

Vienna



Deep Learning Meetup

18 September 2018 @ WKO

#VDLM



Vienna Deep Learning Meetup

The Organizers:



Alex Schindler
AIT & TU Wien



René Donner
Contextflow



Thomas Lidy
Musimap



Jan Schlüter
OFAI

Vienna



17th Deep Learning Meetup

Agenda:

- Welcome (Alexander Schindler)
- Introduction (Matthias Grabner, WKO)
- **Deep Reinforcement Learning: Learning Like a Baby Rather Than a Copier**
Eric Steinberger
- Announcements
 - *30 minutes break*
- **They Grow Up So Fast**
Peter Ferenczy
- Latest News & Hot Topics (Alex Schindler, René Donner)
- Networking and Discussions

Announcements

Announcements

Matthias Grabner

We are hiring deep learning enthusiasts at pre-doc and post-doc level!

Junior Researcher (m/f) in Computer Vision

This position is vacant in the research group Media Computing.

Ihre Aufgaben

- Support research in innovative research projects on computer vision, pattern recognition and machine learning (e.g. in image classification and segmentation, 3D surface classification)
- Development of methods for pattern analysis and classification with a focus on deep learning
- Support the writing of scientific publications and presentations
- Explicitly encouraged: writing of a dissertation/PhD within the area of content-based image analysis
- Support writing of scientific research project proposals
- Opportunity to support teaching

Ihre Qualifikation

- University degree (Mag./Master) in Computer Science (or comparable technical study)
- Comprehensive knowledge in machine learning, computer vision, pattern recognition and statistics
- Excellent knowledge of Matlab and/or Python
- First experience in deep learning frameworks, e.g. TensorFlow, Keras, Torch is an advantage
- Knowledge of Java and/or C/C++, and Linux (is an advantage)
- Excellent knowledge of spoken and written English (ability to write scientific texts in English)
- Willingness to learn or improve the German language (for non-natives)
- Self-contained and independent working style
- Enthusiasm for research and constant curiosity for new developments
- Experience in scientific working and publishing

Unser Angebot

You can expect a long-term employment in the dynamic environment of an ambitious and achievement-oriented University of Applied Sciences. We offer attractive career opportunities and work conditions (e.g. home office, flexible working hours, office close to Vienna). Support in pursuing a PhD and working in a team of highly motivated and experienced experts. The opportunity to shape novel solutions and innovations with your knowledge and exciting tasks and steep learning curves on basic and applied research, support for further training.

The minimum gross salary for this position is € 35,700 per year based on 40h/week. Overpayment based on the internal salary structure and individual qualifications and experience is possible. We attach great importance to diversity and equal opportunities. Women are explicitly encouraged to apply. This position is suitable for qualified persons with disabilities.

Applications to:
bewerbungen@fhstp.ac.at

If you have questions, just send an informal mail to Matthias Zeppelzauer
m.zeppelzauer@fhstp.ac.at
or just call: +43 2742 313228 652

Looking forward to hearing from you! ☺

We are hiring deep learning enthusiasts at pre-doc and post-doc level!

Researcher (m/f) in Computer Vision

This position is vacant in the research group Media Computing.

Ihre Aufgaben

- Support and lead research in innovative research projects on computer vision, pattern recognition and machine learning (e.g. in image classification and segmentation, 3D surface classification)
- Development of methods for pattern analysis and classification with a focus on deep learning
- Writing of scientific publications and presentations
- Support the writing of scientific research project proposals and assist in project acquisition
- Take responsibility for research projects (e.g. as work package coordinator or project lead)
- Opportunity to support teaching

Ihre Qualifikation

- Finished (or soon to be completed) PhD in Computer Science or any comparable technical study
- OR substantial work experience in machine learning, scientific computing or a related field and the willingness to acquire a PhD.
- Substantial knowledge in machine learning, computer vision, pattern recognition and statistics
- Excellent knowledge of Matlab, Python, and GPU-based development
- Long-time experience in deep learning frameworks, e.g. TensorFlow, Keras, Torch is an advantage
- Knowledge in Java and/or C/C++ and Linux (is an advantage)
- Excellent knowledge of spoken and written English (ability to write scientific texts in English)
- Willingness to learn or improve the German language (for non-natives)
- Organized, motivated and the ability to work as an autonomous and flexible researcher in an interdisciplinary team
- Enthusiasm for research and constant curiosity for new developments
- Experience in performing independent research on own responsibility and publishing scientific work

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You can expect a long-term employment in the dynamic environment of an ambitious and achievement-oriented University of Applied Sciences. We offer attractive career opportunities and work conditions (e.g. home office, flexible working hours, office close to Vienna). Support in pursuing a PhD and working in a team of highly motivated and experienced experts. The opportunity to shape novel solutions and innovations with your knowledge and exciting tasks and steep learning curves on basic and applied research, support for further training.

The minimum gross salary for this position is € 47,600 per year based on 40h/week. Overpayment based on the internal salary structure and individual

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If you have questions, just send an informal mail to Matthias Zeppelzauer
m.zeppelzauer@fhstp.ac.at
or just call: +43 2742 313228 652

Looking forward to hearing from you! ☺



November
28. & 29. @ FH
St. Pölten

Call For Papers

Topics

To foster the exchange between various disciplines in the huge field of digital media, the Forum Media Technology intentionally puts its focus on a wide range of content and on interdisciplinary dialogues at the intersection of new technological possibilities, creative design as well as economic, social and cultural framework requirements. We invite [submissions](#) which address one of the topics of the conference.

Innovative Audio – New Applications for Music, Sound Design and Sonic Interaction

- Sound and Music Computing
- Semantic Audio
- Audio and Sound Design in Games
- Auditory Displays and Sonification
- Sonic Interaction



IMPORTANT DATES

Full Papers, Short Papers and Demos:

Submission:
[September 16, 2018](#) September 23, 2018

Notification of Acceptance:

October 17, 2018

Camera-Ready Version Submission:

October 29, 2018

Graduate Consortium:

Submission:
[November 4, 2018](#)

Notification:

November 13, 2018

Submission:
**September, 23
2018**

Vienna Deep Learning Meetup

Community Platform

Updates

VDLM history now on Github

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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No description, website, or topics provided.

49 commits 1 branch 0 releases 2 contributors

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dychief update photos Latest commit [22c11e6](#) 20 days ago

Logo more content 25 days ago

Meetups update photos 20 days ago

README.md fixes 21 days ago

README.md



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.

Getting Started in Deep Learning

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These are the recommended links for getting into Deep Learning:

Video for a really basic overview: Neural Networks demystified: <https://www.youtube.com/watch?v=bxz2T-V8XRk>

A quick video intro to Deep Learning: <https://www.youtube.com/watch?v=N4gDikie8E&list=TLGGOKMRn558jYwNzAyMjAxNw>

A Brief Overview of Deep Learning <http://yyue.blogspot.co.at/2015/01/a-brief-overview-of-deep-learning.html>

Google's Machine Learning & Deep Learning 101: https://docs.google.com/presentation/d/1kSuQyW5DtnkvZzEjCYkfOwxGFe2WBBye9Uedd9k/preview?imm_mid=0fb7e&cmp=em-data-na-na-newsitr_20171213&slide=id.g24521cd995_0_459

A Primer on Deep Learning <https://www.datarobot.com/blog/a-primer-on-deep-learning/>

Keras Tutorial: <https://keras.io/getting-started-30-seconds-to-keras> (Note: Keras is a framework on top of Tensorflow to make your life easier)

Activation Functions

Activation Functions used in (Deep) Neural Networks and their properties:

Note that there is no solid theory of how activation functions should be chosen. There are infinitely many possible activation functions. Which is the best for any given problem? It is unknown.

However, Glorot and Bengio (2010) investigated the effect of various activation functions with respect to the Vanishing Gradient problem and found these conclusions:

- The more classical neural networks with **sigmoid or hyperbolic tangent units** and standard initialization fare rather **poorly**, converging more slowly and apparently towards ultimately poorer local minima.
- Sigmoid activations (not symmetric around 0) should be avoided when initializing from small random weights, because they yield poor learning dynamics, with initial saturation of the top hidden layer.
- The **softmax networks seem to be more robust** to the initialization procedure than the tanh networks, presumably because of their gentler non-linearity.
- For tanh networks, the proposed normalized initialization can be quite helpful, presumably because the layer-to-layer transformations maintain magnitudes of activations (flowing upward) and gradients (flowing backward).

