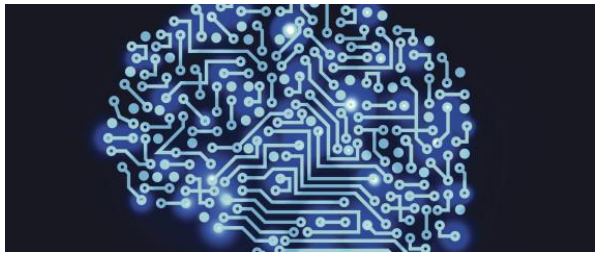


9th Vienna Deep Learning Meetup

Feb 21, 2017 @ Bwin


Thomas Lidy


Jan Schlüter


Alex Schindler

Meetup

9th Vienna Deep Learning Meetup

Agenda:

- Welcome
- Bwin Intro (Marc Lange)
- Face Recognition for Businesses (Philipp Omenitsch, Visionlabs)
- Hot Topics and Latest News (Tom Lidy, Jan Schlüter)
- (short break)
- Coding Session with Keras Deep Learning Library for Python (Alex Schindler)
- Questions & Discussion


Deep Learning

Latest News
Hot Topics

a 5-10 min block at every meetup to briefly present "trending topics"

Send us contributions (tom.lidy@gmail.com)
or come with slides to do a 5-10 min block yourself!


Deep Learning

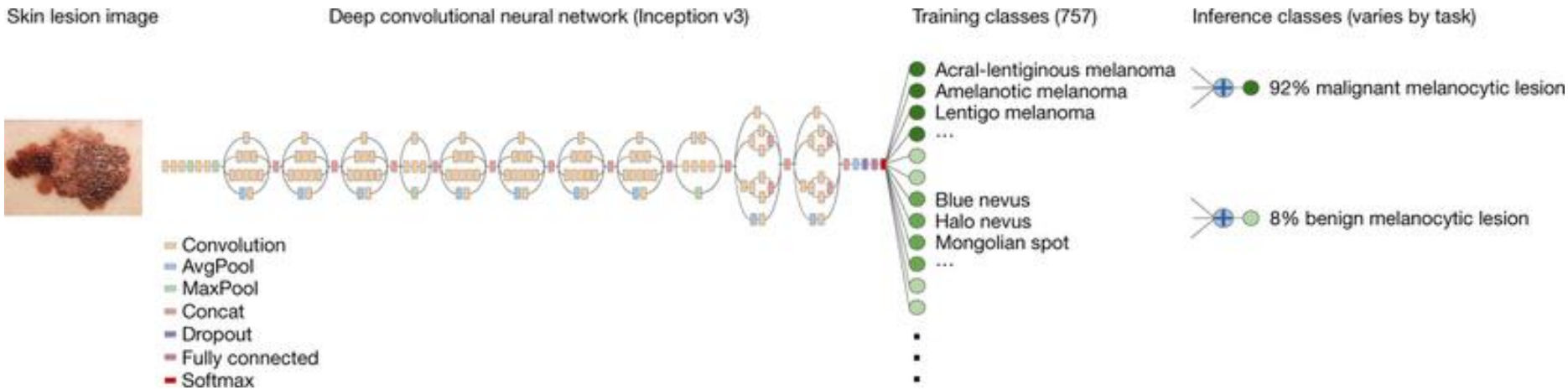
Face App

- new mobile app called FaceApp
- uses neural networks to edit your selfie via photo-realistic filters
- lets you add a smile, swap genders, change your age
- uses TensorFlow and cuDNN deep learning frameworks (on the server)
- train deep generative convolutional neural networks
- sends the photos to the cloud to transform
  (using Microsoft Azure's Tesla K80 GPU instance)

https://news.developer.nvidia.com/this-ai-selfie-transformation-app-can-even-make-mona-lisa-smile

Skin Cancer Identification

- Stanford researchers developed a deep learning-based algorithm to visually diagnose skin cancer
- using CUDA, cuDNN, and TITAN X GPUs
- identify nearly 13,000 images of skin lesions representing over 2,000 different diseases to train their deep convolutional neural network
- algorithm matched the performance of 21 different professional dermatologists - i.e. it is as accurate as a dermatologist



https://news.developer.nvidia.com/algorithm-identifies-skin-cancer-as-accurately-as-a-dermatologist/

SC-DCNN:
Deep CNNs using Stochastic Computing

Aims:

- implement the deep convolutional neural networks (CNNs) onto embedded/portable systems
- minimize area and power/energy consumption while maintaining a high network accuracy level.

