

# FEEDBACK SOBRE O NIPS 2016

Joinville Machine Learning  
15 de Março de 2017

MAGRATHEA LABS

[www.magrathealabs.com](http://www.magrathealabs.com)



# MAGRATHEA LABS

ENGINEERING NEW WORLDS



INTELIGÊNCIA ARTIFICIAL



ANÁLISE DE DADOS

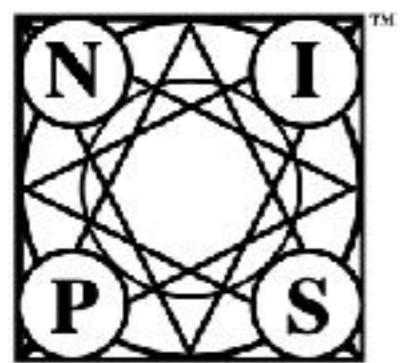


ENGENHARIA DE SOFTWARE



DESENVOLVIMENTO DE PRODUTO

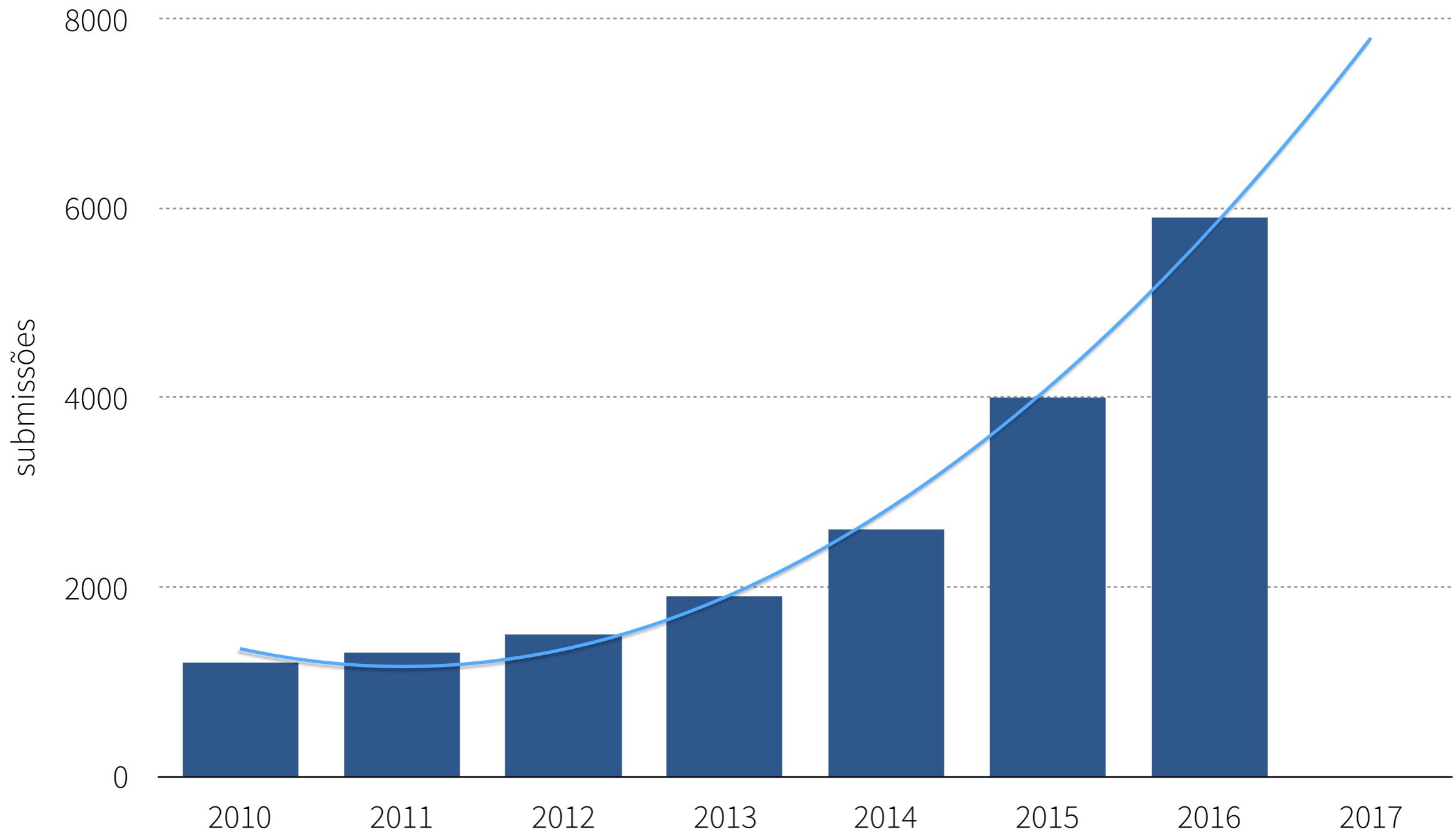


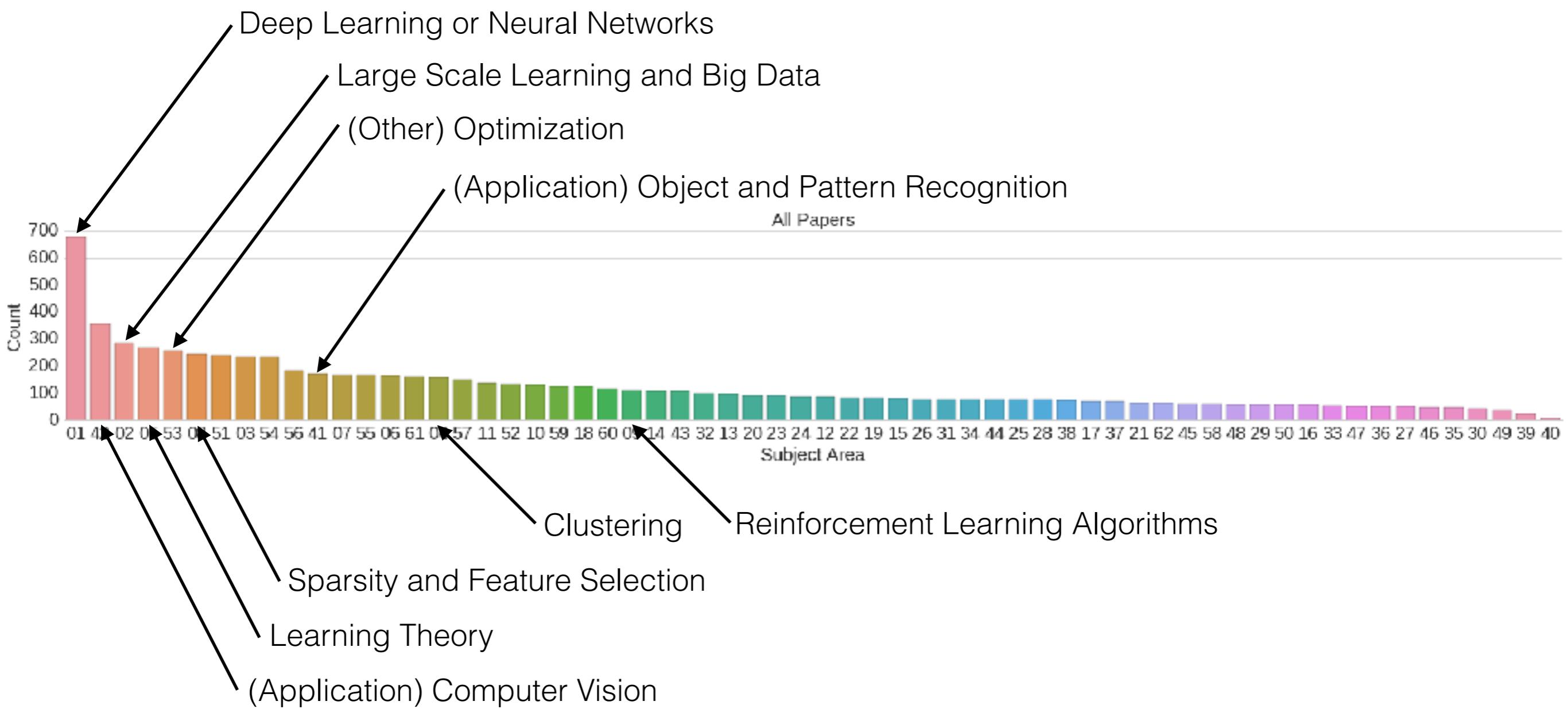


# NEURAL INFORMATION PROCESSING SYSTEMS

<https://nips.cc>

## Terry's Law (crescimento no número de submissões de artigos)







Bloomberg



**ebay**™



**ORACLE®**

**Yandex**

**Palantir**

**NOKIA**



**Google**

**nVIDIA.**

**QUALCOMM®**



**Tencent** 腾讯

**Baidu** 百度



**SAP®**

**Telefonica**

**Panasonic**



NUTS AND BOLTS OF APPLYING DEEP LEARNING - ANDREW NG