Conferences about Neural Networks

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Since some guys asked about conferences about neural networks I want to bring up some:

[b]NIPS[/b] Neural Information Processing Systems <https://nips.cc/>

[b]ICLR[/b] (pronounced: "i clear") International Conference on Learning Representations <http://www.iclr.cc>

[b]ICML[/b] International Conference on Machine Learning <http://www.icml.cc>

[b]ESANN[/b] European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning <https://www.elen.ug.ac.be/esann/>

[b]ICAAI[/b] International Conference on Agents and Artificial Intelligence <http://www.icaai.org/>

[b]AAAI[/b] Association for the Advancement of Artificial Intelligence <http://www.aaai.org/>



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Vienna Deep Learning Meetup - Wiki

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- [GPU Compute Providers](#)
- [Conferences about Neural Networks](#)
- [Activation Functions Overview](#)
- [Common Questions and Terminology](#)
- [Software Tools for DL](#)
- [Deep Learning Papers on Music Analysis](#)
- [Deep Learning Papers \(scientific literature\)](#)
- [Books on Deep Learning](#)
- [Overview Articles in Press](#)
- [Code Repositories](#)
- [Blogs about DL](#)

Books on Deep Learning

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Deep Learning Book (<http://www-labs.iro.umontreal.ca/~bengioy/dlbook/>) by Yoshua Bengio (work in progress)

Deep learning Book by Microsoft (<http://research.microsoft.com/pubs/209355/DeepLearning-NowPublishing-Vol7-SIG-039.pdf>)

Neural Networks and Deep Learning (<http://neuralnetworksanddeeplearning.com>) a free online book (very good one)

Deep Learning - A Practitioner's Approach - O'Reilly (<http://shop.oreilly.com/product/0636920035343.do>) Starting from almost 0, nevertheless covering pretty much everything to get started

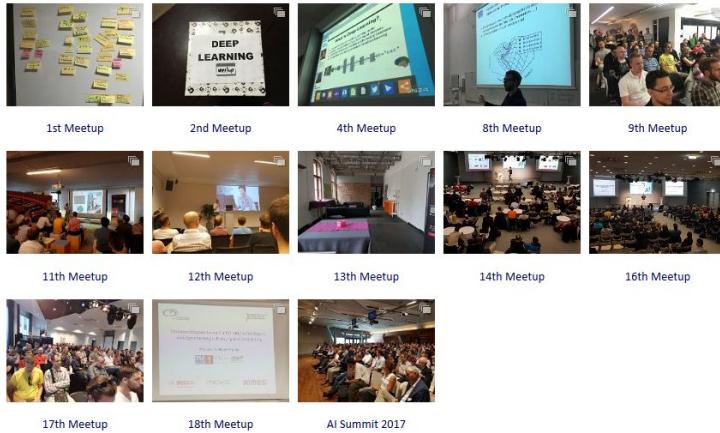
Maschinelles Lernen (<https://www.amazon.de/Maschinelles-Lernen-Ethem-Alpaydin/dp/3486581147>) really good book in german not only about deep learning but machine learning

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

VDLM Photo Gallery (new)

1st Meetup 2nd Meetup 4th Meetup 8th Meetup 9th Meetup 11th Meetup 12th Meetup 13th Meetup
14th Meetup 16th Meetup 17th Meetup 18th Meetup AI Summit 2017

Vienna Deep Learning Meetup



17th Meetup 18th Meetup AI Summit 2017

VDLM Youtube Channel



 Vienna Deep Learning Meetup
198 Abonnenten

VON 198 ABONNIERT 

ÜBERSICHT VIDEOS PLAYLISTS KANÄLE DISKUSSION KANALINFO >

Uploads ALLE WIEDERGEHEN



BELIEBTE KANÄLE

 Kurzgesagt – In a Nut...
ABONNIEREN

 7-SEKUNDEN-RÄTSEL
ABONNIEREN

 Dinge Erklärt – Kurz...
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<https://vdlm.github.io/photos/>

VDLM Poster



Vienna
Deep Learning
Meetup

20th Deep Learning Meetup in Vienna Reinforcement Learning

Talk 1:

**Deep Reinforcement Learning:
Learning Like a Baby Rather Than a
Copier,** Eric Steinberger

Break & Refreshments

Talk 2:

They Grow Up So Fast, Péter Ferenczy

Hot Topics and Latest News

Networking Session

Date
September 18th, 2018
18:00 – 22:30

Venue
Wirtschaftskammer Österreich
Wiedner Hauptstraße 63
Julius Raab Saal

Hosts
Alexander Schindler
Rene Donner
Thomas Lidy
Jan Schlüter

Hosted and Sponsored by:
WKO AUSSENWIRTSCHAFT AUSTRIA (www.wko.at/aussenwirtschaft)

September 18th, 2018
18:00
Free Entrance



Event Announcements

Next VDLM Meetup

October 15, 2018
Marx-Palast Wien
Maria-Jacobi Gasse 2
1030 Wien

Sponsored by **Anexia**

anexia



anexia

VDLM T-Shirts

VOTE:

Deadline:

http://bit.do/vdlm_tshirt

September 20th, 2018



THE DENT



THE RIPPLE



Vienna
Deep
Learning
Meetup

The logo consists of the text "Vienna Deep Learning Meetup" in a sans-serif font. To the left of the text is a graphic element: a circle composed of three smaller circles connected by lines, with one line extending downwards.

Vienna



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- Networking and Discussions

Hot Topics & Latest News

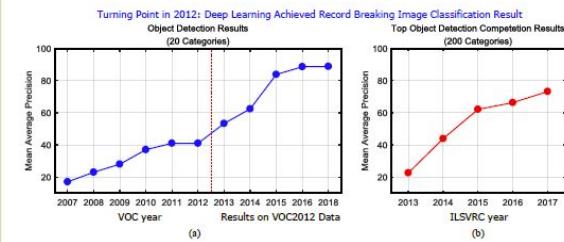
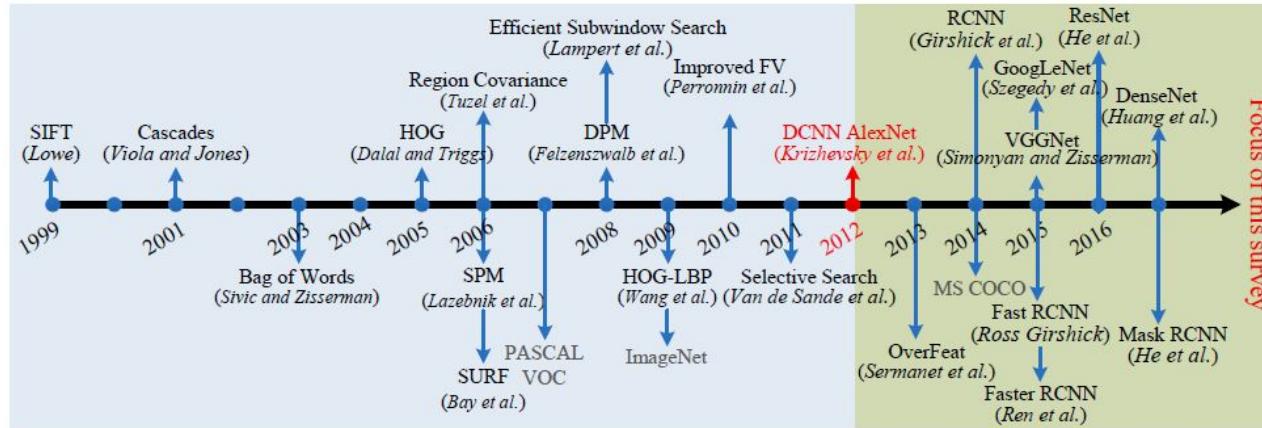
a short block at every meetup
to briefly present recent papers and news

