

创业者如何拥抱人工智能？

- 挑战60分钟入门深度神经网络



Huan LI (李卓桓)

PreAngel Partner
Plug and Play Venture Partner

November, 2017



Microsoft®
Most Valuable
Professional

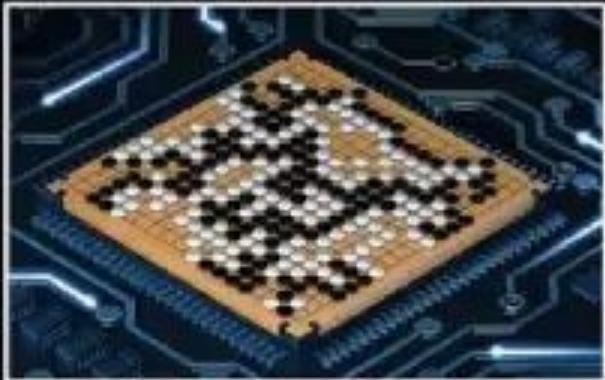


AI is Like Teenage SEX

Everyone talks about it,
Nobody really knows how to do it,
Everyone thinks everyone else is doing it,
so everyone claims they are doing it.
- Dan Ariely, Professor at Duke



Deep Learning研究生



朋友覺得我在



我媽覺得我在



大眾覺得我在



指導教授覺得我在



我以為我在



事實上我在



投资人中最AI/ML的程序员

李卓桓, PreAngel Partner, Plug and Play Venture Partner, 技术背景连续创业者, 活跃天使投资人。投资过百余家初创公司, 其中AI公司包括桔子互动; 硅心科技、ChatOpera、SIGAI等。

叽歪网创始人, zixia BBS创始人, 水木清华BBS站长; 前优酷网首席科学家。微软人工智能最具价值专家(AI MVP); 谷歌机器学习开发者专家(ML GDE)

清华大学本科, 中欧国际工商学院EMBA, 北邮 CS PhD
曾撰写《Linux网络编程》、《反垃圾邮件完全手册》
和《智能问答深度学习》等技术作品。



个人爱好



- 滑翔伞全国排位赛第29名 (2005)
- SALSA拉丁舞精彩人生比赛第1名 (2009)
- 跑酷红牛全国赛第81名 (2009)
- MMA (Mixed Martial Arts) 综合格斗爱好者
- Ham Radio业余无线电三级



Completed Machine Learning Course

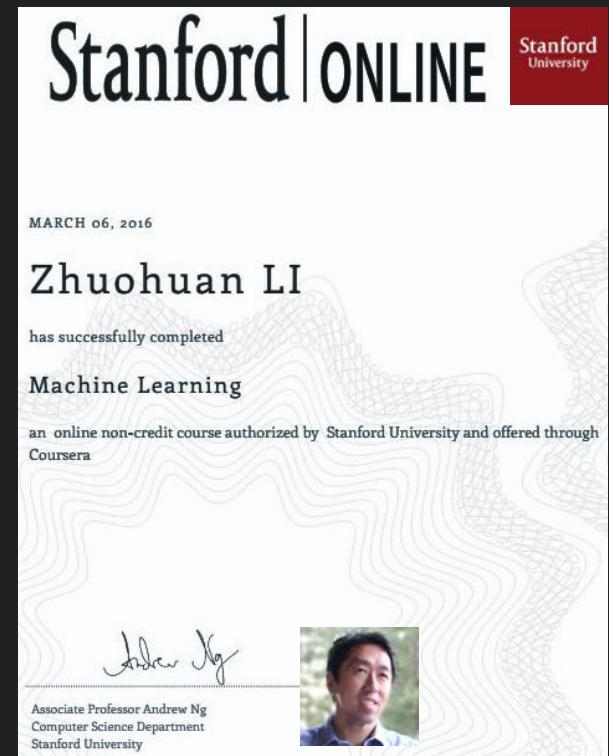
By Andrew Ng, Stanford

Andrew Ng: Associate Professor, Stanford University; Chief Scientist, Baidu; Chairman and Co-founder, Coursera.

机器学习是一门研究在非特定编程条件下让计算机采取行动的学科。

包括:智能机器人(感知和控制)、文本理解(网络搜索和垃圾邮件过滤)、计算机视觉、医学信息学、音频、数据库挖掘等领域。

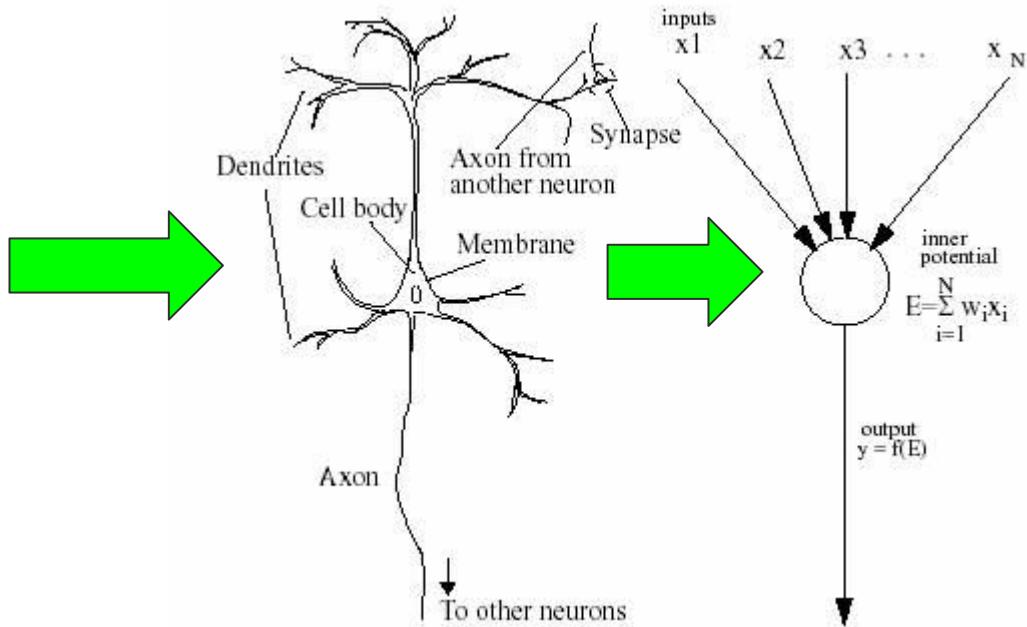
<https://www.coursera.org/learn/machine-learning> 11 Weeks