<https://www.youtube.com/watch?v=F1ka6a13S9I>



## PREDICTIVE LEARNING - YANN LECUN

<https://drive.google.com/open?id=0BxKBnD5y2M8NREZod0tVdW5FLTQ>

# GENERATIVE ADVERSARIAL NETWORKS (GAN)

A photograph of Yann LeCun, a man with glasses and a white shirt, speaking on stage. He is gesturing with his hands while speaking into a microphone. The background is dark with blue lighting.

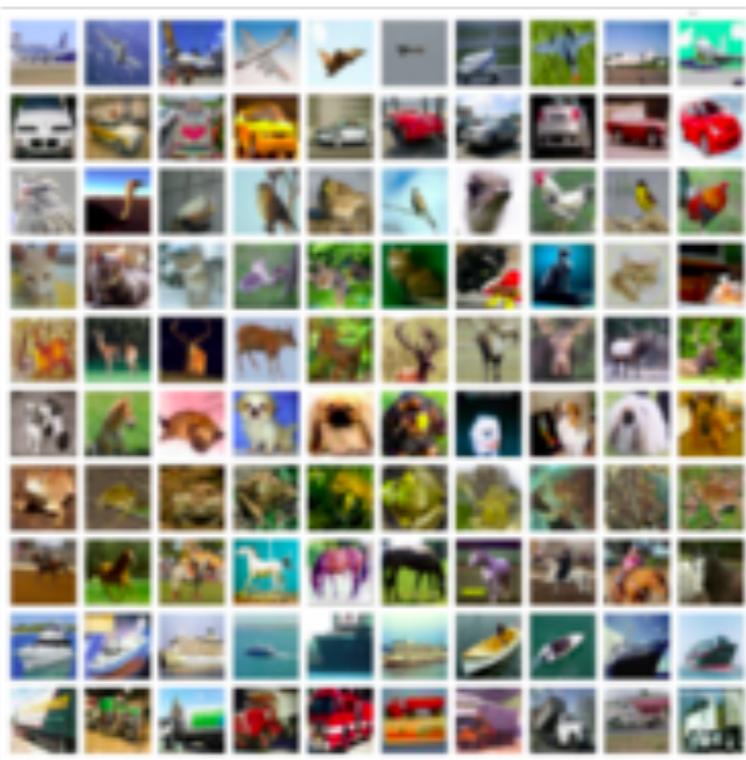
"Generative Adversarial Networks is the **most interesting idea in the last ten years** in machine learning."

Yann LeCun, Director, Facebook AI

Real / Fake

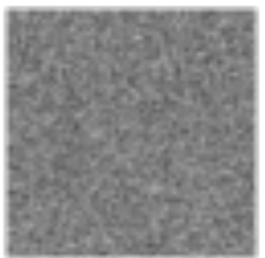


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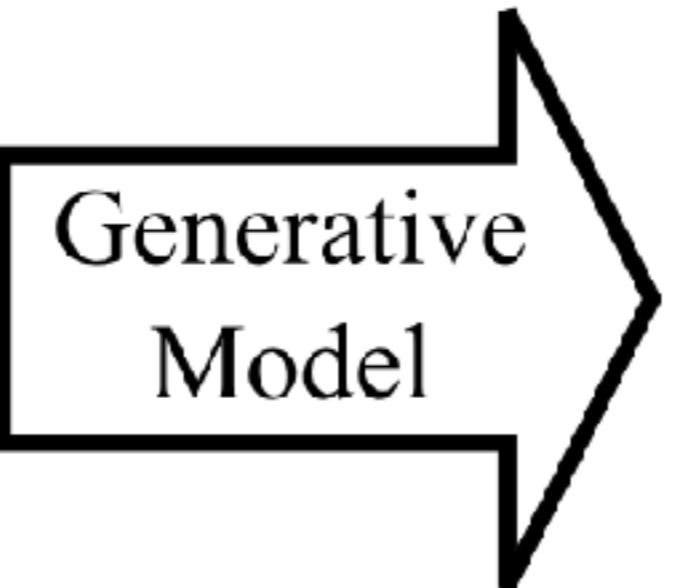
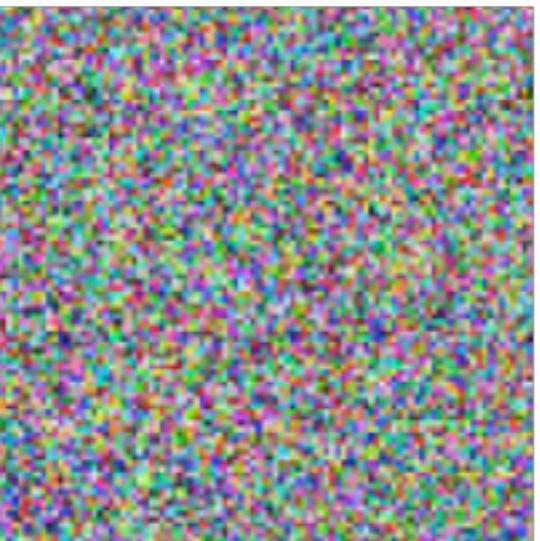


