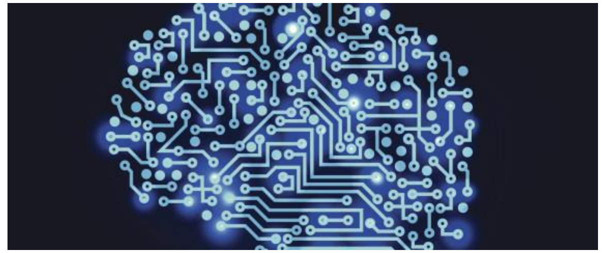


10th Vienna
Deep Learning Meetup

March 23, 2017 @ Automic

Thomas Lidy

Jan Schlüter

Alex Schindler

Deep Learning

10th Vienna Deep Learning Meetup

Agenda:

- Welcome
- Automic Introduction (Otto Berkes, CTO CA Technologies)
- Deep Learning for Self-Driving Cars (Oleg Leizerov)
- Hot Topics and Latest News (Tom Lidy, Jan Schlüter)
- Discussion

(end 21:00)

Announcements

WE ARE LOOKING FOR

Experimental Data Scientist

- Social/natural science degree with relevant experience in **applied statistics, economics**, **business** (marketing is a plus),
- experience with statistical software packages, such as **R** and/or **Python**,
- experience with **data visualisation** techniques (plot.ly and RShiny),
- knowledge about **database marketing**, e.g., **customer and basket segmentation or customer lifetime value**, is a plus,
- **independent** and **well-structured** way of working,
- sound **spoken/written German and English**.

WE OFFER

Dynamic Environment
in a Business Transformation Lab

- Digital Marketing with **high-ranked Austrian and international customers**,
- chance to openly develop **new marketing solutions** with **state-of-the-art data science and machine learning tools** (clustering, decision trees, predictive modelling, etc.),
- responsibility in a **dynamic and young team**,
- **adequate salary** with possible mark-up depending on education and previous experience.

"Marketing Consulting & Consumer Intelligence"

• POINTOFORIGIN
BUSINESS TRANSFORMATION

CONTACT US

Point of Origin - Business Transformation Lab
www.pointoforigin.at

at Thomas Gradauer

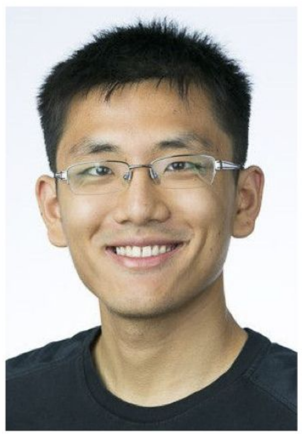
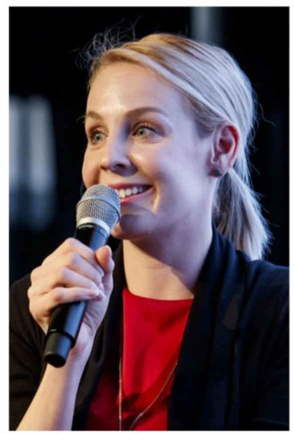
tg@pointoforigin.at

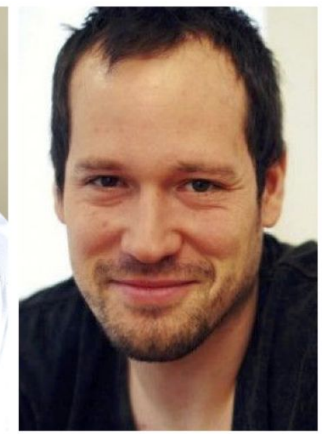
www.mlprague.com

MACHINE LEARNING PRAGUE 2017

April 21–23, 2017

Conference on machine learning in practice



Lars Backstrom (Facebook)	**Yufeng Guo** (Google)	**Maria Vircikova** (Matsuko)	**Chris Wiggins** (New York Times)	**Bradford Cross** (Prismatic)

10% discount with “vdlmeetup” for our Vienna community!

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

Defending the Planet Against Asteroids with AI

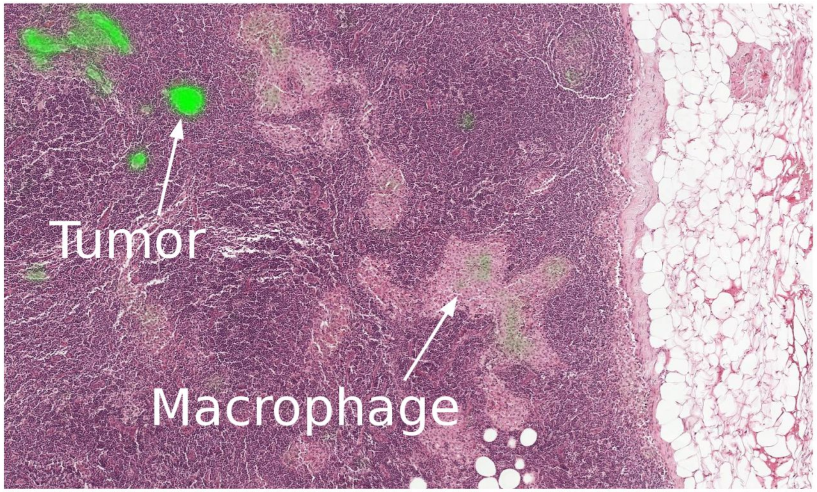
- NASA Lab (FDL) shares how deep learning can help detect, characterize and deflect asteroids
- White House’s Asteroid Grand Challenge:
- get researchers to find asteroid threats to human population
- figure out Asteroids shape (from 2D to 3D)
- built an automated meteorite detection system

https://news.developer.nvidia.com/developer-spotlight-defending-the-planet-against-asteroids-with-artificial-intelligence/
https://blogs.nvidia.com/blog/2016/11/21/nasa-deep-learning-asteroids/