1. 深度神经网络的历史发展

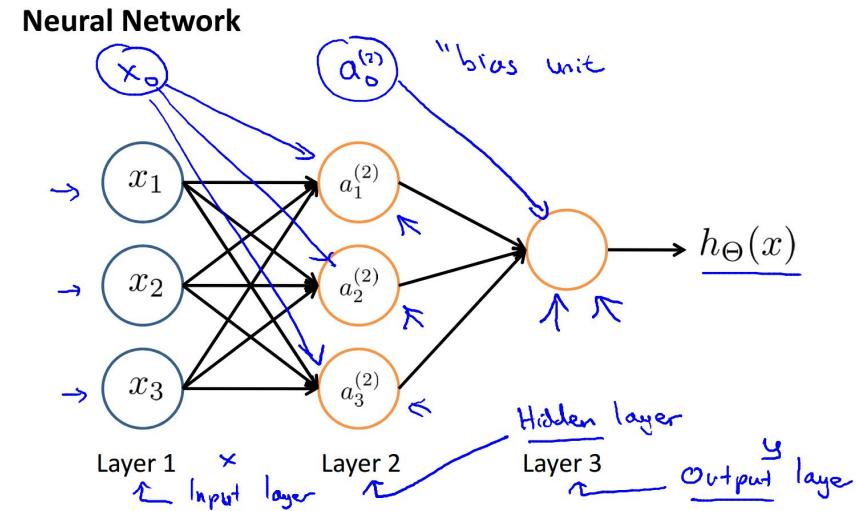
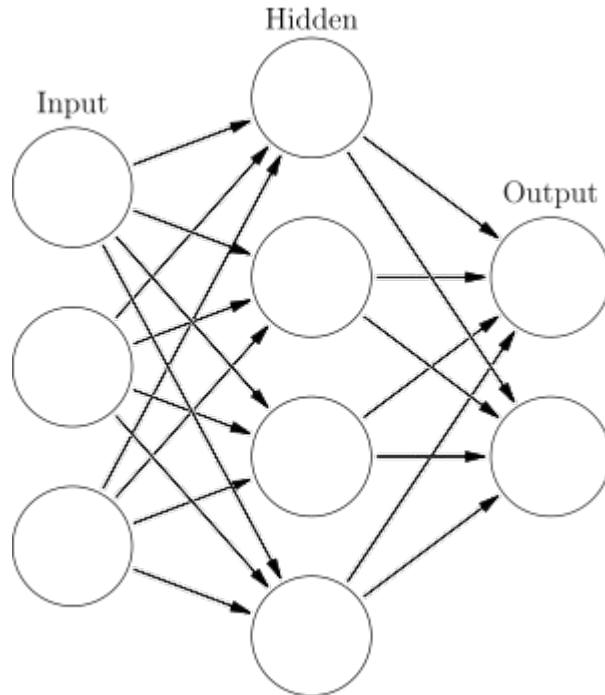
2. 10+个机器学习解决问题的有趣例子