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

Deep Learning for Generic Object Detection: A Survey

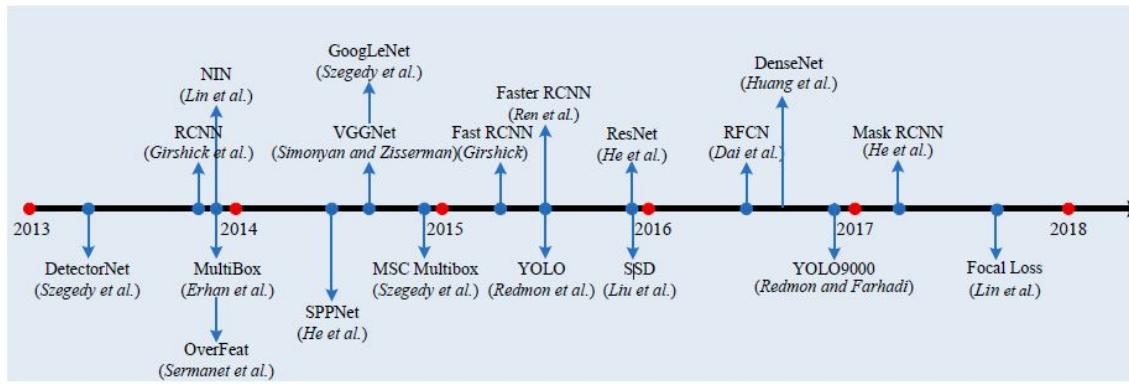
Li Liu^{1,2} · Wanli Ouyang³ · Xiaogang Wang⁴ ·
Paul Fieguth⁵ · Jie Chen² · Xinwang Liu¹ · Matti Pietikäinen²

- 30 pages Survey paper
- Introduction to Pre-Deep Learning Approaches



Deep Learning for Generic Object Detection: A Survey

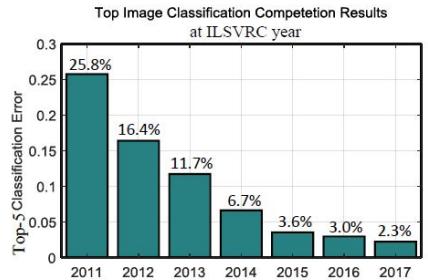
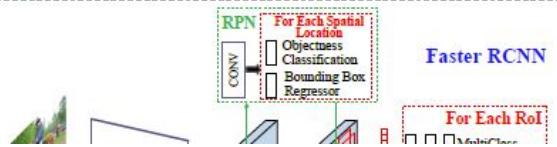
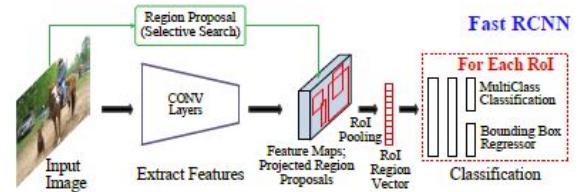
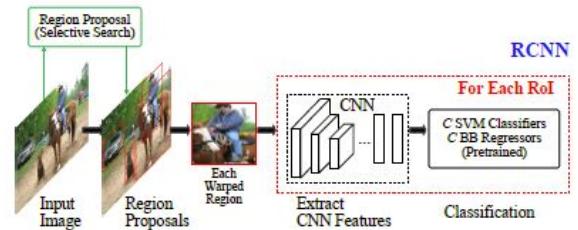
- 30 pages Survey paper
- Introduction to Pre-Deep Learning Approaches
- Summary of 24 Surveys since 2000
- Detailed problem description and discussion
- Time-Line of DNN architecture Milestones



Deep Learning for Generic Object Detection: A Survey

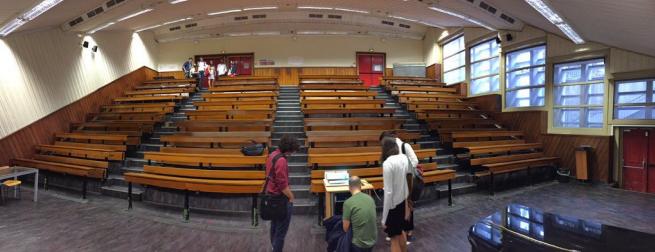
- Detailed description of each Architecture
- Optimization Methods / Transformations
- Context Modelling
- Datasets Overview
- Evaluations

<https://arxiv.org/pdf/1809.02165v1.pdf>



Deep Learning for Music Information Retrieval

- Tutorial @ Int. Society for Music Information Retrieval Conference
- 3 Perspectives to Deep Learning for MIR
 - Mood, Genre, Instrument Classification with CNNs
 - Similarity Search with Siamese Networks
 - Onset/Beat Detection with RNNs
- Code and Data available on Github
 - https://github.com/slychief/ismir2018_tutorial



A screenshot of a GitHub repository page for `slychief/ismir2018_tutorial`. The repository has 18 commits, 1 branch, and 0 releases. The latest commit is dated 6 days ago. The commits are listed below:

Commit	Description	Date
gitignore	added rp_extract for feature extraction	7 days
Part 1 - Prepare Dataset Magnatagatune.ipynb	added rp-feature extraction	7 days
Part 3a - Distance Based Search.ipynb	updated Sim Search Part 1 to use new Dataset	6 days
Part 3b - Siamese Networks.ipynb	update similarity retrieval notebooks	7 days
Part 3c - Siamese Networks with Tag Similarity.ip...	int	12 days
Part1_Audio_Basics.ipynb	updated audio-basics notebook	7 days
Part2_Instrumental_Genre_Mood_detection.ipynb	int	12 days
README.md	Update README.md	12 days
requirements.txt	int	12 days
rp_extract.py	added rp_extract for feature extraction	6 days

Deep Learning for Music Classification using Keras

(c) 2018 by

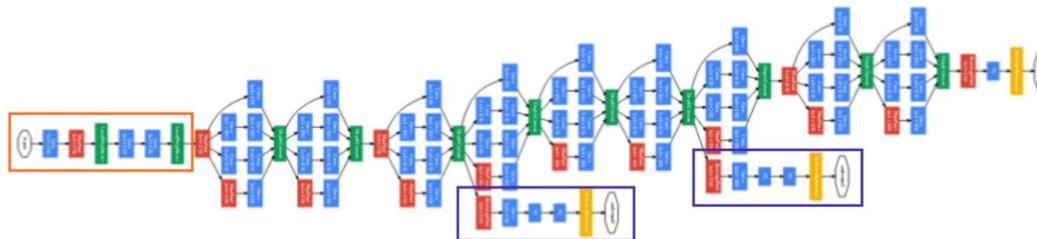
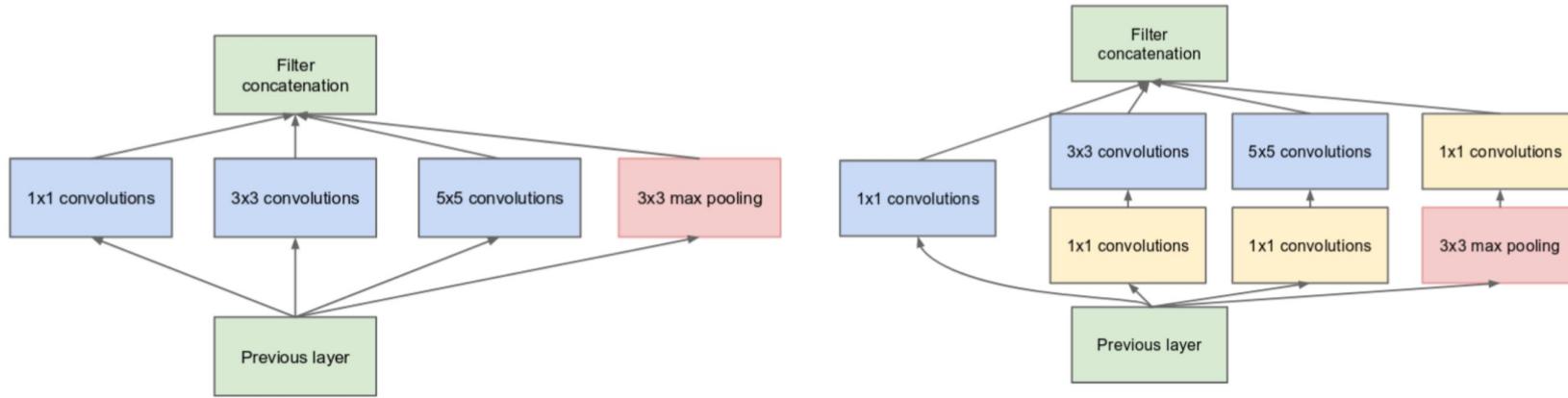
<http://ismir2018.ircam.fr/pages/events-tutorial-04.html>