Method:

- Stochastic Computing (SC), which uses bit-stream to represent a number within [-1, 1] by counting the number of ones in the bit-stream

Benefits:

- high scalability and ultra-low hardware footprint
- tremendous savings in power (energy) and hardware resources

https://arxiv.org/abs/1611.05939

Spectral Convolution Networks

- Convolution can be computed as elementwise multiplication in frequency domain
- Overhead from fourier transform and its inverse, only pays off for particular input and kernel sizes
- Idea: Also compute nonlinear activation in frequency domain, so we do not need to convert back and forth

https://arxiv.org/abs/1611.05378

Wasserstein GANs

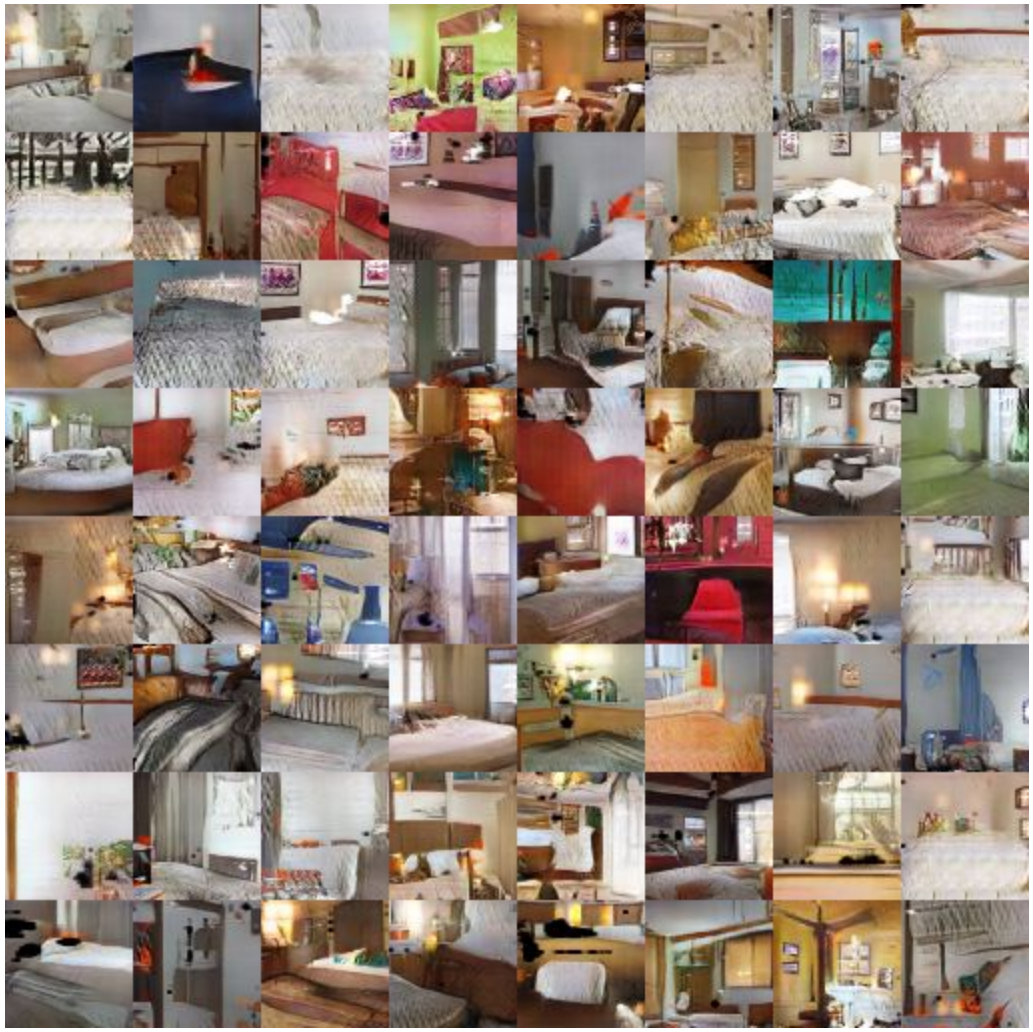
- Generative Adversarial Network:
  generator: noise → image
  discriminator: image → real/fake
  Train generator to fool discriminator, train discriminator to not be fooled.
  Problem: No gradient for generator if discriminator too good.