从仿生角度得到的启发:单个大脑神经元的工作方式



Source: <http://commonsenseatheism.com/?p=13607>

从仿生角度得到的启发：多个神经元协同的数学模型



Source: Machine Learning, Andrew Ng, Coursera

神经网络应用案例:计算机视觉识别图片中的物体

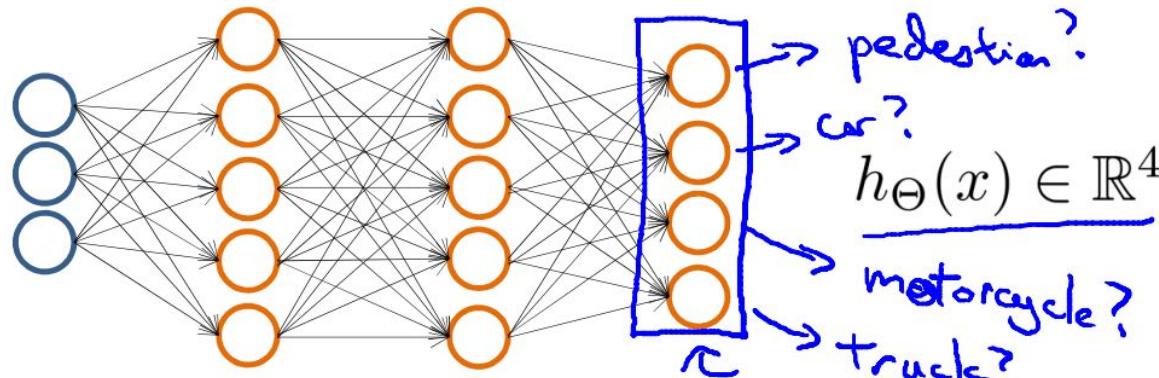


Pedestrian

Car

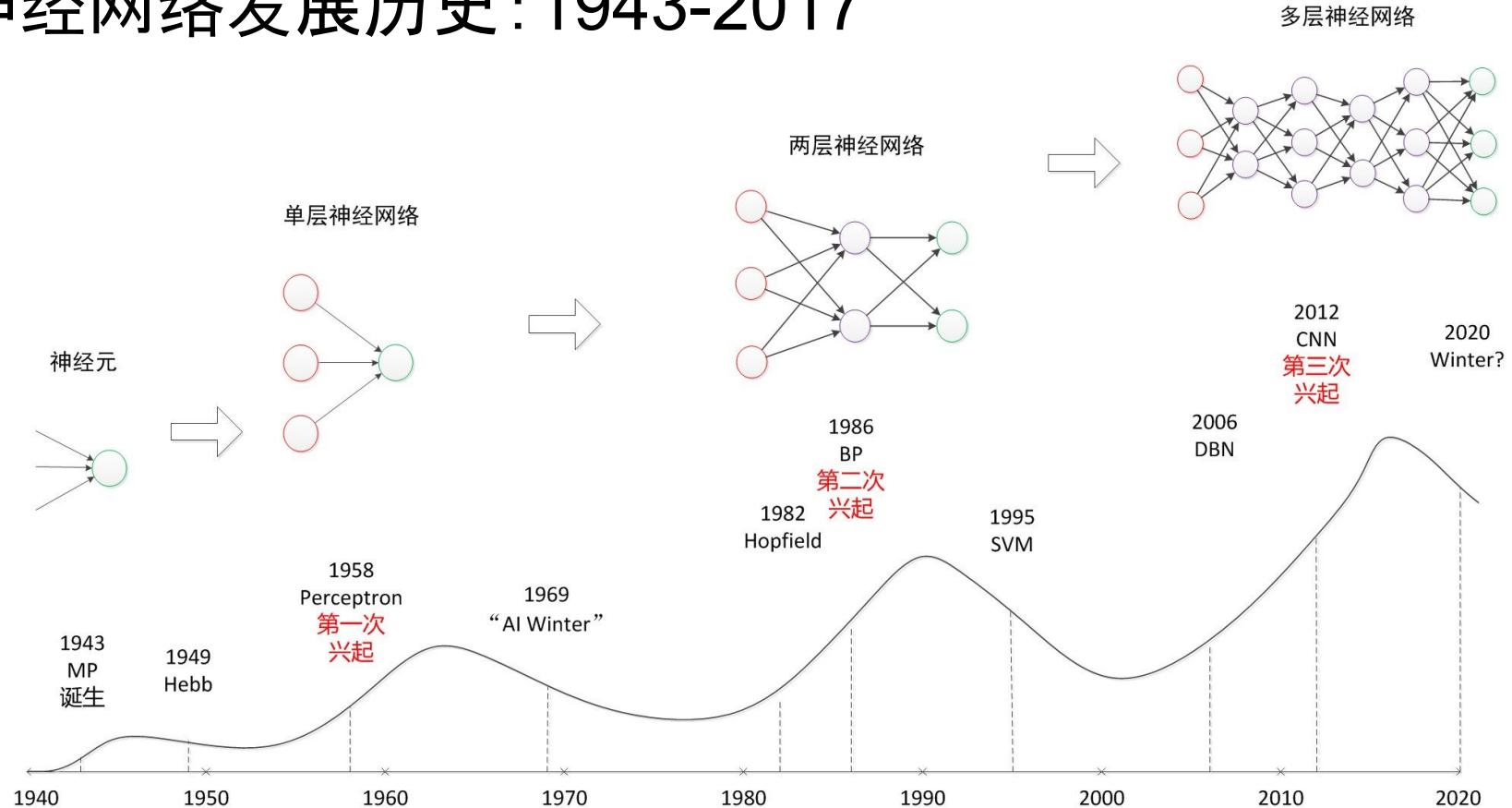
Motorcycle

Truck



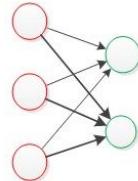
Source: Machine Learning, Andrew Ng, Coursera

神经网络发展历史: 1943-2017

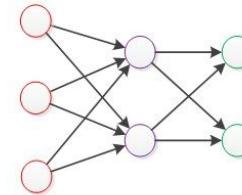


神经网络发展基础:计算能力的飞速提升

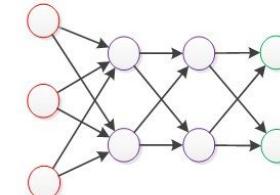
单层神经网络
(60-70)



两层神经网络
(85-95)



多层神经网络
(2010-)



计算能力 :

晶体管

CPU

集群或GPU



数据量:

1-10

1K-10K

1M-100M

算法:

学习算法

BP算法

Pre-training,
Dropout等方法

人工智能定义与发展轨迹

□ 学术界重要观点



✓ 1956 年达特茅斯会议：

人工智能就是使机器的反应方式像人行动时一样所依据的智能。

✓ Nils J. Nilsson (Stanford) :

人工智能是关于知识的学科——怎么表示知识以及怎样获得知识并使用知识的。

✓ Patrick Winston (MIT) :

人工智能就是研究如何使计算机去做过去只有人才做的智能工作。

人工智能是一门综合了计算机科学、生理学、哲学的交叉学科。凡是使用机器代替人类实现认知、识别、分析决策等功能，均可认为使用了人工智能技术。 —— 《36Kr 人工智能行业研究报告》