 Alexander Schindler is member of the Music Information Retrieval group at the Technical University since 2010 where he actively participates in research, various international projects and currently finishes his Ph.D. on audio-visual analysis of music videos. He participates in teaching MIR, machine learning and DataScience. Alexander is currently employed as scientist at

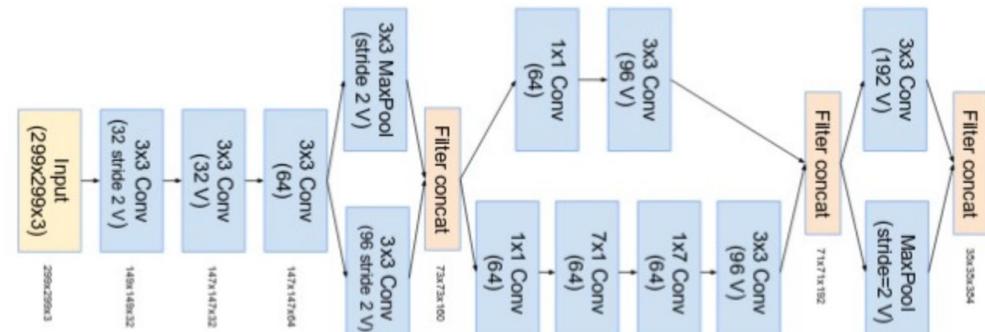
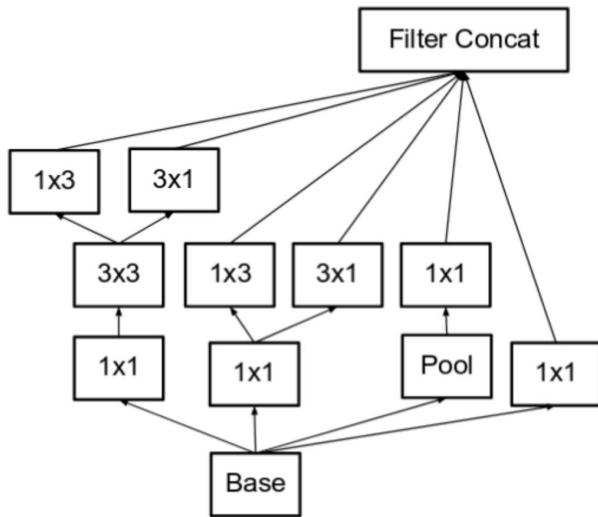
Website,
Twitter

Neural Architecture Search

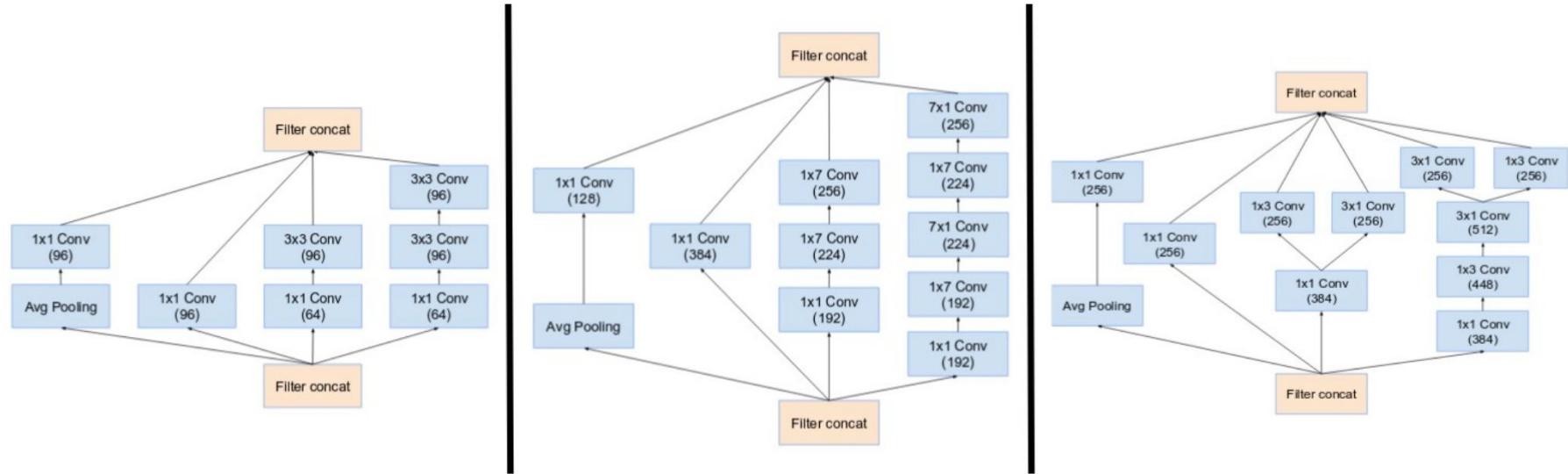
Inception Architectures



Inception Architectures



Inception Architectures



Manually?

Neural Architecture Search Vs Hyperparameter Optimization

Neural Architecture Search vs Hyperparameter Optimization

■ **Hyperparameter optimization**

- E.g. learning rate, regularization parameters, type of optimizer ...
- Grid search / random / evolutionary algorithms / Bayesian optimization

■ **Neural Architecture Search**

- Change the topology of the network!
- Huge search space
- Optimize over blocks instead - micro scale (blocks) / macro scale (cells)

Neural Architecture Search

■ **Search strategies**

- Evolutionary algorithms
- RL
- Heuristic

■ **Main problem:**

- How to make search space smaller?
- Huge to reduce compute demand?

Neural Architecture Search

- **Learning Transferable Architectures** for Scalable Image Recognition

Blocks and Cell instead of entire networks

Neural Architecture Search

- Learning Transferable Architectures for Scalable Image Recognition
Blocks and Cell instead of entire networks
- Efficient Neural Architecture Search via **Parameter Sharing**
Share trained weights between runs for each block

Neural Architecture Search

- Learning Transferable Architectures for Scalable Image Recognition
Blocks and Cell instead of entire networks
- Efficient Neural Architecture Search via Parameter Sharing
Share trained weights between runs for each block
- **Progressive** Neural Architecture Search
Start small, add blocks, predict with combination most promising

Neural Architecture Search

- Learning Transferable Architectures for Scalable Image Recognition
 - Blocks and Cell instead of entire networks
- Efficient Neural Architecture Search via Parameter Sharing
 - Share trained weights between runs for each block
- Progressive Neural Architecture Search
 - Start small, add blocks, predict with combination most promising
- Efficient Progressive Neural Architecture Search
 - Combine the above