Deep Learning

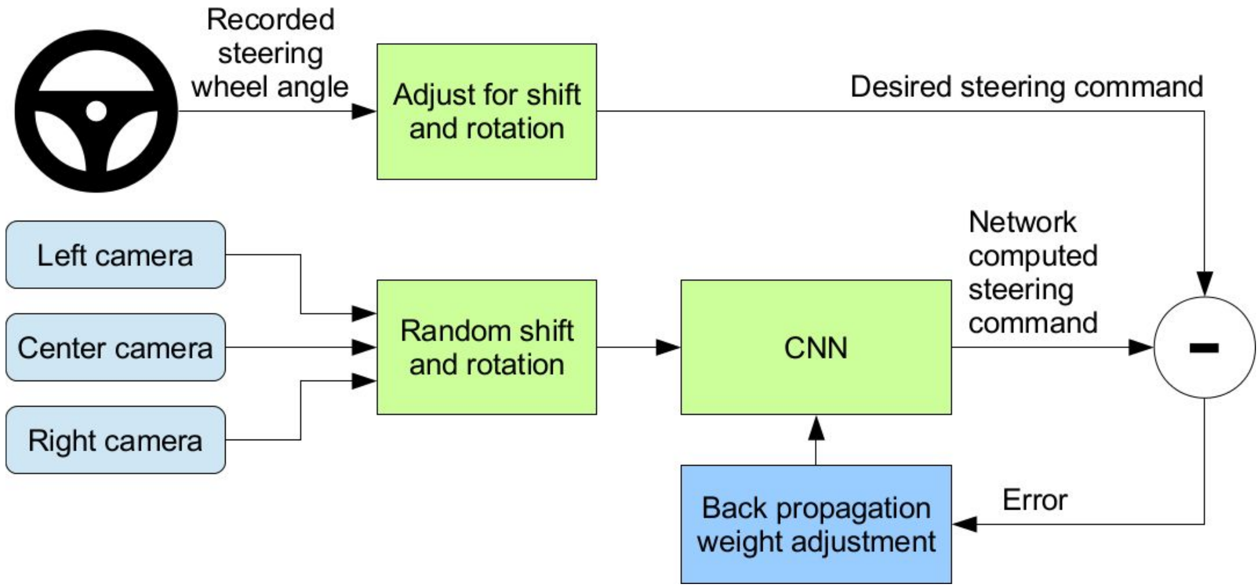
AI to Diagnose Breast Cancer

- Google researchers developed a deep learning framework that automatically identifies tumors
- localization of breast cancer that has spread to lymph nodes
- using TensorFlow
- AI model matched or exceeded the performance of a pathologist
- keep human in the loop: AI will flag things a human will miss. But it sometimes will falsely identify something as cancer, whereas a human pathologist is better at coming to a final decision



https://news.developer.nvidia.com/google-uses-ai-to-diagnose-breast-cancer/
http://money.cnn.com/2017/03/03/technology/google-breast-cancer-ai/