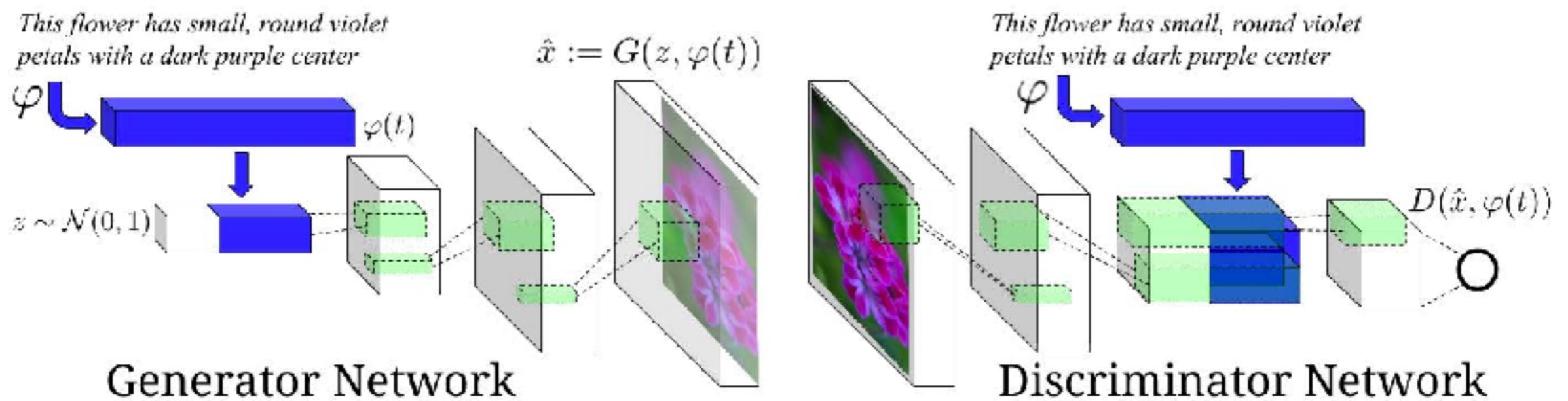
G

Z

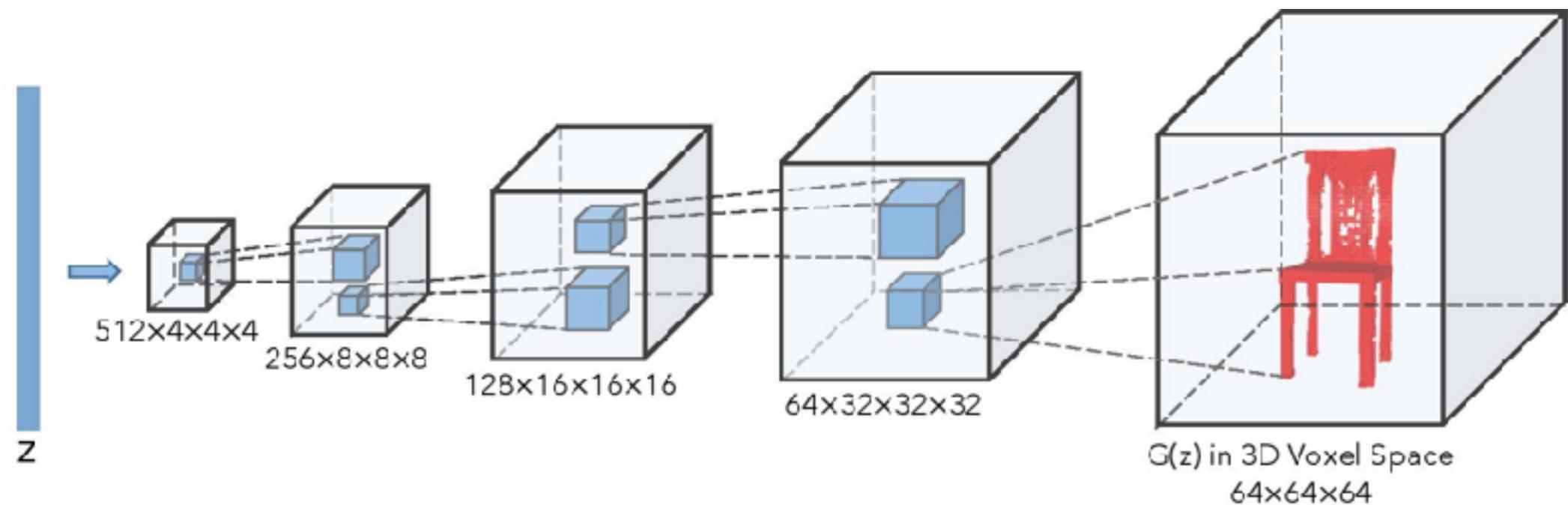


Noise  $\sim N(0,1)$





Generative Adversarial Text to Image Synthesis  
<https://arxiv.org/abs/1605.05396>