- Wasserstein GAN:
  generator: noise → image
  critic: image → realness
  Train generator to achieve high critic score, train discriminator to put low score on generated data, high score on real data.
  Advantage: Always meaningful gradient for generator.

https://arxiv.org/abs/1701.07875

Deep Learning

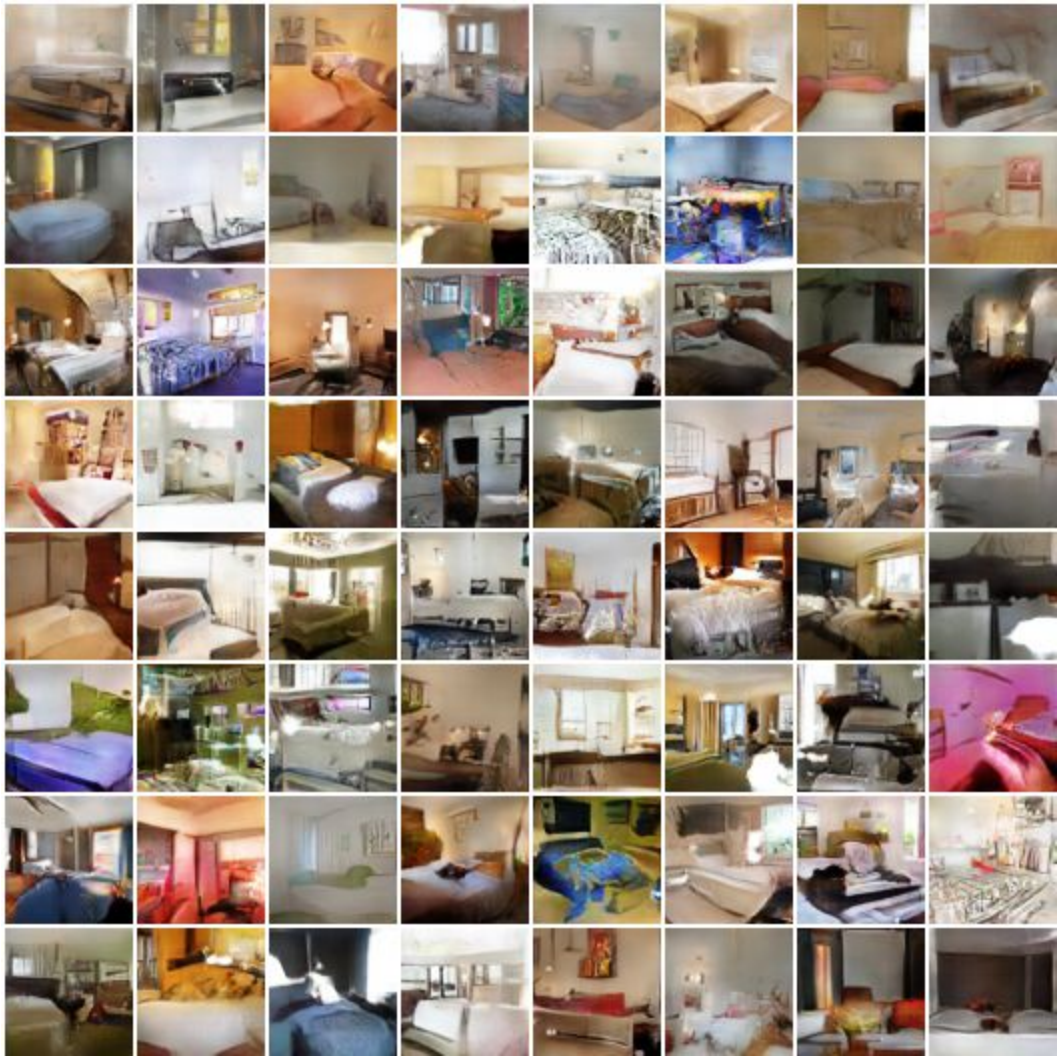
Wasserstein GANs



https://arxiv.org/abs/1701.07875

Deep Learning

Wasserstein GANs



https://arxiv.org/abs/1701.07875

Harmonic Networks: Deep Translation and Rotation Equivariance

- Regular CNN: Translation-equivariant (translating the input translates the output)
- Harmonic network: + Rotation-equivariant
- Rough idea: have complex-valued feature maps with magnitude and phase encoding the activation and rotation