End to End Learning for Self-Driving Cars



http://arxiv.org/abs/1604.07316

Deep Learning

Deep Voice: Real-time Neural Text-to-Speech

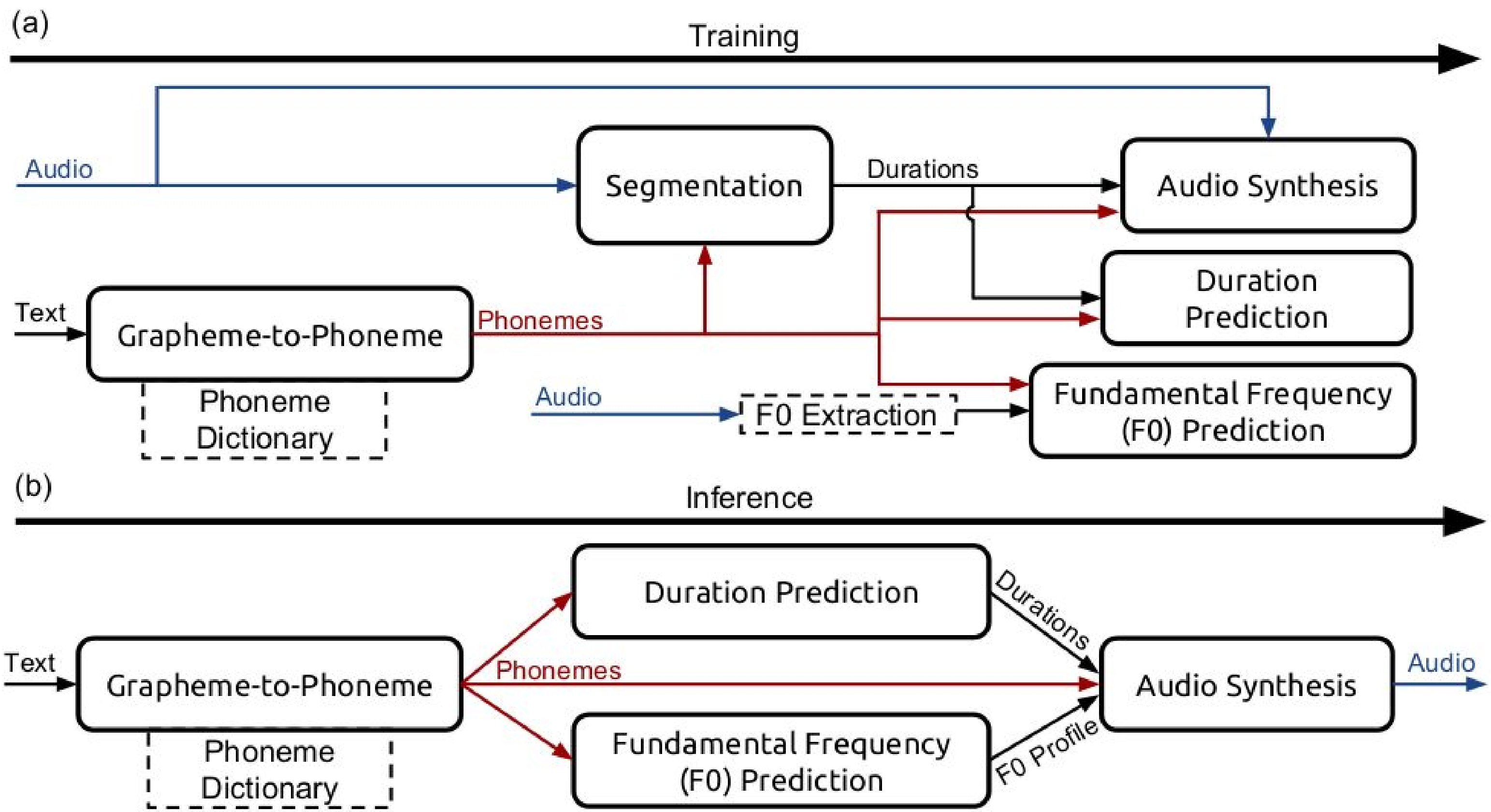
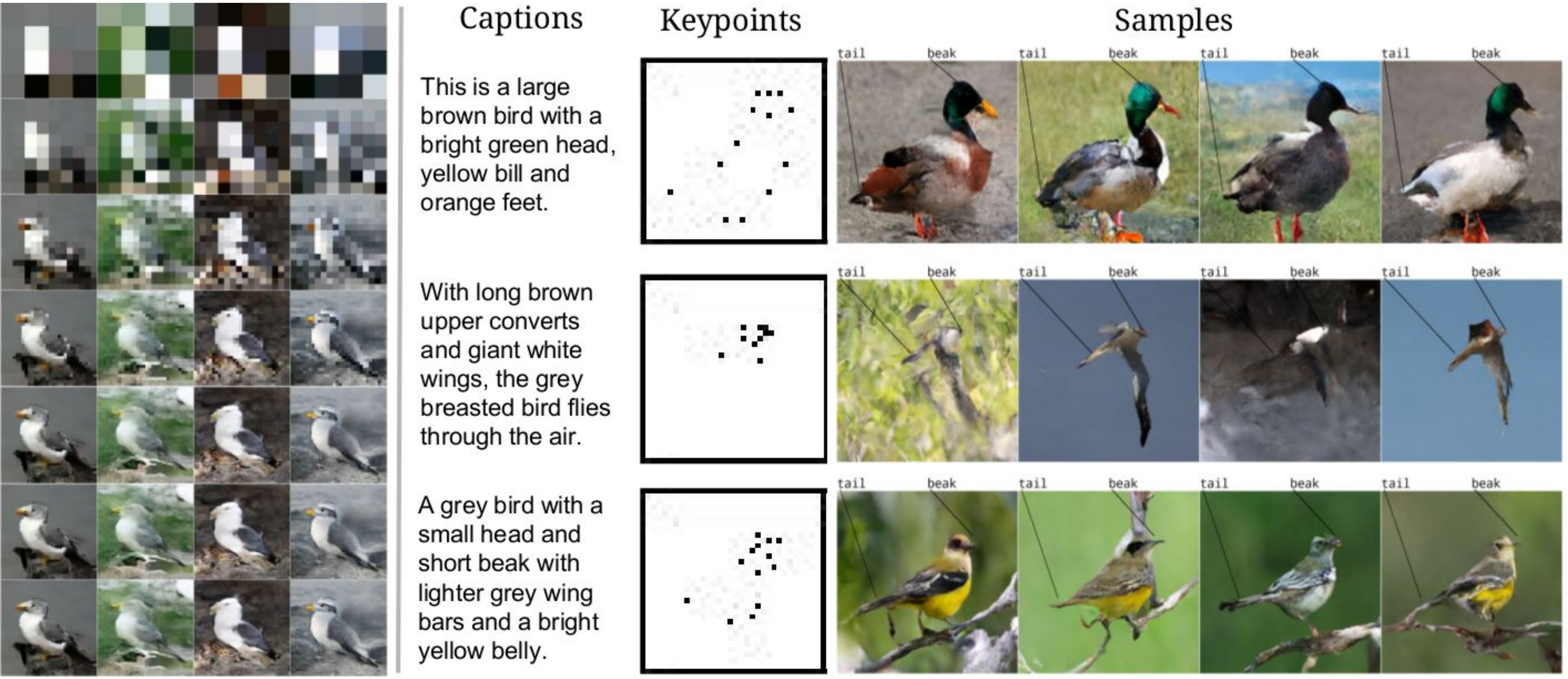