Learning Transferable Architectures for Scalable Image Recognition

Learning Transferable Architectures for Scalable Image Recognition

Barret Zoph
Google Brain

barretzoph@google.com

Vijay Vasudevan
Google Brain

vrv@google.com

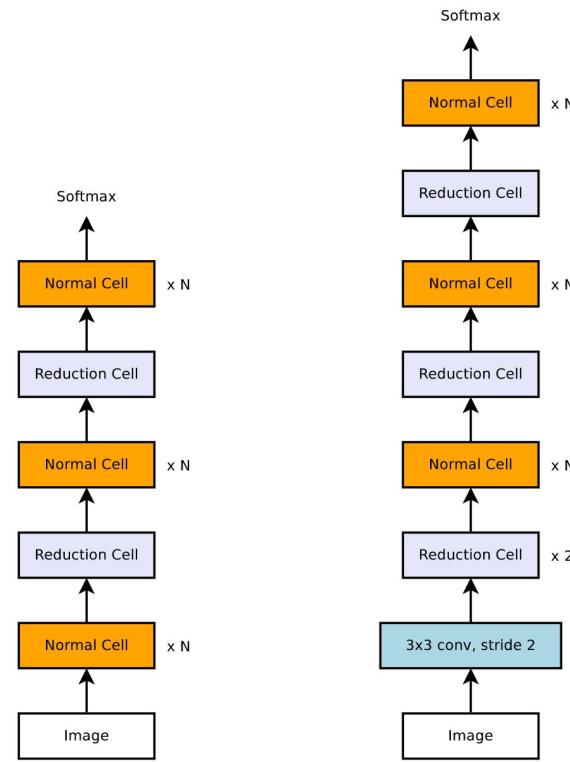
Jonathon Shlens
Google Brain

shlens@google.com

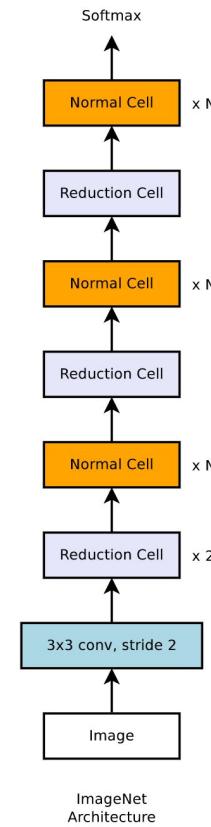
Quoc V. Le
Google Brain

qvl@google.com

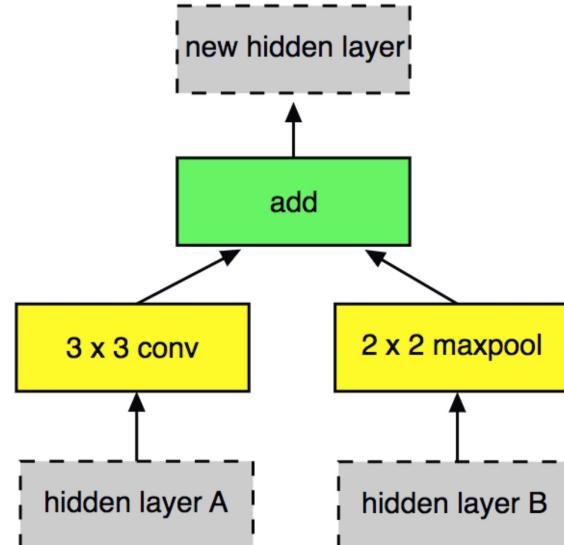
Learning Transferable Architectures for Scalable Image Recognition



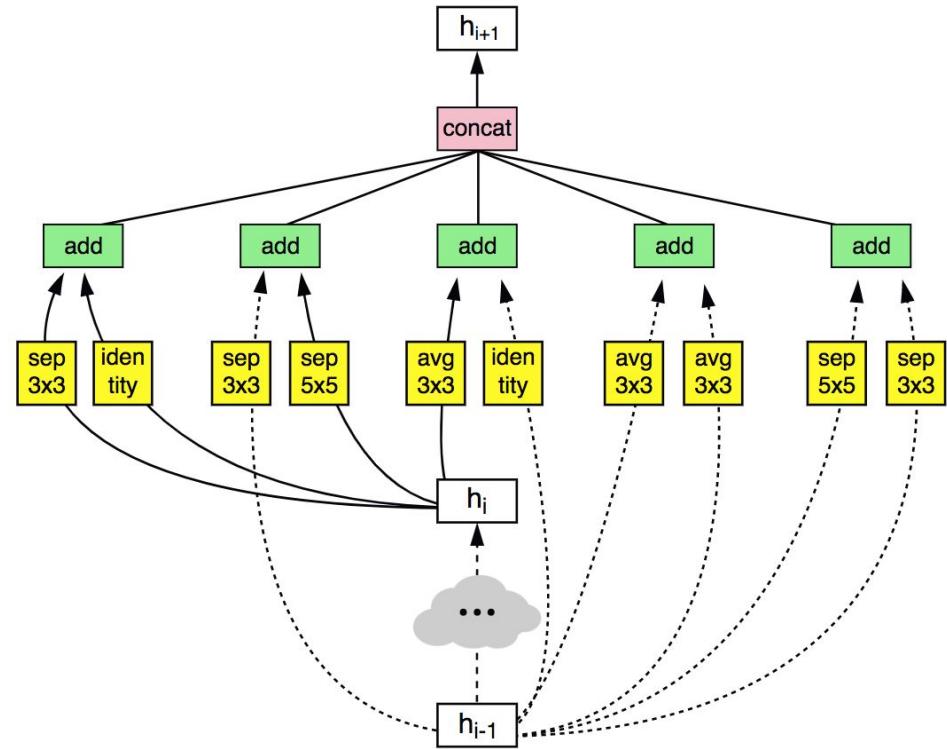
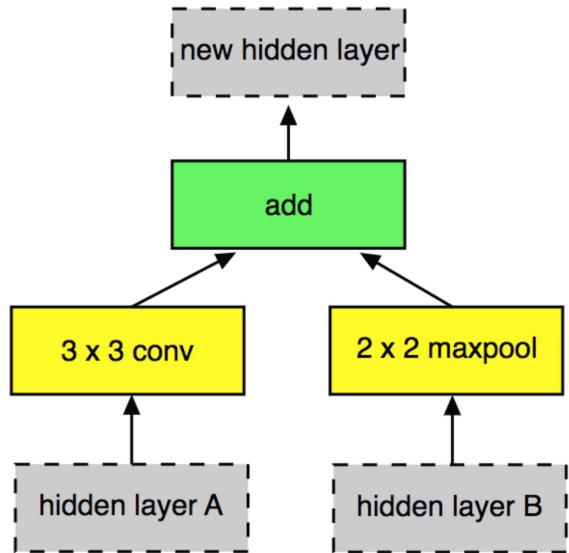
CIFAR10
Architecture