□ 人工智能发展轨迹

人工神经网络和数学模型建立；计算机与人工智能之父图灵提出图灵测试。

达特茅斯会议召开，标志着人工智能的诞生；随之国际研究潮流兴起，学术交流频繁。

受计算能力限制，国家和公众信心减弱，人工智能研究陷入沉寂。

BP 算法开始研究；半导体技术发展提升计算能力；人工智能研究开始复苏。

计算机硬件能力快速提升；互联网构建，分布式降低人工智能计算成本；深度学习提出，人工智能开始面向实际应用场景

1943

萌芽期

1956

启动期

1969

消沉期

1975

突破期

1986

发展期

2006

高速发展期

1. 深度神经网络的历史发展
2. 10+个机器学习解决问题的有趣例子

Example #1: 电脑写作

“让计算机学会写也一定是非常有意思的事情，试想一下，如果计算机通过读韩寒和小四的小说，就能写出有一样的调调的文字，这是多带劲的一件事啊。

于是我们把四娘的大作集合，从《幻城》到《左手倒影右手年华》，再到《悲伤逆流成河》和《小时代》，处理了处理，放在一起，丢给RNN学习了，然后，恩，我们看看它能学到什么。

小四的文字我是看不懂的，不过RNN生成的这些文字，却让我也隐约感受到了一些‘45度角仰望天空，眼泪才不会掉下来’的气息。”



每个人，闭上眼睛的时候，才能真正面对光明

他们在吱呀作响的船舷上，静静看着世界，没有痛苦的声音，碎裂的海洋里 摆晃出阵阵沉默，吞噬过来。他们的躯体，一点，一点，逐渐暗淡在巨浪中，下沉。温润、潮湿、环抱，他手中兰花草磨成的微笑已经腐烂。记忆破蛹而出，翻滚着随风摆动的兰花草，气味扑鼻，海潮依旧。

尘世凡间 沉睡亿万光年的年轻战士 萦绕不散的寂寞烟云中 静候在末世岛屿之上 守候，女王何时归来 你的目光延向她迟归的方向 缓缓推进的海浪 这最后一夜 荡漾

Shakespeare

PANDARUS:

Alas, I think he shall be come approached and the day
When little strain would be attain'd into being never fed,
And who is but a chain and subjects of his death,
I should not sleep.

Second Senator:

They are away this miseries, produced upon my soul,
Breaking and strongly should be buried, when I perish
The earth and thoughts of many states.

DUKE VINCENTIO:

Well, your wit is in the care of side and that.

Second Lord:

They would be ruled after this chamber, and
my fair nues begun out of the fact, to be conveyed,
Whose noble souls I'll have the heart of the wars.

VIOLA:

Why, Salisbury must find his flesh and thought
That which I am not aps, not a man and in fire,
To show the reining of the raven and the wars
To grace my hand reproach within, and not a fair are
hand ...

My power to give thee but so much as hell:
Some service in the noble bondman here,
Would show him to her wine.

KING LEAR:

O, if you were a feeble sight, the courtesy of your law,
Your sight and several breath, will wear the gods
With his heads, and my hands are wonder'd at the
deeds,
So drop upon your lordship's head, and your opinion
Shall be against your honour.

Example #2: 摘要图片内容为文字说明



a black and white cat sitting in a bathroom sink



a young man riding a skateboard down the side
of a ramp

<https://github.com/karpathy/neuraltalk2>



an airplane is parked on the
tarmac at an airport



a group of people standing on
top of a beach

Example #2.5: 文字描述生成图片

This flower has overlapping pink pointed petals surrounding a ring of short yellow filaments

Stage-I



Stage-II

A small yellow bird with a black crown and a short black pointed beak

Stage-I

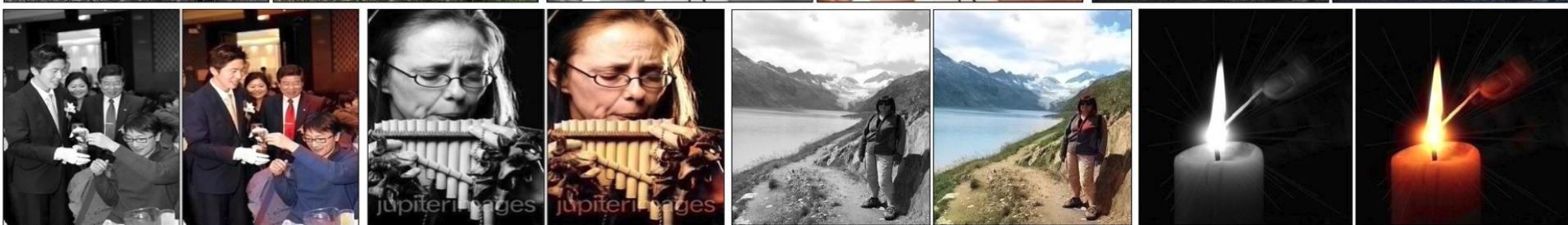
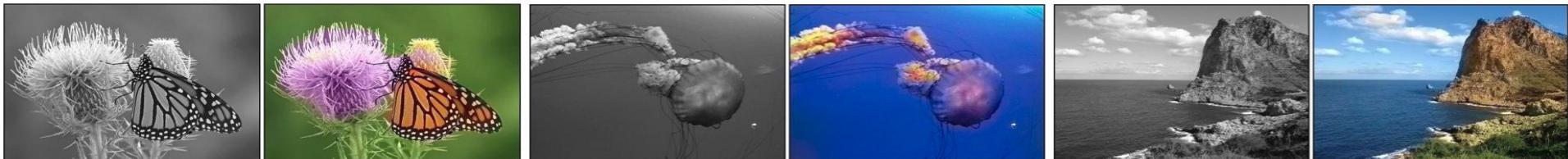