Figure 1. System diagram depicting (a) training procedure and (b) inference procedure, with inputs on the left and outputs on the right. In our system, the duration prediction model and the F0 prediction model are performed by a single neural network trained with a joint loss. The grapheme-to-phoneme model is used as a fallback for words that are not present in a phoneme dictionary, such as CMUDict. Dotted lines denote non-learned components.

https://arxiv.org/abs/1702.07825

http://research.baidu.com/deep-voice-production-quality-text-speech-system-constructed-entirely-deep-neural-networks/

Parallel Multiscale Autoregressive Density Estimation



A white large bird with orange legs and gray secondaries and primaries, and a short yellow bill.

Figure 4. Text-to-image bird synthesis. The leftmost column shows the entire sampling process starting by generating 4 × 4 images, followed by six upscaling steps, to produce a 256 × 256 image. The right column shows the final sampled images for several other queries. For each query the associated part keypoints and caption are shown to the left of the samples.

https://arxiv.org/abs/1703.03664

Parallel Multiscale Autoregressive Density Estimation

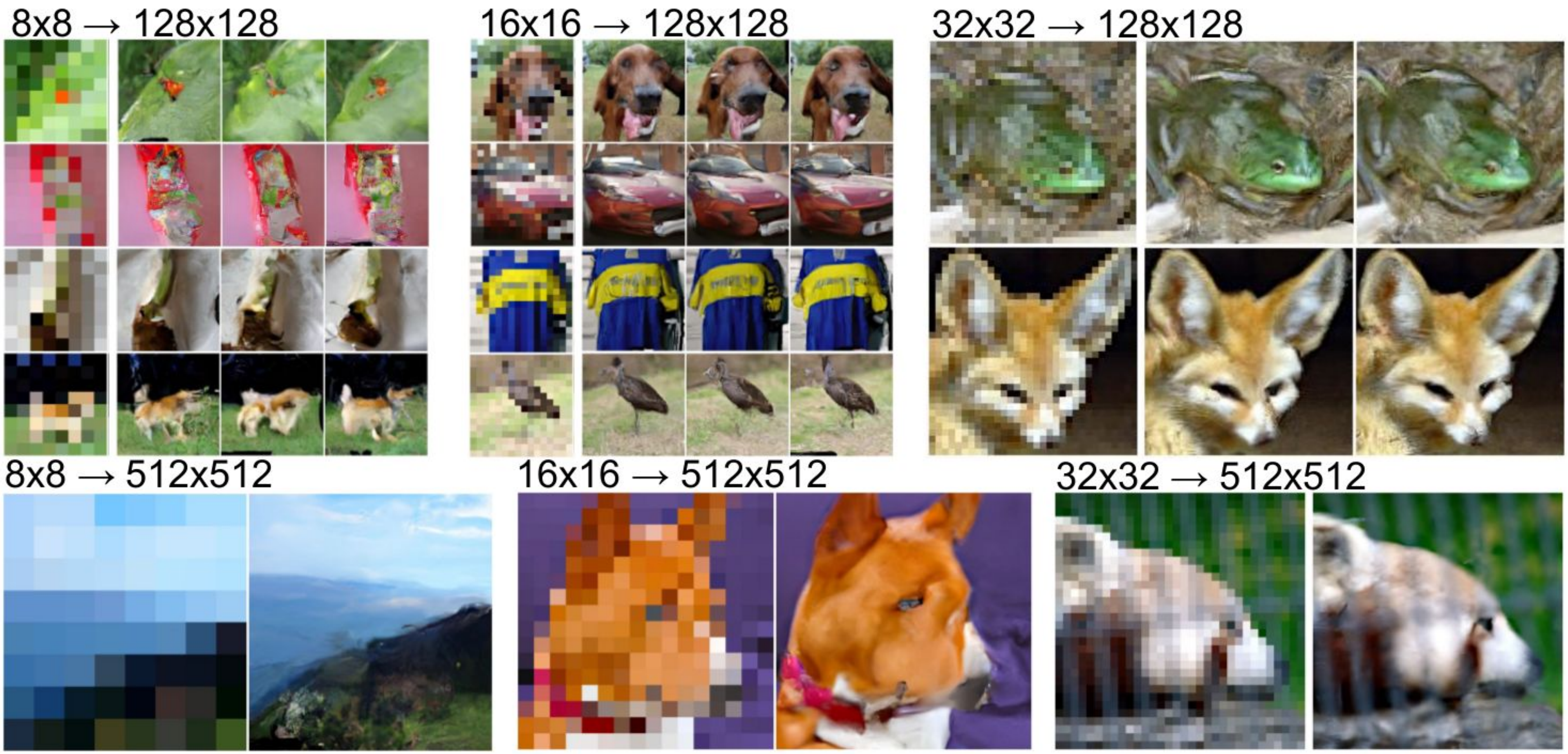
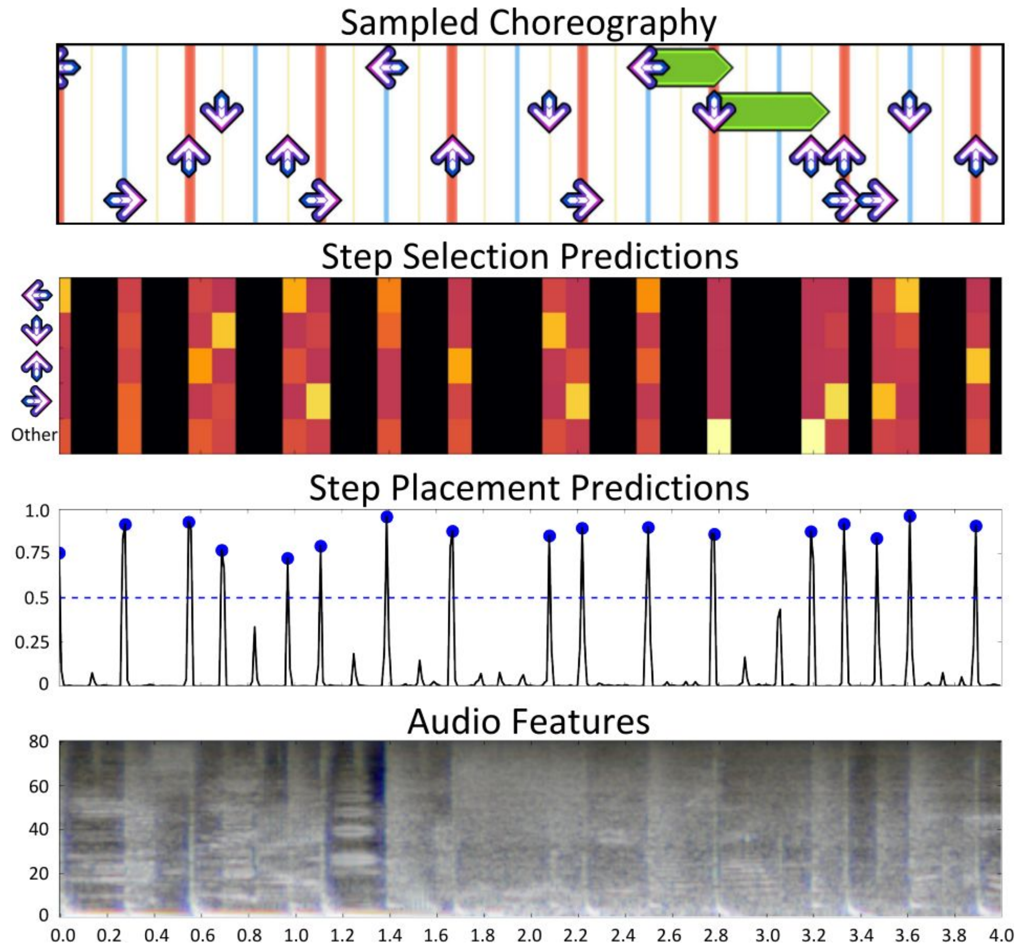


Figure 7. Upscaling low-resolution images to 128 × 128 and 512 × 512. In each group of images, the left column is made of real images, and the right columns of samples from the model.