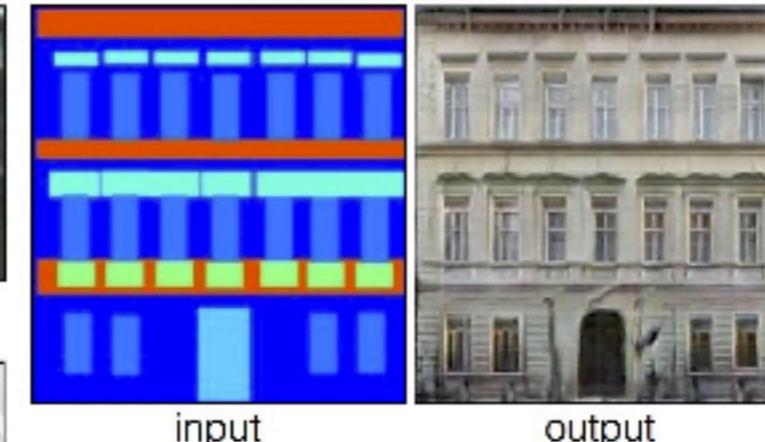
**Labels to Street Scene**



input

output

**Labels to Facade**



input

output

**BW to Color**



input

output

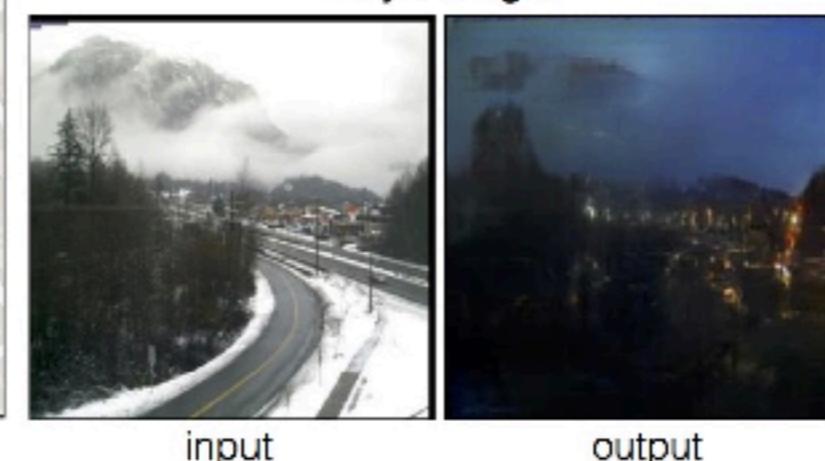
**Aerial to Map**



input

output

**Day to Night**



input

output

**Edges to Photo**



input

output

## ■ “Pure” Reinforcement Learning (cherry)

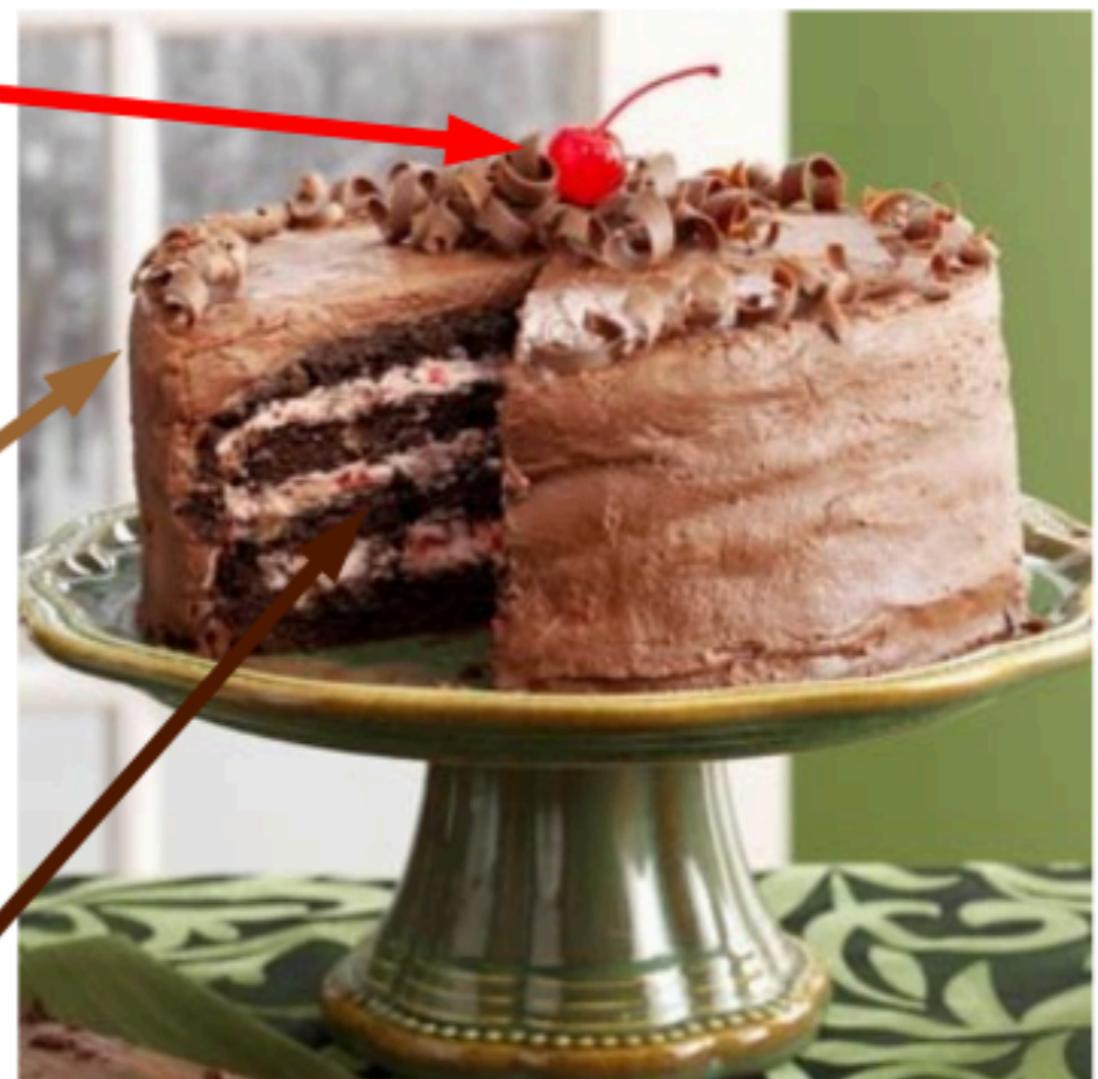
- ▶ The machine predicts a scalar reward given once in a while.
- ▶ **A few bits for some samples**

## ■ Supervised Learning (icing)

- ▶ The machine predicts a category or a few numbers for each input
- ▶ Predicting human-supplied data
- ▶ **10→10,000 bits per sample**

## ■ Unsupervised/Predictive Learning (cake)

- ▶ The machine predicts any part of its input for any observed part.
- ▶ Predicts future frames in videos
- ▶ **Millions of bits per sample**



■ (Yes, I know, this picture is slightly offensive to RL folks. But I'll make it up)



# magenta

Make Music and Art Using Machine Learning

GET STARTED

Magenta: Make Music and Art Using Machine Learning  
<https://magenta.tensorflow.org>  
<https://github.com/tensorflow/magenta>