Stage-II

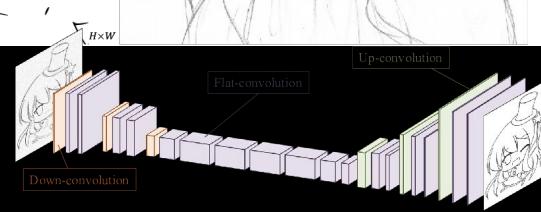
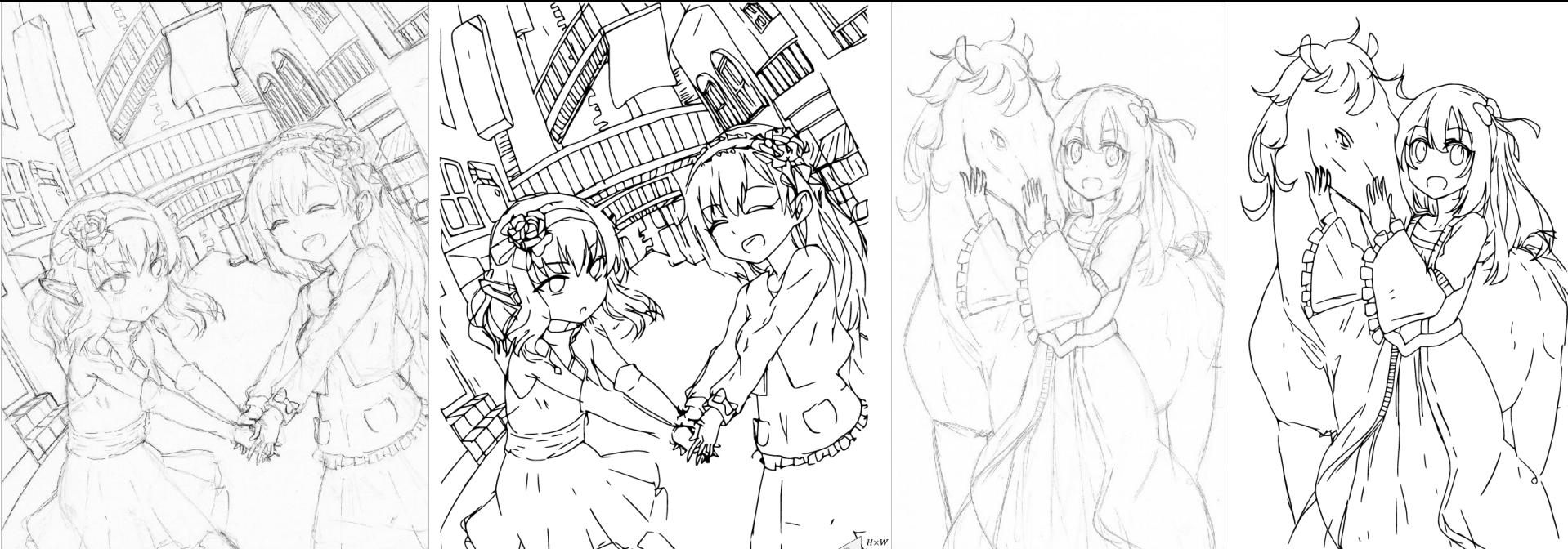
Example #3: 为黑白照片还原色彩



<https://richzhang.github.io/colorization/>

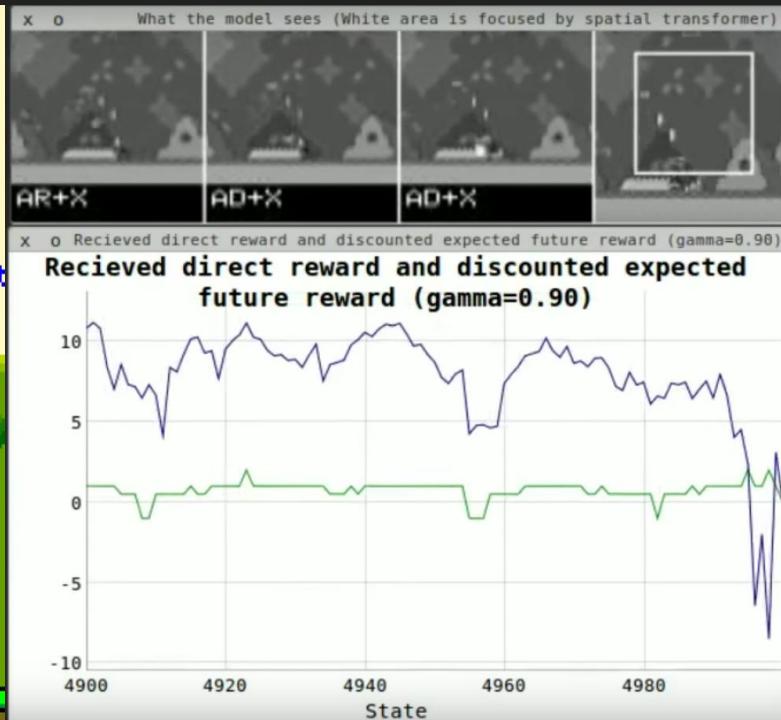
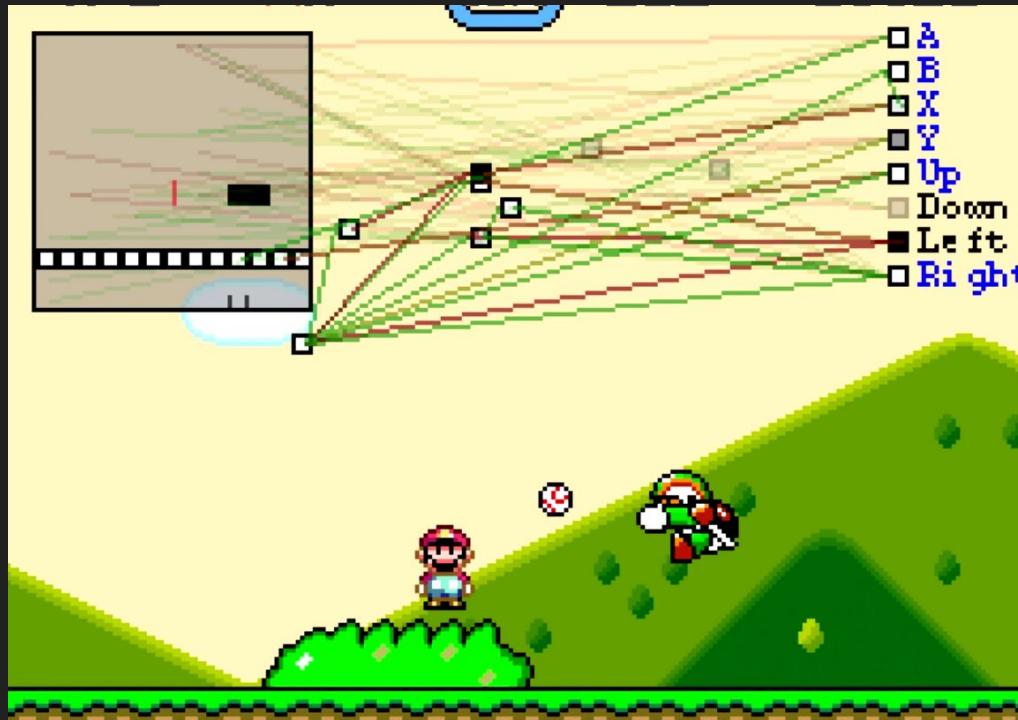