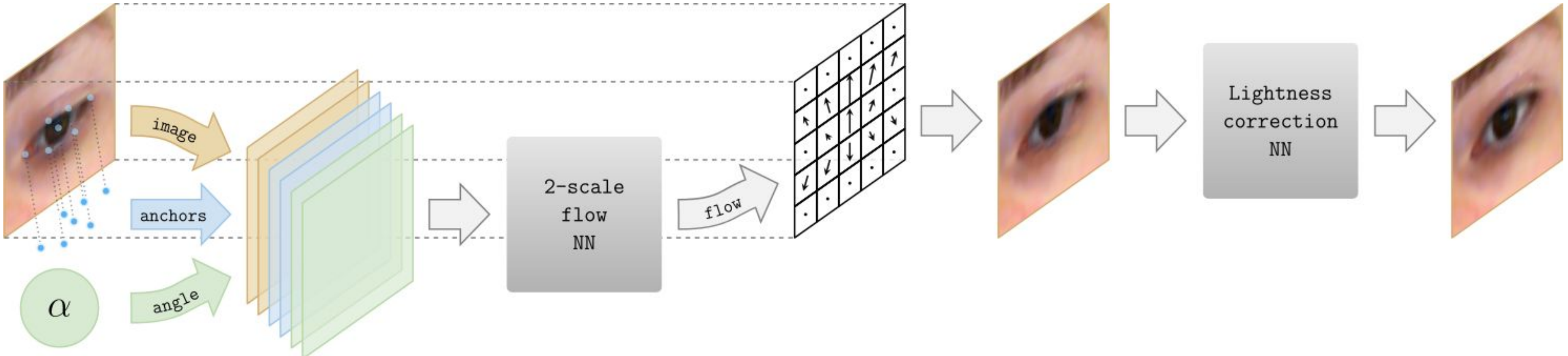
https://arxiv.org/abs/1703.03664

Dance Dance Convolution



https://openreview.net/forum?id=HyzsgBEtg&noteId=HyzsgBEtg

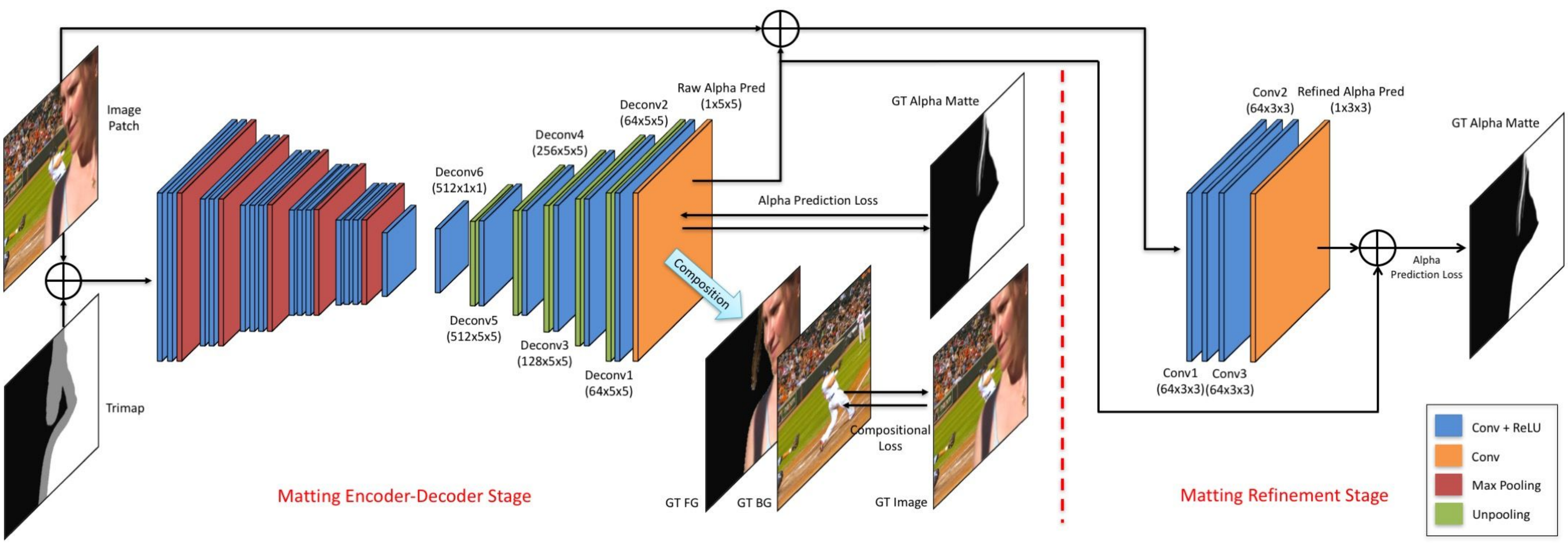
DeepWarp: Photorealistic Image Resynthesis for Gaze Manipulation



The **proposed system** takes an input eye region, feature points (`anchors`) as well as a correction `angle` and sends them to the multi-scale neural network predicting a `flow` field. The flow field is then applied to the input image to produce an image of a redirected eye. Finally, the output is enhanced by processing with the lightness correction neural network.