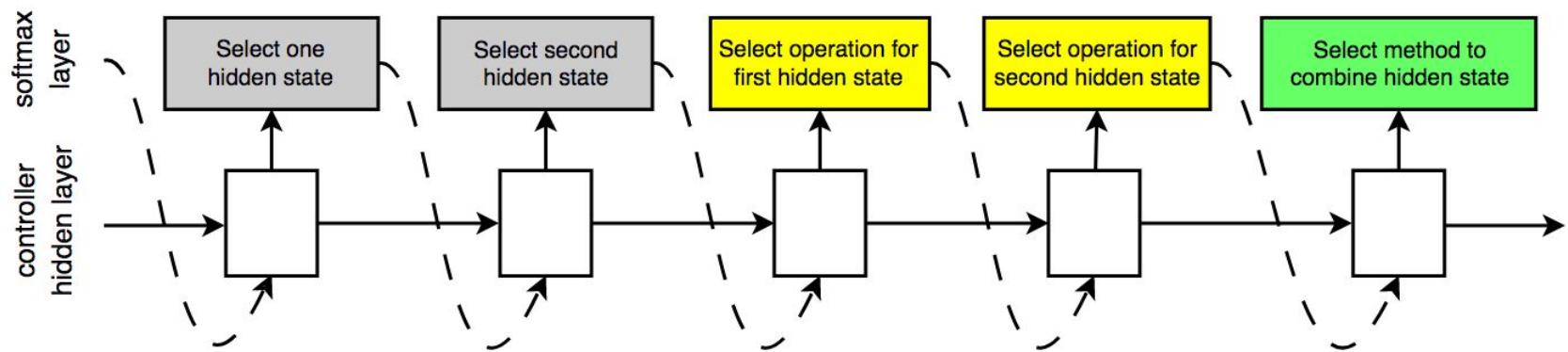
ImageNet
Architecture



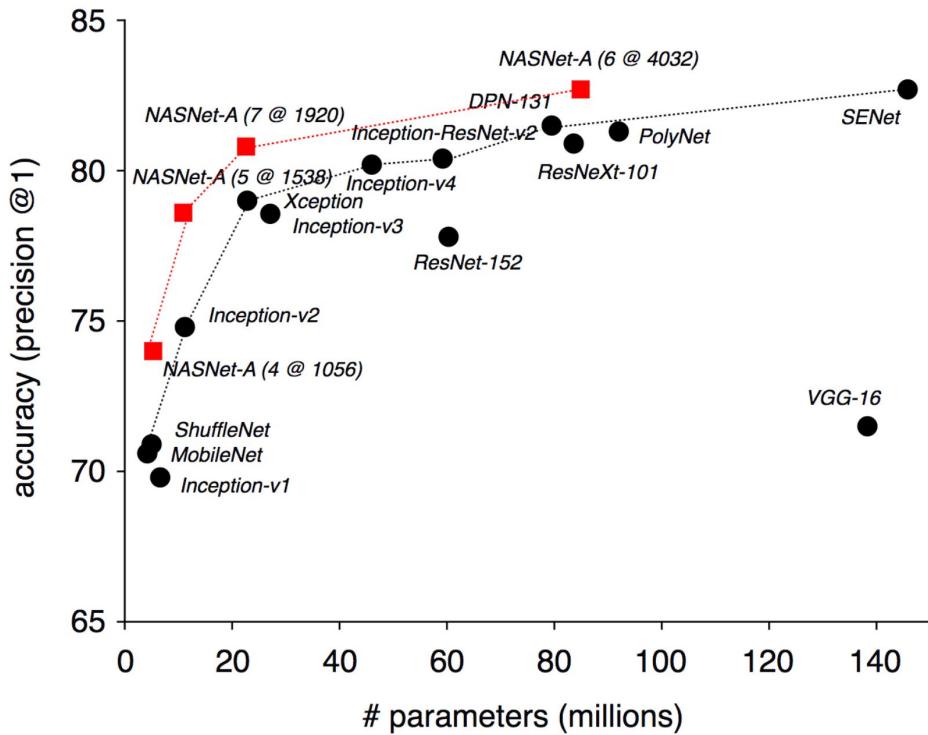
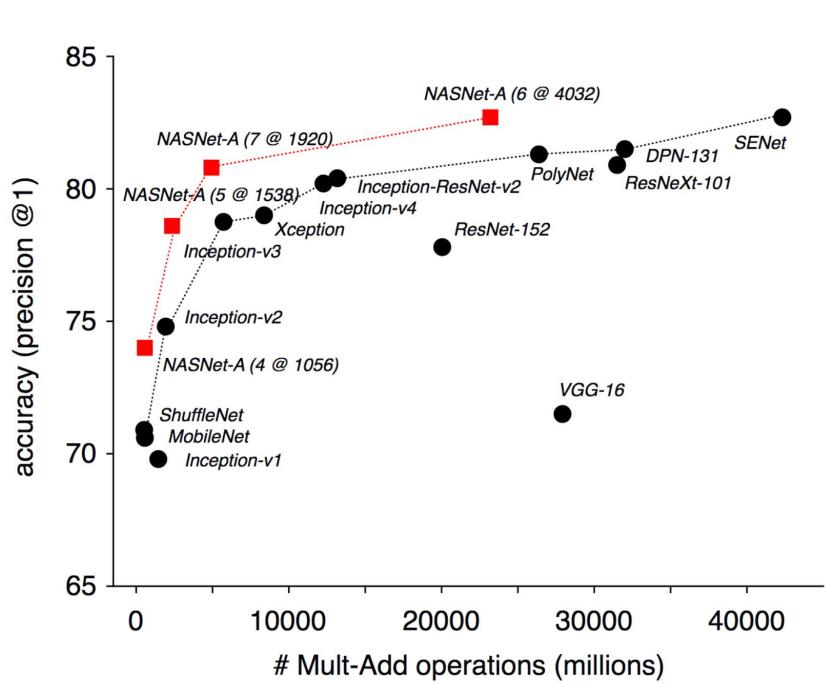
Learning Transferable Architectures for Scalable Image Recognition



Learning Transferable Architectures for Scalable Image Recognition



Learning Transferable Architectures for Scalable Image Recognition



Neural Architecture Search

- **Learning Transferable Architectures** for Scalable Image Recognition

Blocks and Cell instead of entire networks

Efficient Neural Architecture Search via Parameter Sharing

Learning Transferable Architectures for Scalable Image Recognition

Barret Zoph
Google Brain

barrettzoph@google.com

Vijay Vasudevan
Google Brain

vrv@google.com

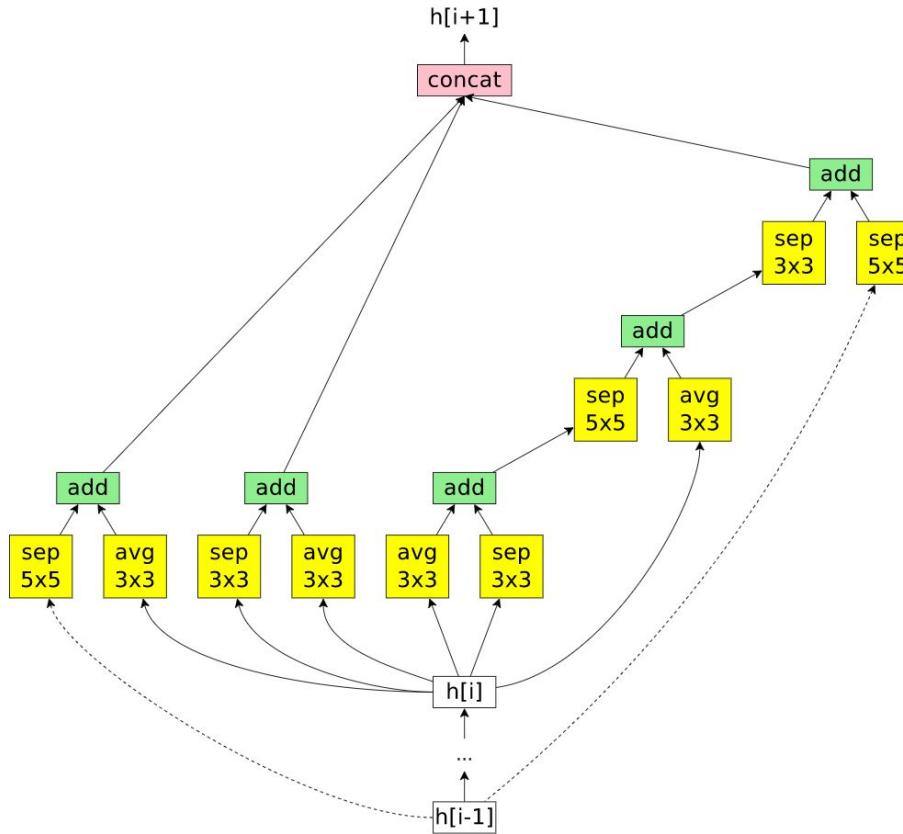
Jonathon Shlens
Google Brain

shlens@google.com

Quoc V. Le
Google Brain

qvl@google.com

Efficient Neural Architecture Search via Parameter Sharing



Progressive Neural Architecture Search

Progressive Neural Architecture Search

Chenxi Liu^{1*}, Barret Zoph², Maxim Neumann², Jonathon Shlens², Wei Hua²,
Li-Jia Li², Li Fei-Fei^{2,3}, Alan Yuille¹, Jonathan Huang², and Kevin Murphy²