Example #3.5: 漫画草稿变成稿



<http://hi.cs.waseda.ac.jp/~esimo/en/research/sketch/>

Example #4: 学习打游戏

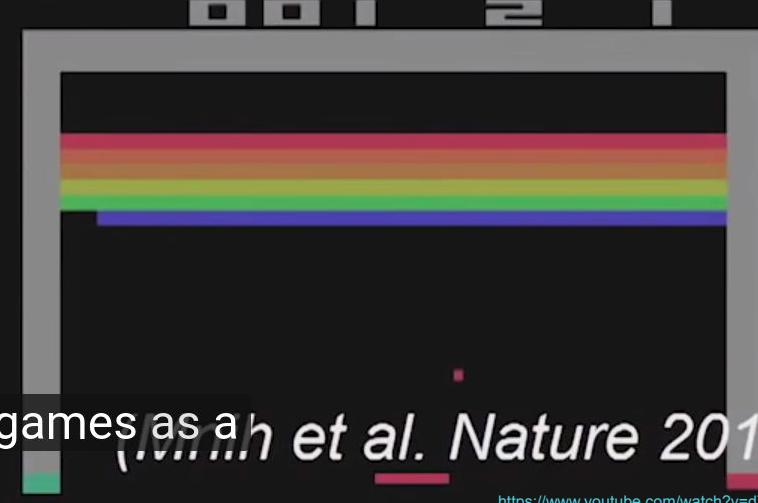
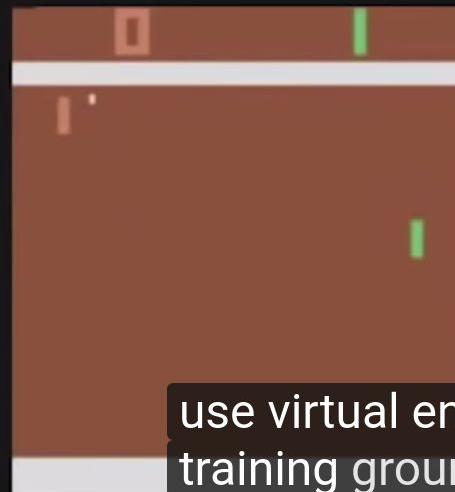


<http://www.ehrenbray.com/2016/08/teaching-your-computer-to-play-super-mario-bros-a-fork-of-the-google-deepmind-atari-machine-learning-project/>