http://sites.skoltech.ru/compvision/projects/deepwarp/

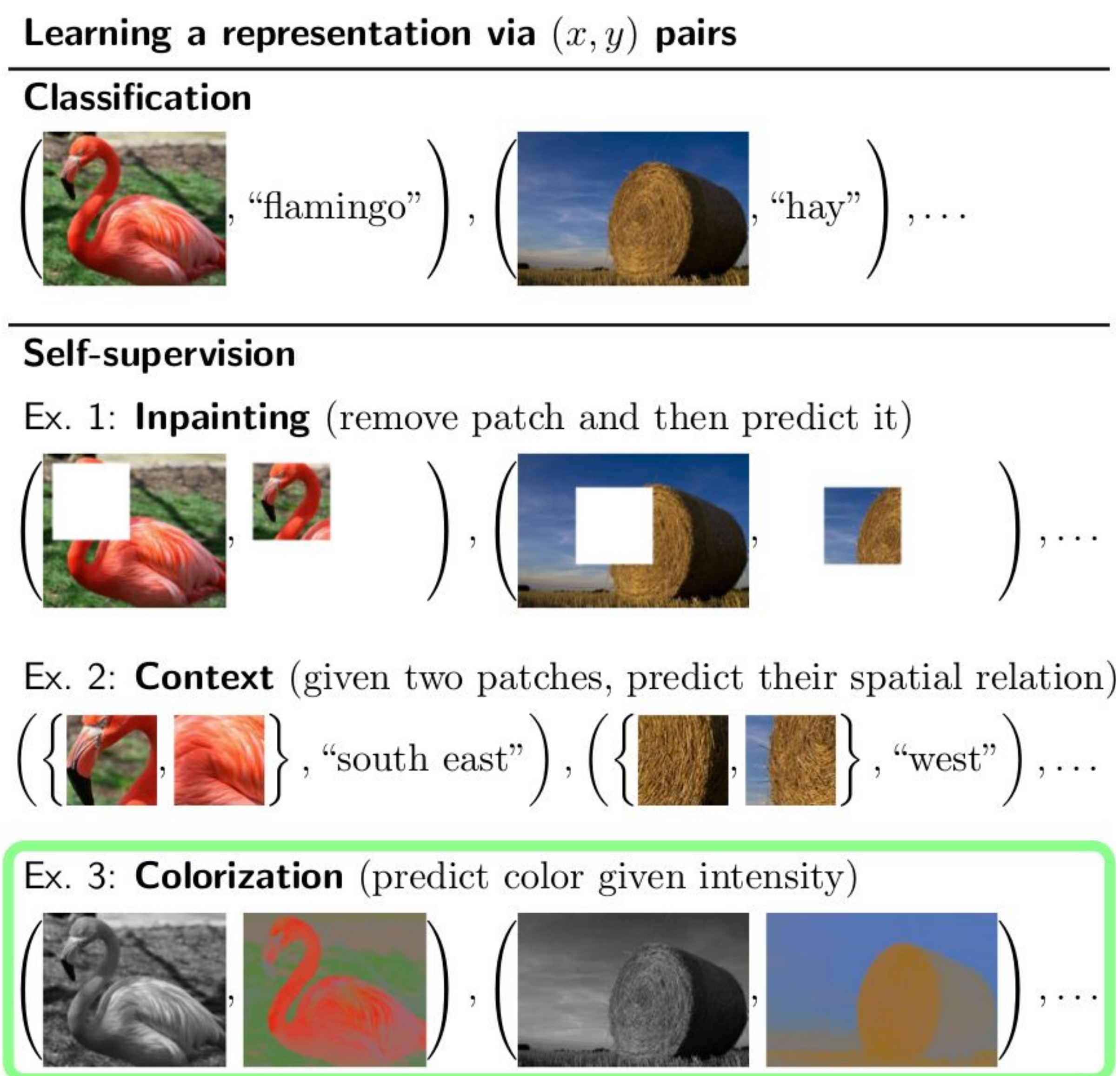
Deep Image Matting



https://arxiv.org/abs/1703.03872

Deep Learning

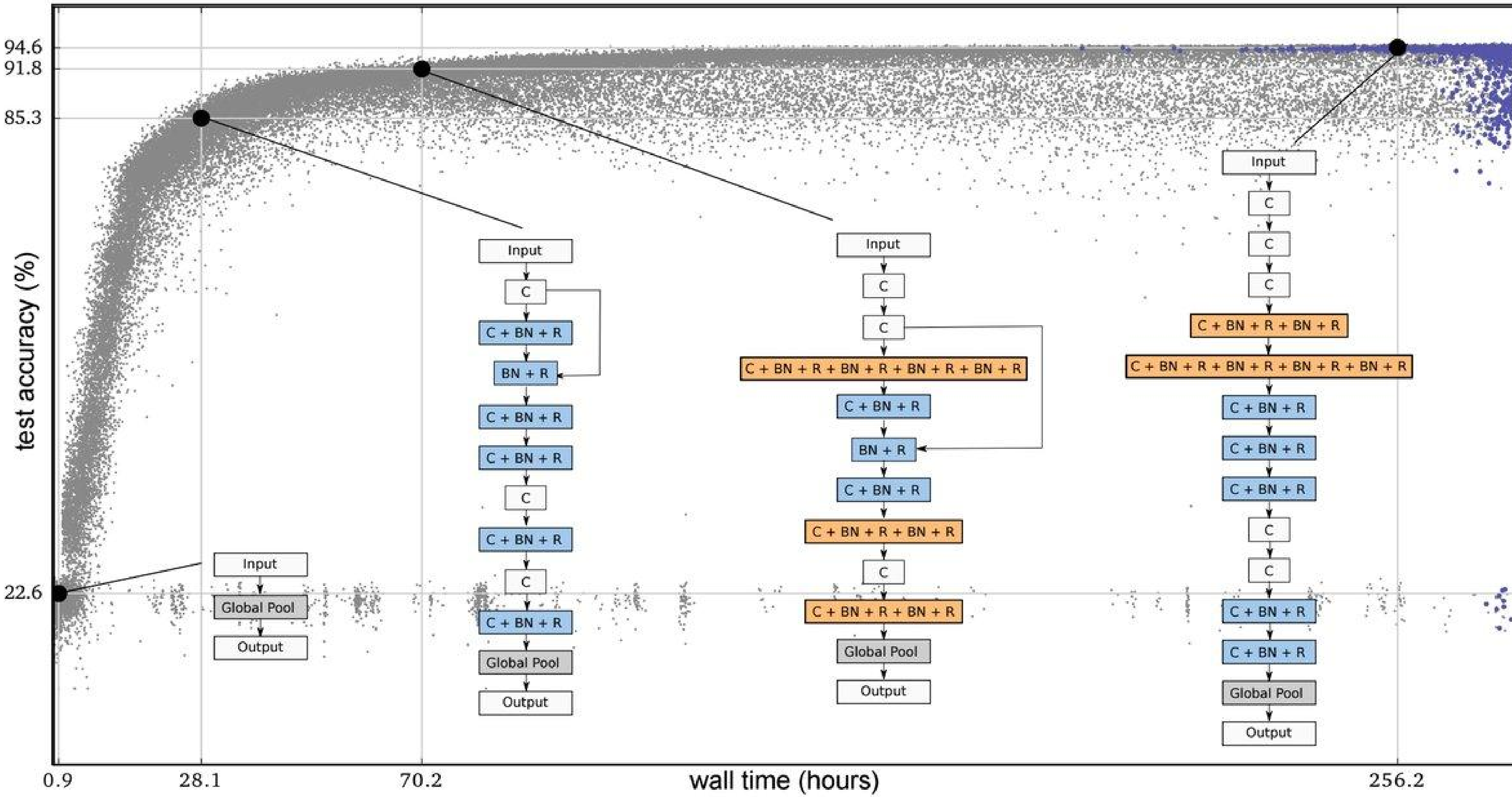
Colorization as a Proxy Task for Visual Understanding