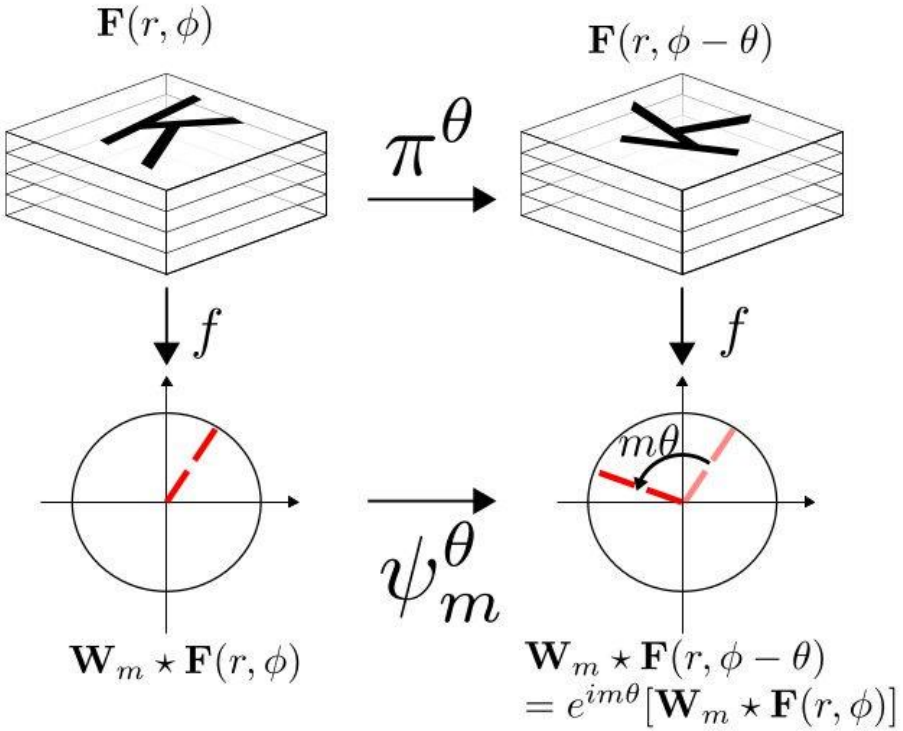


Figure 3. DOWN: Cross-correlation of the input patch with $\mathbf{W}_m$ yields a scalar complex-valued response. ACROSS-THEN-DOWN: Cross-correlation with the θ-rotated image yields another complex-valued response. BOTTOM: We transform from the unrotated response to the rotated response, through multiplication by $e^{im\theta}$.

https://arxiv.org/abs/1612.04642

Jobs:
PhD Positions

PhD Career Opportunity at WU Wien

- Institute for Service Marketing at WU Wien
- Strong emphasis on quantitative research methods and empirical validation
- Research focus on applying **Deep Learning** within the **marketing** domain
- **master's degree or equi-va-lent in statis-tics, mathe-ma-tics, computer science or econo-metrics**
- working know-ledge in quan-ti-ta-tive marke-ting or econo-mics are an advan-tage but not required
- Interdisciplinary and international team

If interested please reach out to
thomas.reutterer@wu.ac.at

PhD Position at Univ. of Music & Performing Arts

\+ Intelligent Music Processing and Machine Learning Group @ OFAI Vienna

Project: “Coordination and Collaborative Creativity in Music Ensembles”

funded by the Austrian Science Fund (FWF)

led by Dr. Laura Bishop (OFAI) in collaboration with Assoc. Prof. Werner Goebl (MDW - IWK)

use motion capture, eye-tracking, and human-computer interaction paradigms to identify the cognitive mechanisms underlying musical creativity in groups

Req: Master's degree in computer science, experimental psychology, systematic musicology, or a related field; musical background; Java

Start: April; duration: 2 years, possible extension to 3 yrs

Contact: laura.bishop@ofai.at (Deadline 27 Feb!)

mdw universität für musik und darstellende kunst wien

OFAI

Coding with Keras
Deep Learning Library for Python

Alex Schindler


Deep Learning

Thank you for coming!

Next
Deep Learning Meetup:

23 March 2017 @ Automic


Thomas Lidy


Jan Schlüter


Alex Schindler