<https://github.com/aleju/mario-ai>

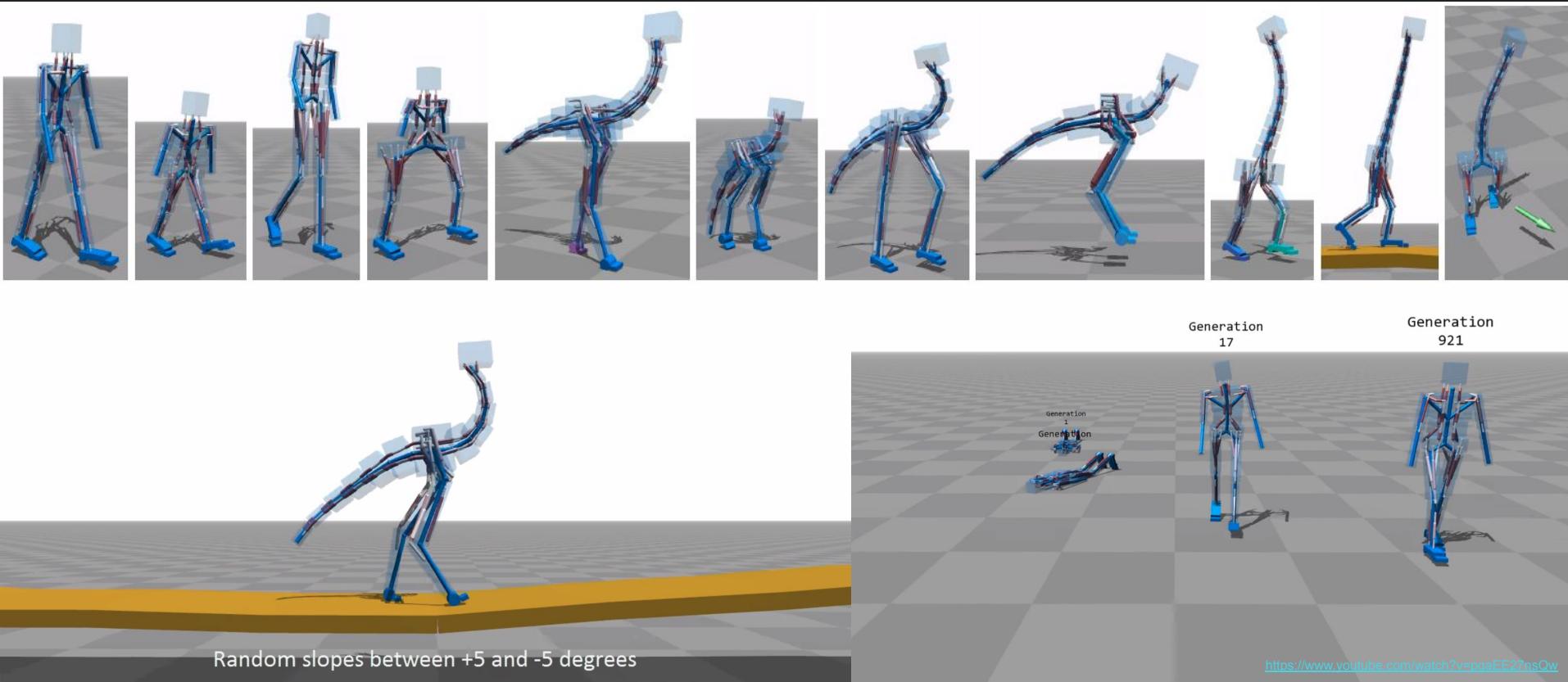


Deep RL
for Atari



use virtual environments like games as a training ground for *Mnih et al. Nature 2015*

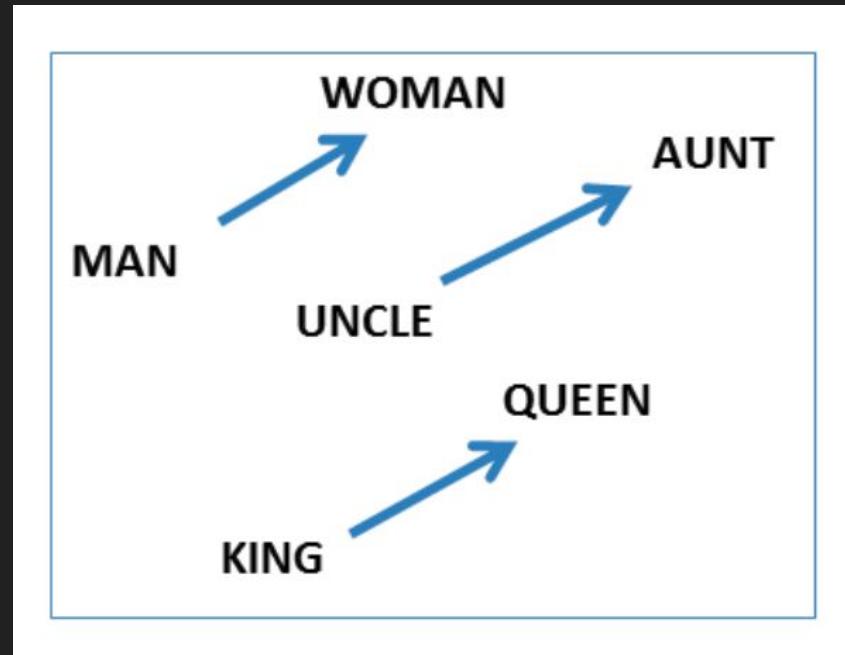
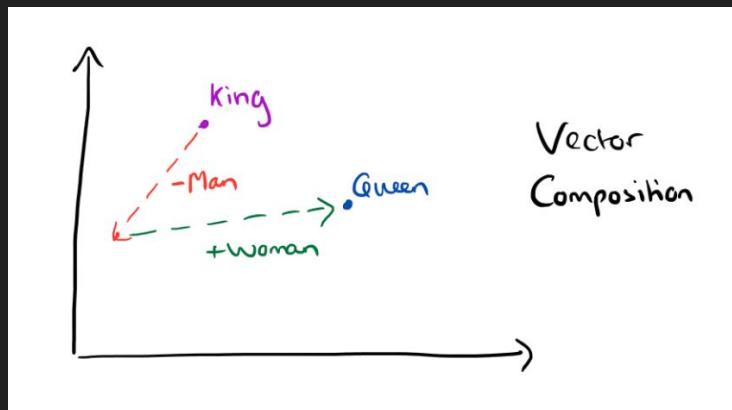
Example #4.5: 进化控制双足行走



Example #5: Understand Relationship

Q: King - Man + Woman = ?