¹ Johns Hopkins University

² Google AI

³ Stanford University

Progressive Neural Architecture Search

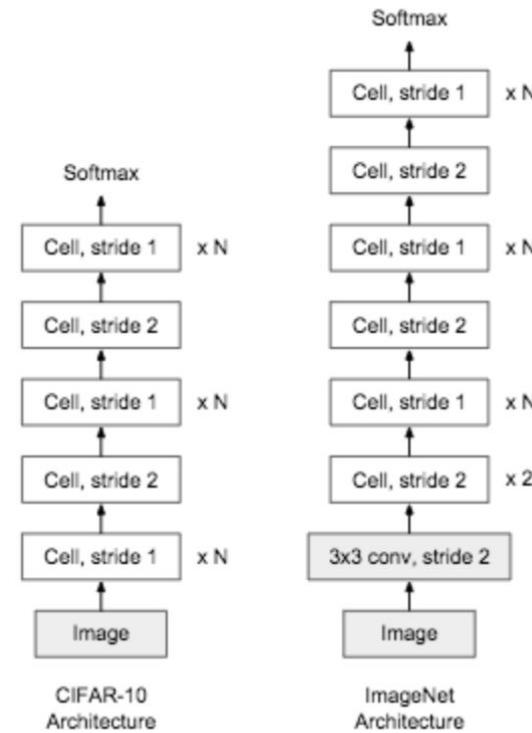
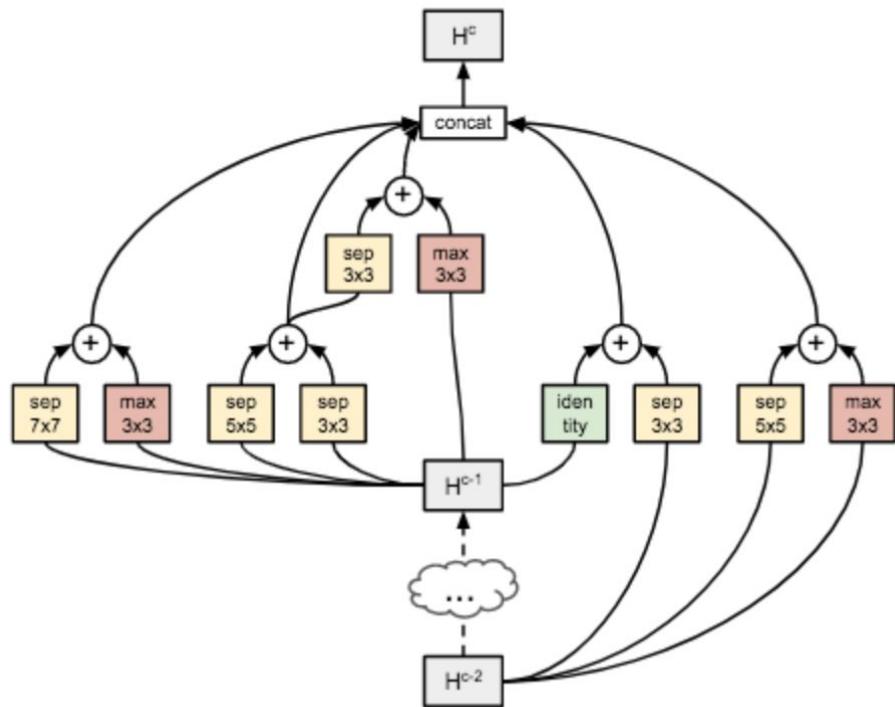
■ **Search strategies**

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- RL
- Heuristic

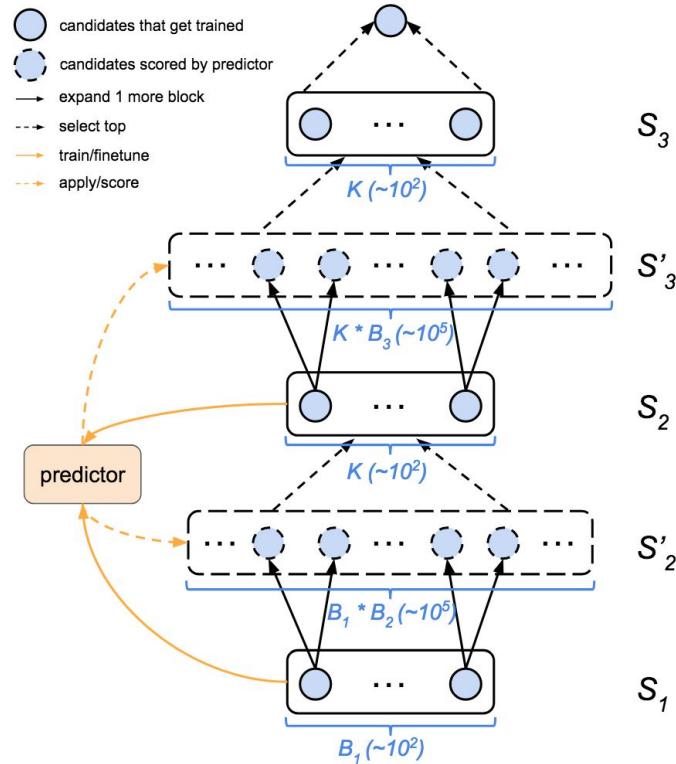
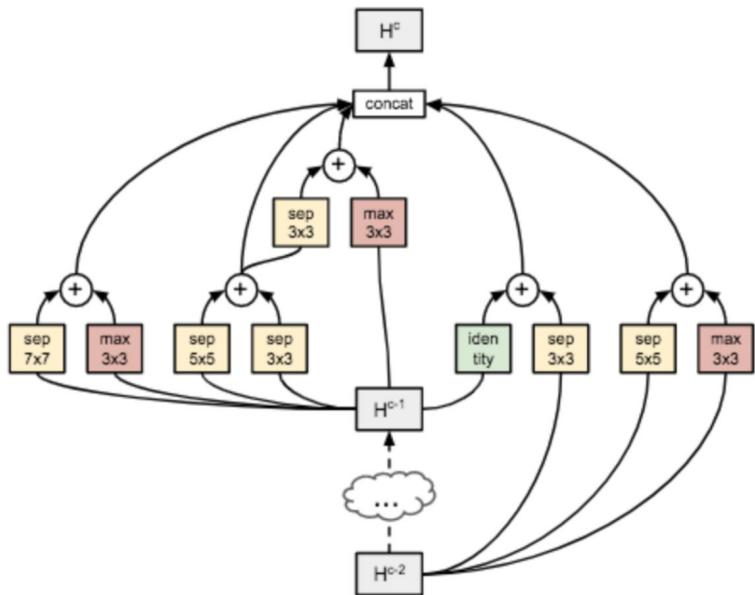
■ **Sequential model-based optimization**

- surrogate function
- can predict the performance of a structure without needing to training it

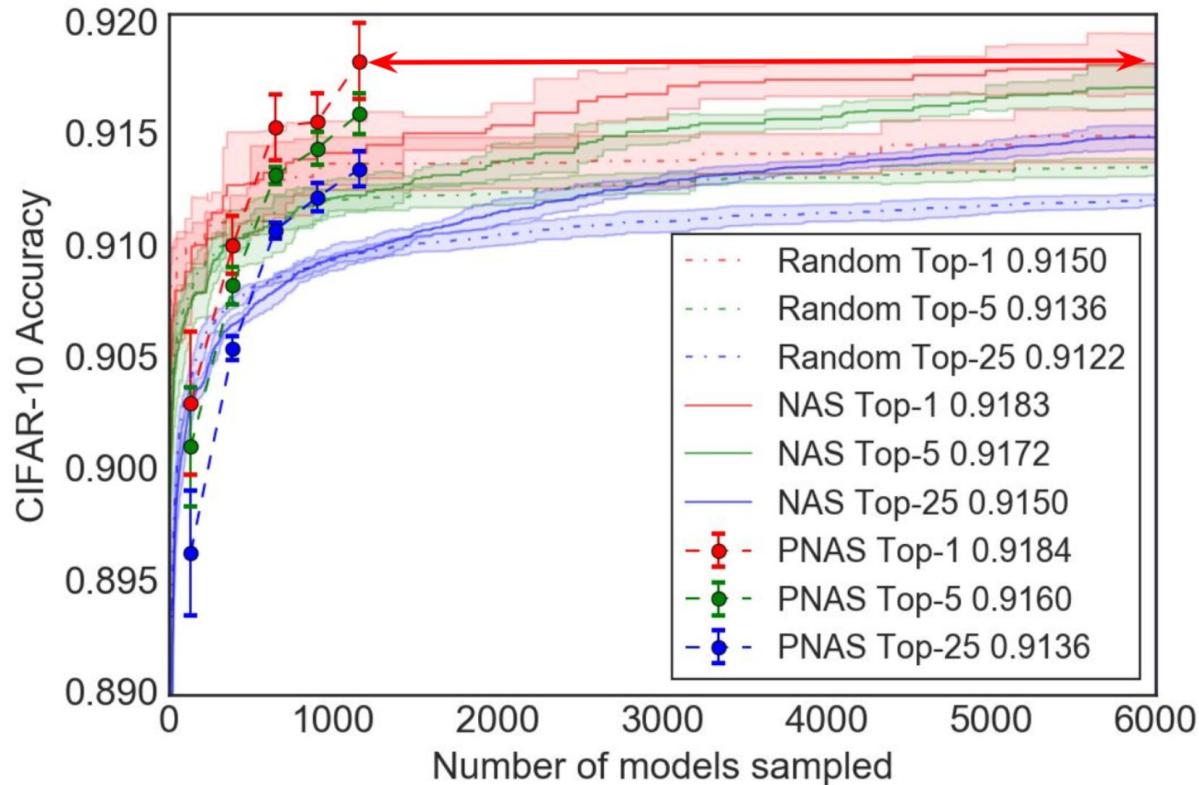
Progressive Neural Architecture Search



Progressive Neural Architecture Search



Progressive Neural Architecture Search



Neural Architecture Search

- Learning Transferable Architectures for Scalable Image Recognition
 - Blocks and Cell instead of entire networks
- Efficient Neural Architecture Search via Parameter Sharing
 - Share trained weights between runs for each block
- **Progressive** Neural Architecture Search
 - Start small, add blocks, predict with combination most promising