# REINFORCEMENT LEARNING

# REINFORCEMENT LEARNING

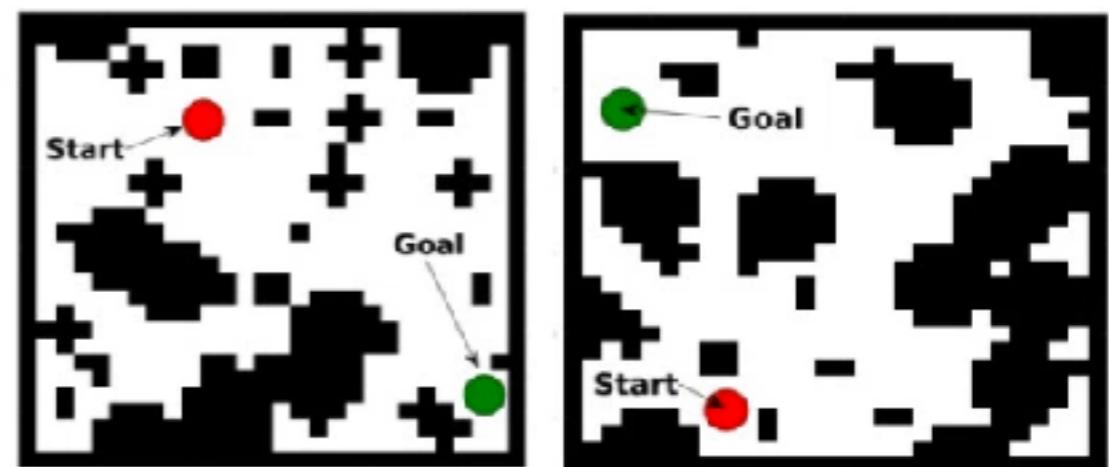
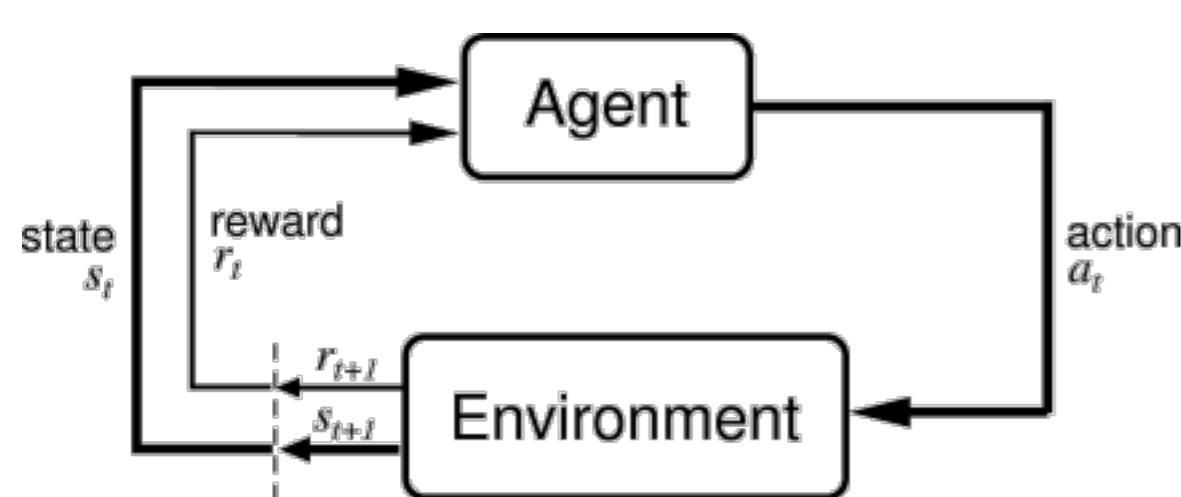
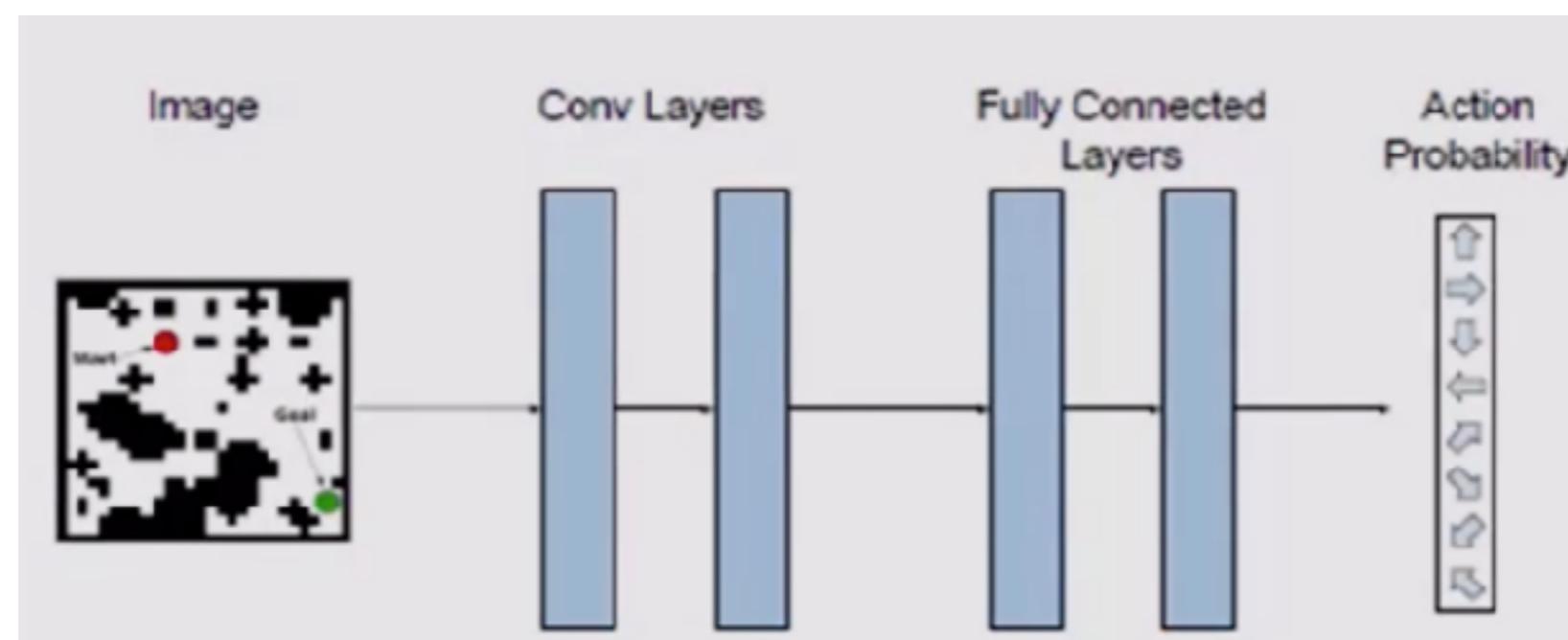
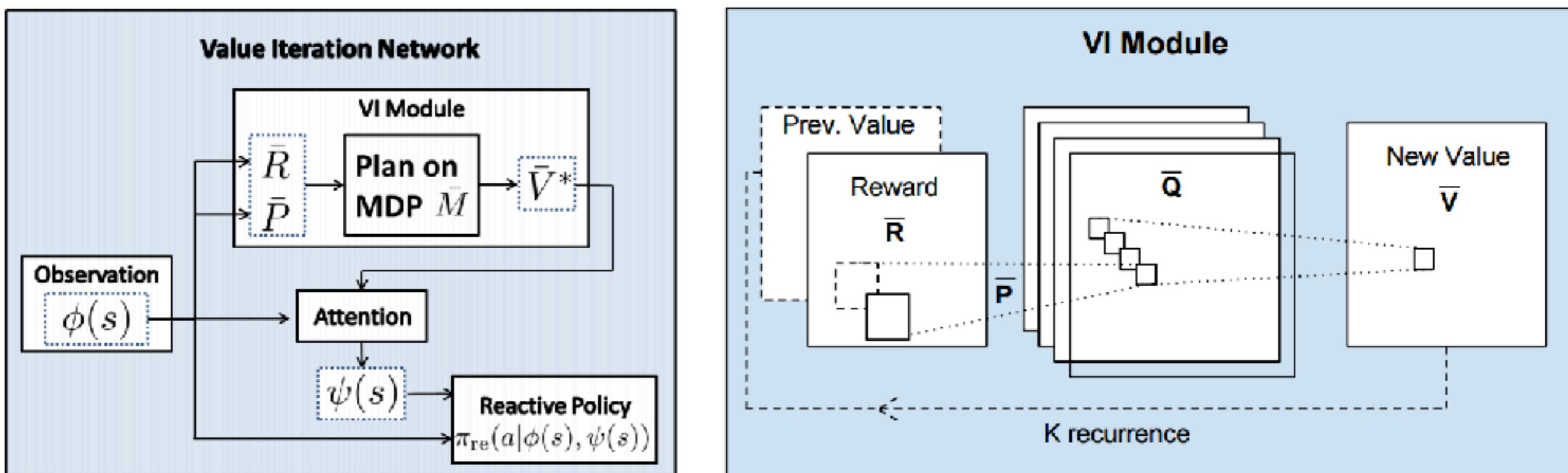


Figure 1: Two instances of a grid-world domain. Task is to move to the goal between the obstacles.



# VALUE ITERATION NETWORKS

- Value Iteration é um algoritmo para computar o valor ótimo para uma função ou política





<https://github.com/Microsoft/malmo>



<https://github.com/deepmind/lab>



# UNIVERSE

<https://openai.com/blog/universe/>

# META-LEARNING

# Learning to Learn, to Program, to Explore and to Seek Knowledge

Nando de Freitas

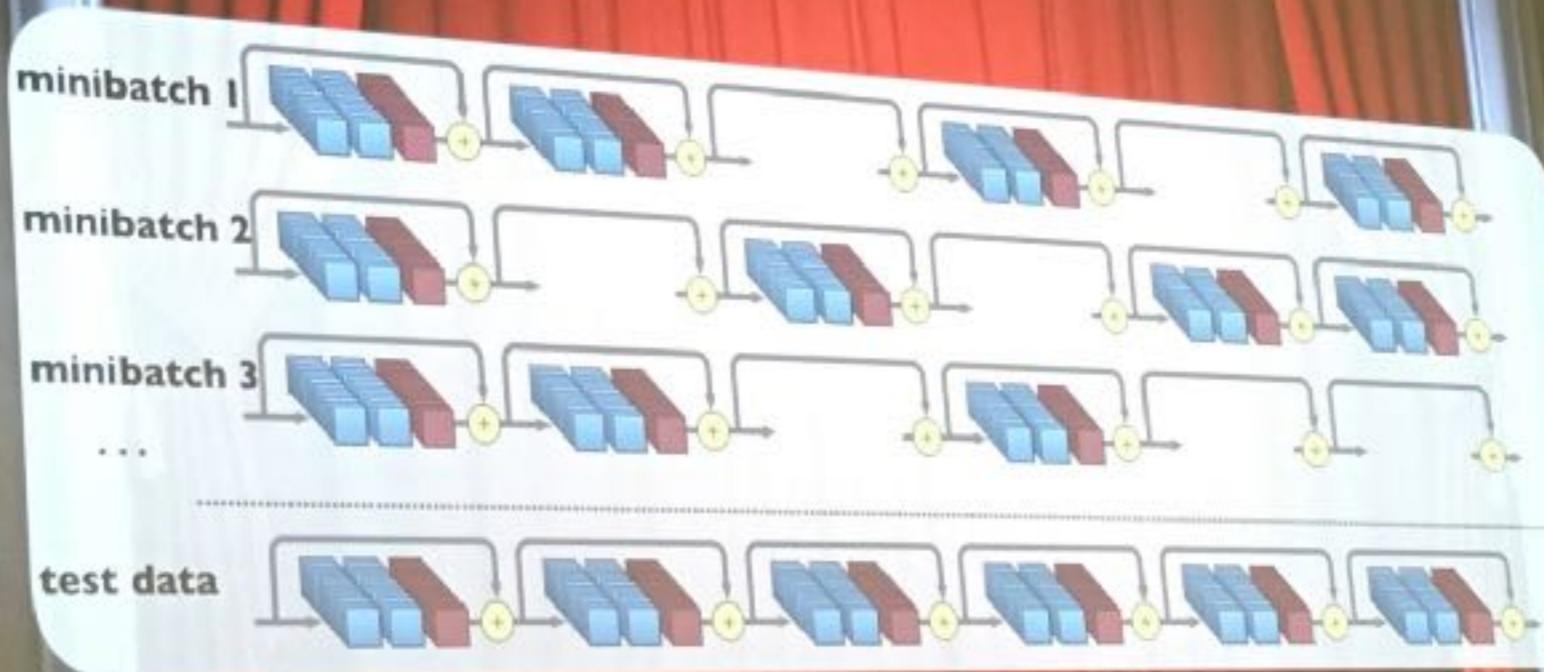
Misha Denil, Scott Reed, Marcin Andrychowicz, Matt Hoffman,  
Sergio Gomez Colmenarejo, Yutian Chen, Serkan Cabi, Ziyu Wang, Brendan  
Shillingford, Yannis Assael, Jakob Foerster  
and many others at DeepMind