http://arxiv.org/abs/1703.04044

Large-Scale Evolution of Image Classifiers

Deep Learning



https://arxiv.org/abs/1703.01041

Deep Learning

Large-Scale Evolution of Image Classifiers

Study	Params.	C10+	C100+	Reachable?
Maxout (Goodfellow et al., 2013)	–	90.7%	61.4%	No
Network in Network (Lin et al., 2013)	–	91.2%	–	No
All-CNN (Springenberg et al., 2014)	1.3 M	92.8%	66.3%	Yes
Deeply Supervised (Lee et al., 2015)	–	92.0%	65.4%	No
Highway (Srivastava et al., 2015)	2.3 M	92.3%	67.6%	No
ResNet (He et al., 2016)	1.7 M	93.4%	72.8%†	Yes
Evolution (ours)	5.4 M	94.6%		N/A
	40.4 M		76.3%	
Wide ResNet 28-10 (Zagoruyko & Komodakis, 2016)	36.5 M	96.0%	80.0%	Yes
Wide ResNet 40-10+d/o (Zagoruyko & Komodakis, 2016)	50.7 M	96.2%	81.7%	No
DenseNet (Huang et al., 2016a)	25.6 M	96.7%	82.8%	No

Alex J. Champandard
@alexjc

Folgen

17/ With enough compute to raise planet temperature by 0.1°C, they failed to show interesting results or address useful research problems.

RETWEETS 7   GEFÄLLT 39

11:45 - 6. März 2017

2   7   39

https://arxiv.org/abs/1703.01041

More

- Embedding Watermarks into Deep Neural Networks
  http://arxiv.org/abs/1701.04082
- WebCaricature: a benchmark for caricature face recognition
  http://arxiv.org/abs/1703.03230
- Using Deep Learning and Google Street View to Estimate the Demographic Makeup of the US
  http://arxiv.org/abs/1702.06683
- Skip Connections as Effective Symmetry-Breaking
  http://arxiv.org/abs/1701.09175
- Batch Renormalization: Towards Reducing Minibatch Dependence in Batch-Normalized Models
  https://arxiv.org/abs/1702.03275

https://arxiv.org/abs/1703.04421, https://github.com/google/guetzli, https://github.com/google/butteraugli

More

- Google Cloud acquired Kaggle: https://techcrunch.com/2017/03/07/google-is-acquiring-data-science-community-kaggle/

- Keras 2.0 released (with many API changes!): https://blog.keras.io/introducing-keras-2.html

https://arxiv.org/abs/1703.04421, https://github.com/google/guetzli, https://github.com/google/butteraugli

Deep Learning

Deep Learning Tips and Tricks for the practitioner

- Shuffle the data
- Use dropout
- Use Max pooling
- Instead of Sigmoid or TanH use ReLU or better PReLU
- Use ReLU or PreLU's gates not before max pooling
- Use Batch Normalization
- Expand your dataset: collect more data or use data augmentation
- If you can’t and you use the smaller models: try ensembles
- use 1x1 CNN's layer where appropriate
- …….

https://nmarkou.blogspot.co.at/2017/02/the-black-magic-of-deep-learning-tips.html

Deep Learning

Thank you for coming!

Next
Deep Learning Meetup:

17 May 2017 @ Casinos Austria Hub (tbc)

Thomas Lidy

Jan Schlüter

Alex Schindler