Efficient Progressive Neural Architecture Search

Efficient Progressive Neural Architecture Search*

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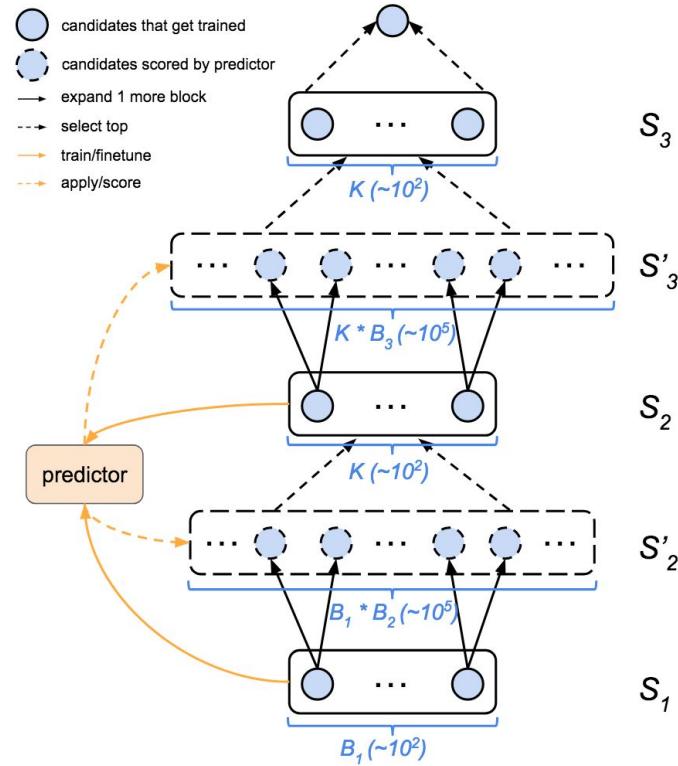
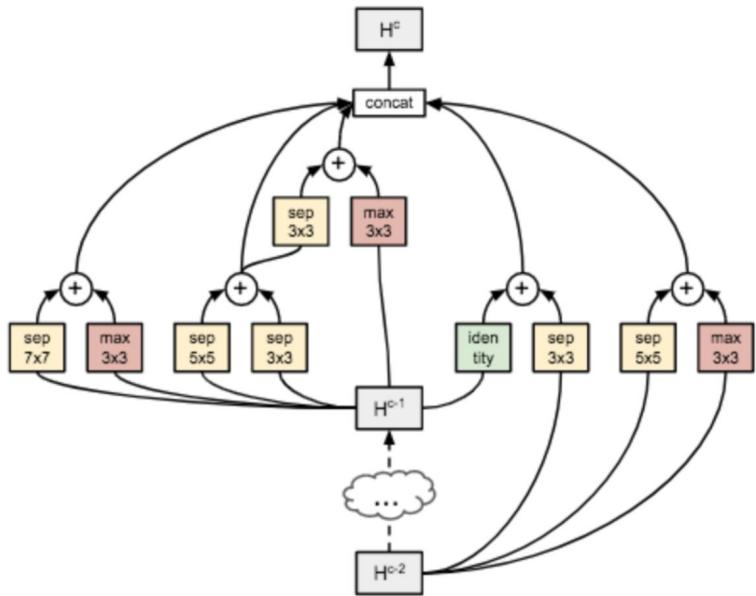
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Efficient Progressive Neural Architecture Search

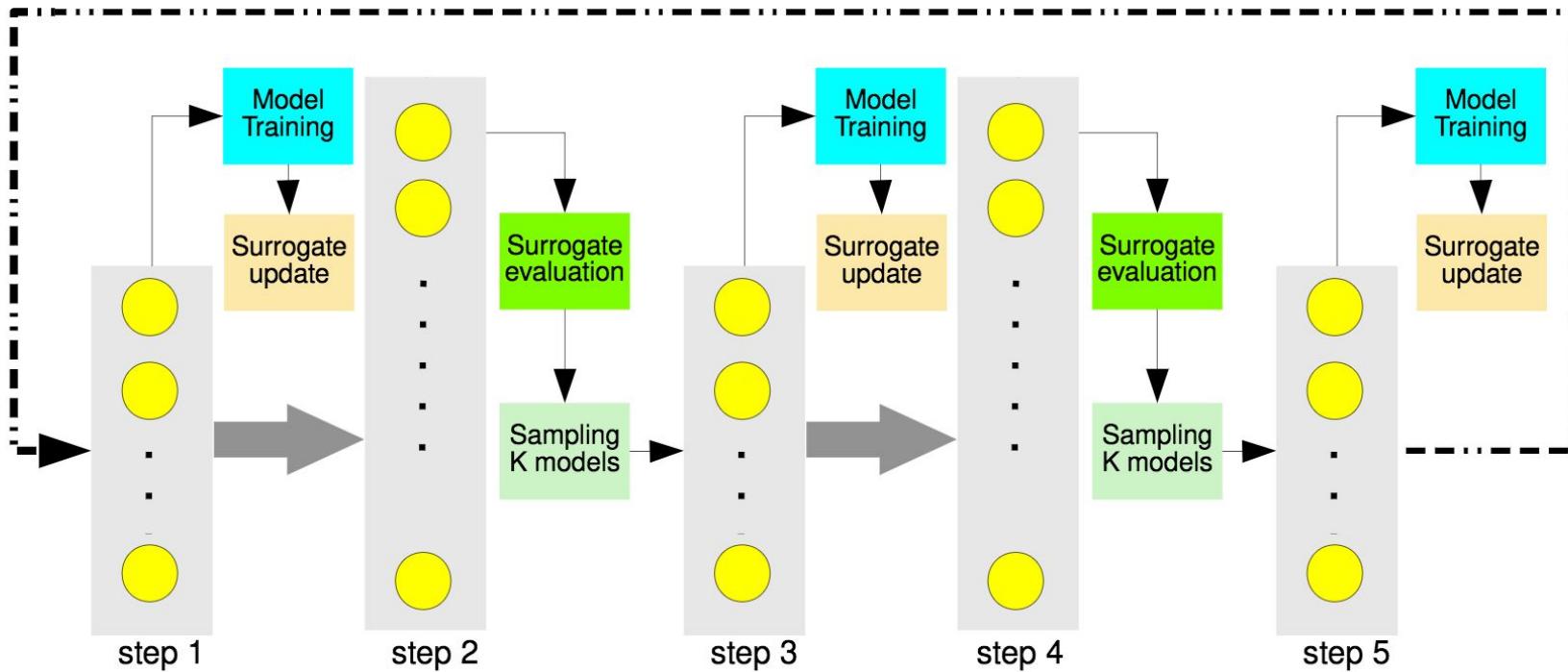
- **Combines**

- Progressice Search
- Parameter sharing
- Relaxes greedy candidate selection, sampling

Progressive Neural Architecture Search



Efficient Progressive Neural Architecture Search



Efficient Progressive Neural Architecture Search

Method	Gpus	Time (days)	Parameters (millions)	Error (%)
ResNet [7]	-	-	1.7	6.43
DenseNet [9]	-	-	25.6	3.46
Super Nets [27]	-	-	-	9.21
ConvFabrics [21]	-	-	21.2	7.43
SMASH [4]	1	1.5	16.0	4.03
QNAS [2]	10	10	11.2	6.92
NAS [30]	800	28	37.4	3.65
ENAS macro [18]	1	0.32	21.3	4.23
EPNAS macro (ours)	1	1.2	5.9	5.14
EPNAS macro (ours + more channels)	1	1.2	38.8	4.01
NASNet micro [31]	450	4	3.3	3.41
ENAS micro [18]	1	0.45	4.6	3.54
PNAS micro [15]	100	1.5	3.2	3.63
EPNAS micro (ours)	1	1.8	1.6	5.69
EPNAS micro (ours + more channels)	1	1.8	6.6	3.71

Neural Architecture Search

Vienna



Deep Learning Meetup

18 September 2018 @ WKO

#VDLM