DeepMind, University of Oxford, CIFAR

NIPS 2016 RNN Symposium

STOCHARTIC DEPTH

# STOCHASTIC DEPTH

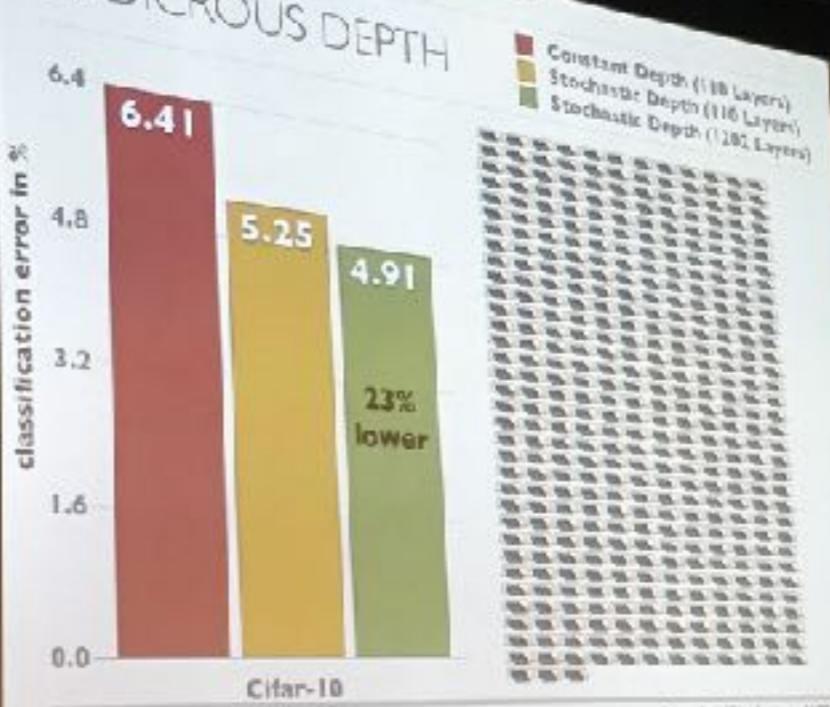


<https://arxiv.org/abs/1603.09382>

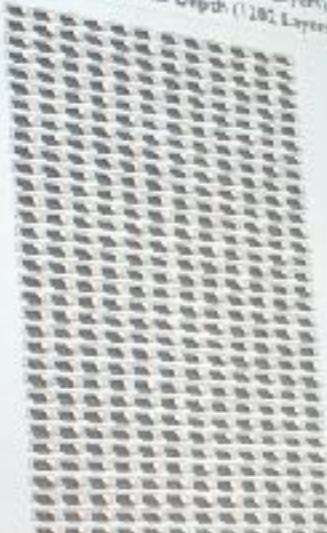
## RESULTS



## LUDICROUS DEPTH



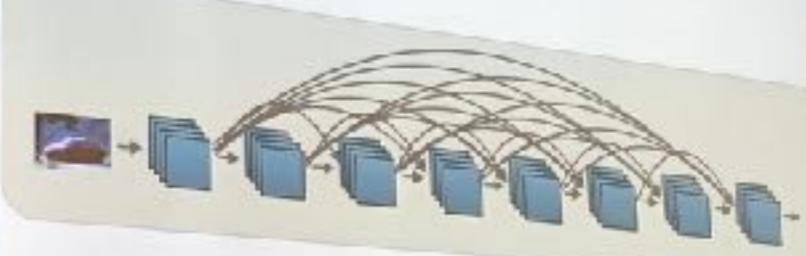
Constant Depth (110 Layers)  
Stochastic Depth (110 Layers)  
Stochastic Depth (1281 Layers)



Sergey Levine, NIPS 2016

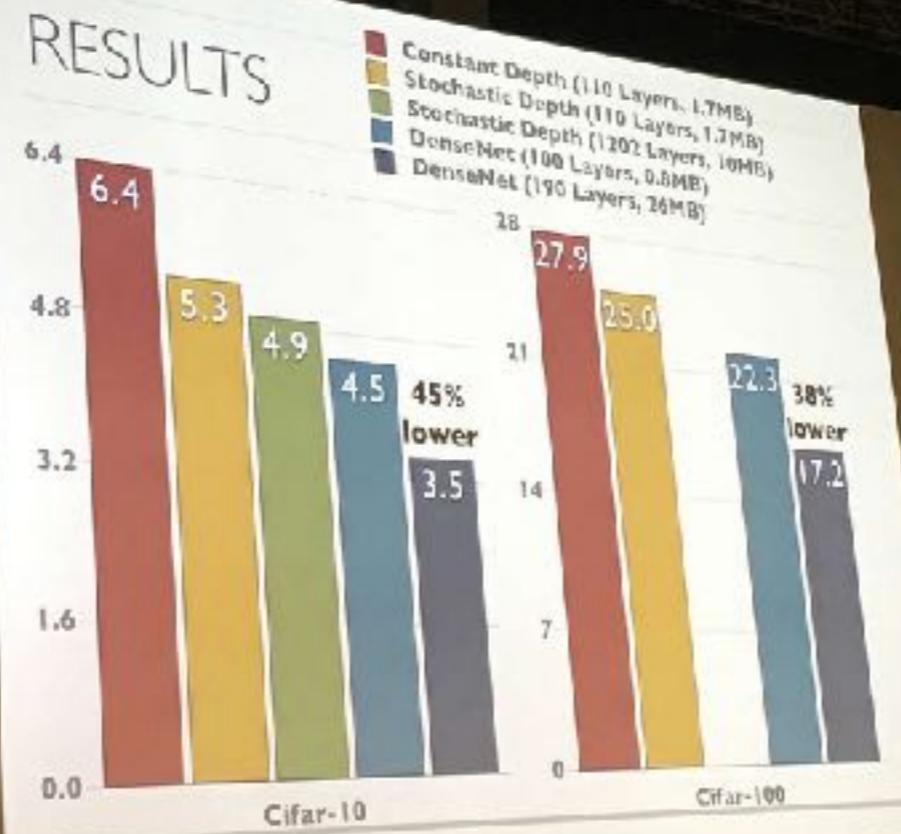
## DENSE CONNECTIVITY

Connect every layer to every other layer of the same filter size.  
[arXiv:1608.06993]



AdaNet [arXiv:1607.01097]

## RESULTS



## CONCLUSION

Use ResNets with Stochastic Depth

- lower training time
- lower testing error

Try out Dense Connectivity!

