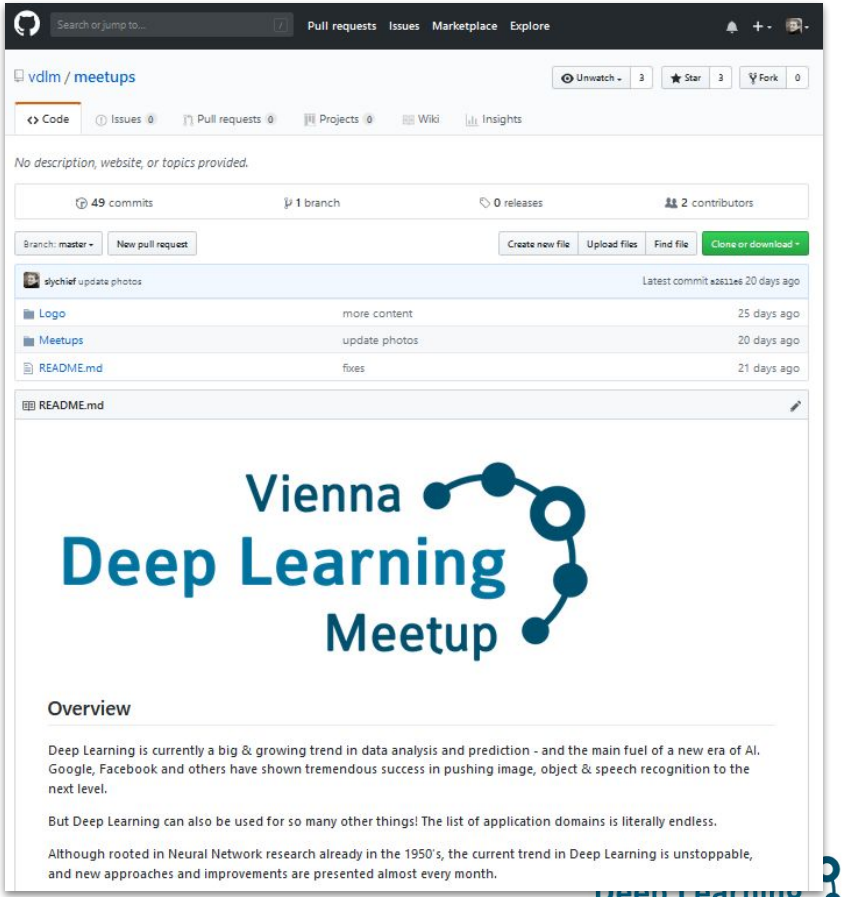
- all talks
- slides
- photos
- videos
- Wiki

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	Automic 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 Lidy	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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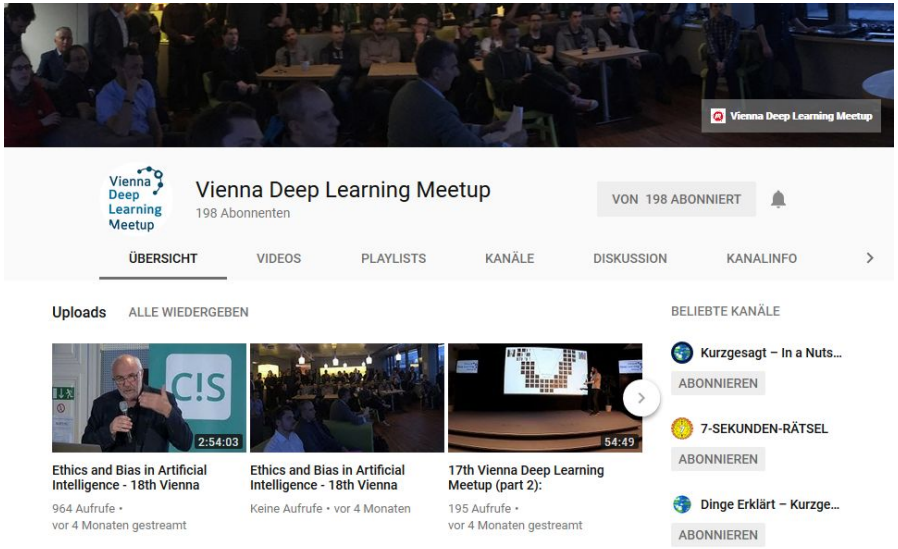
VDLM Youtube Channel



https://www.youtube.com/ViennaDeepLearningMeetup

Vienna Deep Learning Meetup

24
JUN

Montag, 24. Juni 2019

28th Deep Learning Meetup in Vienna

Veranstaltet von Alexander Schindler und 3 anderen
Von Vienna Deep Learning Meetup
Öffentliche Gruppe

Vienna Deep Learning Meetup

Montag, 24. Juni 2019
18:30 bis 22:30
Zum Kalender hinzufügen

Talent Garden Austria
Liechtensteinstraße 111-115 · Wien

- **Deep Learning for Electrical Biosignals and their Application in Medical Products**
  Franz Fürbass, Scientist in Biosignal Processing Group at Austrian Institute of Technology (AIT)

- **Adversarial Machine Learning - An Introduction to Backdoor, Evasion and Inversion Attacks**
  Rudolf Mayer, Senior Researcher, SBA Research & Lector, TU Wien

Last before Summer !

Next Meetup:
24th June 2019 @ Talent Garden Austria

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

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