- Explicit long term connections
- Best generalization performance

# OUTROS PAPERS E LINKS

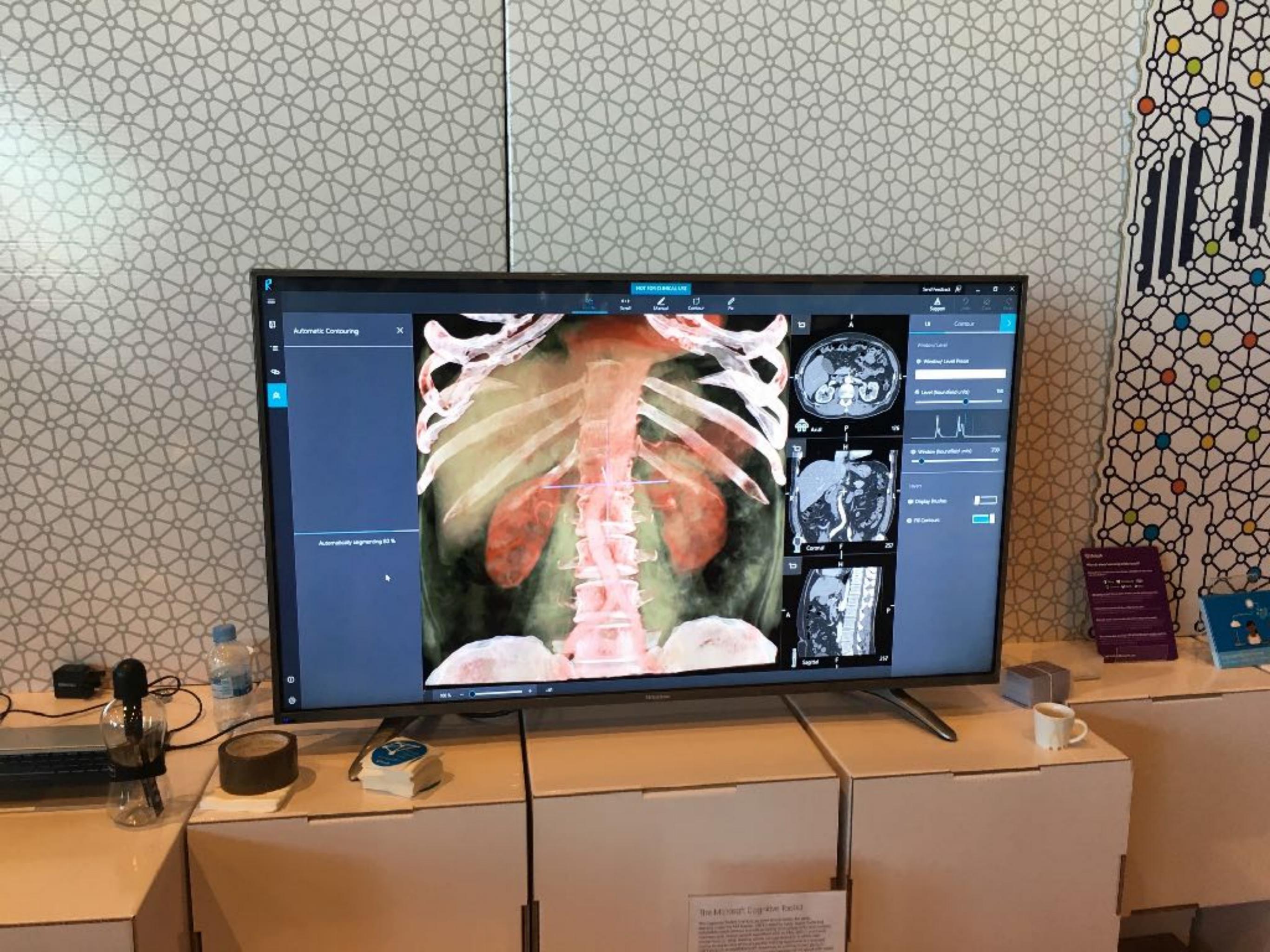
- [Nuts and bolts of building AI applications using Deep Learning](#)
- [Introduction to Generative Adversarial Networks](#)
- [How to train a GAN?](#)
- [Fast and Provably Good Seedings for k-Means](#)
- [On the Expressive Power of Deep Learning: A Tensor Analysis](#)
- [The Nuts and Bolts of Deep Reinforcement Learning Research](#)
- [Value Iteration Networks](#)
- [Building Machines That Learn and Think Like People](#)
- [Lista de tutoriais](#)
- [Lista de projetos Open Source](#)
- [Palestras](#)











The Microsoft Cognitive Toolkit



ImageNetRT

Inference Time:

9.0 ms

110fps

Coffee Mug  
Red Wine  
Coffeepot



ASUS

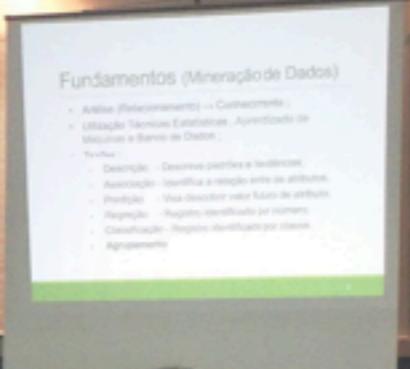


VÁRIOS BRASILEIROS  
MAS TODOS MORANDO FORA

6 MESES DE  
JOINVILLE.ML

SAÍDA

SAÍDA





ContaAzul





Algoritmos bio-inspirados e  
neuroevolução

Diego Trentini

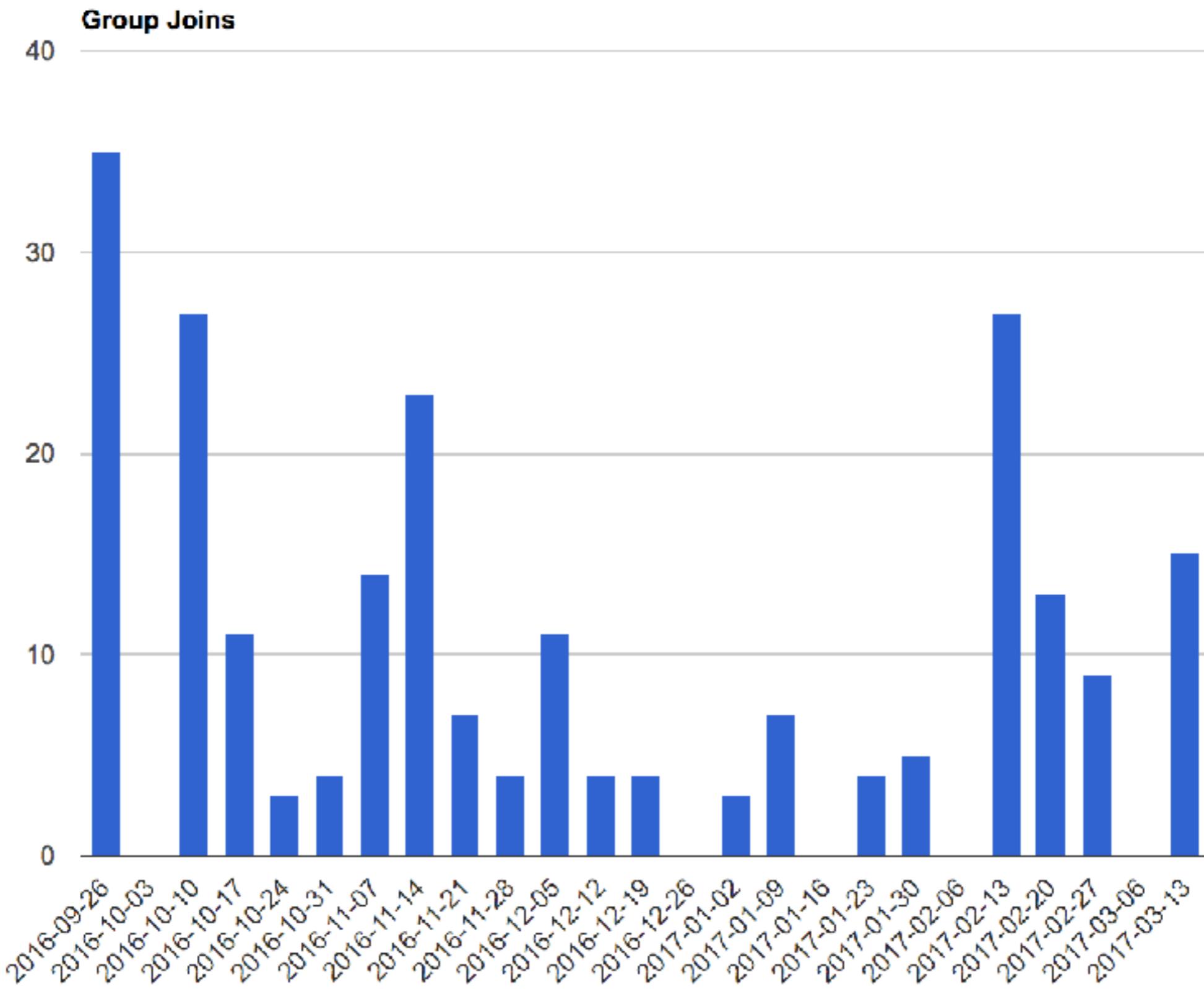
Algoritmos bio-inspirados e  
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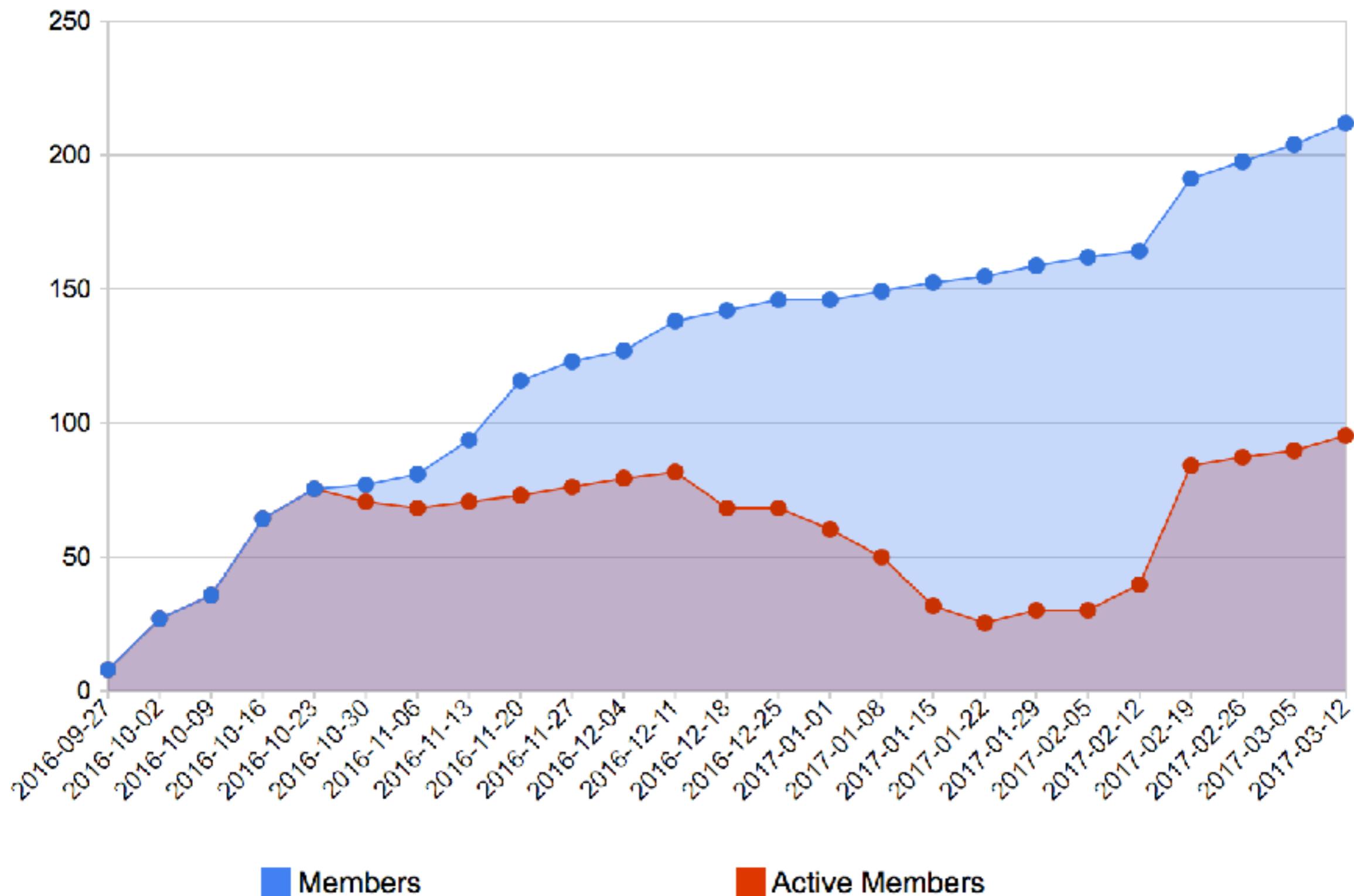
TOTVS

SAÍDA





# Total and Active Members



joinville.ml

# Joinville Machine Learning

Comunidade de empreendedores, engenheiros, cientistas e entusiastas de Aprendizado de Máquinas de Joinville, SC

m KQ f #

## Comunidade

Participe do **Clube de Computação Aplicada** que acontece semanalmente na quarta-feira a partir das 19 horas no [Fab Lab Joinville](#).

Este é o site da comunidade Joinville Machine Learning. Nossa comunidade nasceu depois que algumas pessoas se encontraram na Semana da Computação da UDESC. Realizamos um evento mensal para apresentar os projetos em que estamos trabalhando, artigos interessantes e tutoriais de ferramentas. Somos entusiastas, cientistas e engenheiros que estão atuando na área, estudando ou tentando descobrir um pouco mais sobre o assunto. *Não existe nenhum pré-requisito para participar dos nossos eventos.*

Participe do nosso [Meetup](#) e acompanhe os projetos da comunidade no [GitHub](#) e no [Kaggle](#).

## Últimos Eventos

Os materiais apresentados nos encontros estão no nosso [repositório de eventos](#).

- 15 de Março ([Apresentações](#))
- 15 de Fevereiro ([Apresentações](#))
- 14 de Dezembro ([Apresentações](#))

# PRÓXIMOS PASSOS

- Kaggle
- Instalar <https://github.com/thoughtbot/community>
- Clube de Computação Aplicada: carro autônomo