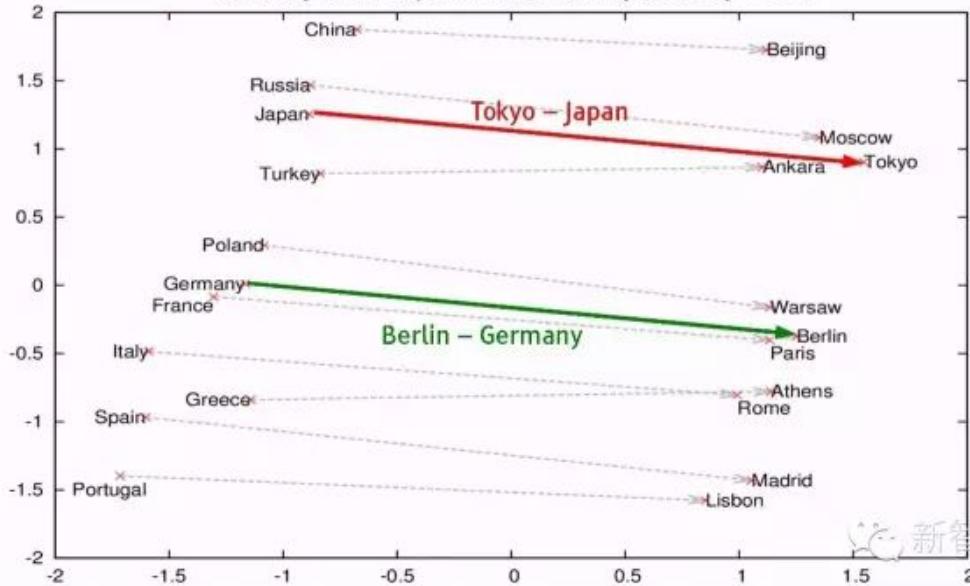
A: Queen



Tokyo - Japan = Berlin - Germany

Tokyo - Japan + Germany = Berlin

Country and Capital Vectors Projected by PCA



<https://blog.acolyer.org/2016/04/21/the-amazing-power-of-word-vectors/>

Beijing - China + Russia = Moscow

France - Paris + Tokyo = Japan

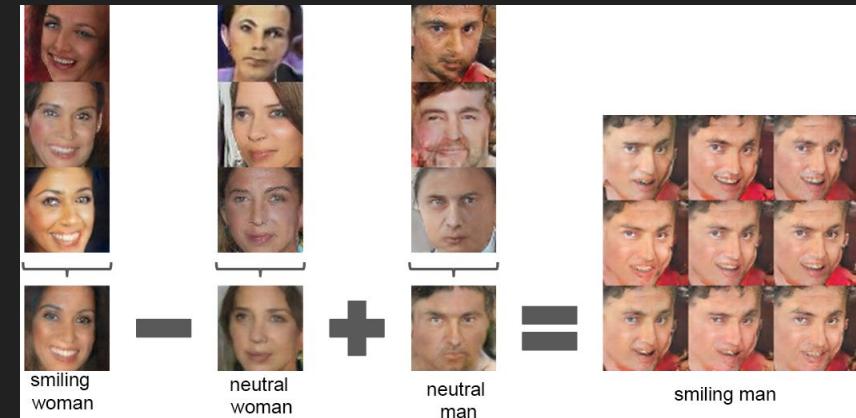
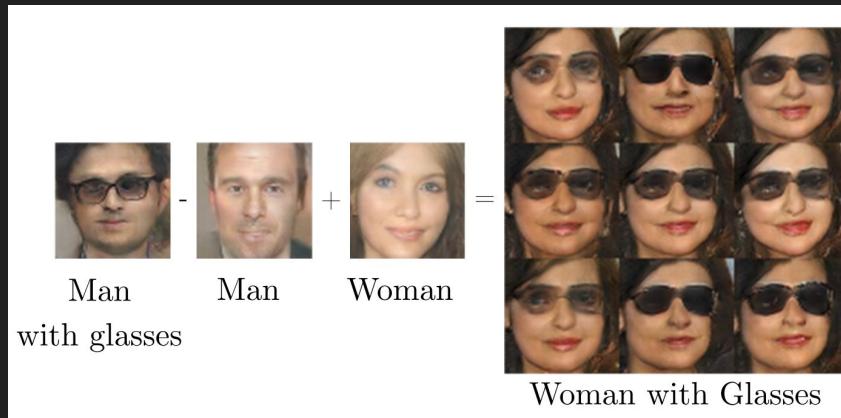
Sushi - Japan + USA = pizza

Windows - Microsoft + Google = Android

Table 8: Examples of the word pair relationships, using the best word vectors from Table 4 (Skip-gram model trained on 783M words with 300 dimensionality).

Relationship	Example 1	Example 2	Example 3
France - Paris	Italy: Rome	Japan: Tokyo	Florida: Tallahassee
big - bigger	small: larger	cold: colder	quick: quicker
Miami - Florida	Baltimore: Maryland	Dallas: Texas	Kona: Hawaii
Einstein - scientist	Messi: midfielder	Mozart: violinist	Picasso: painter
Sarkozy - France	Berlusconi: Italy	Merkel: Germany	Koizumi: Japan
copper - Cu	zinc: Zn	gold: Au	uranium: plutonium
Berlusconi - Silvio	Sarkozy: Nicolas	Putin: Medvedev	Obama: Barack
Microsoft - Windows	Google: Android	IBM: Linux	Apple: iPhone
Microsoft - Ballmer	Google: Yahoo	IBM: McNealy	Apple: Jobs
Japan - sushi	Germany: bratwurst	France: tapas	USA: pizza

Example #6: Understand Relationship(Image)



Man with glasses - Man + Woman

=

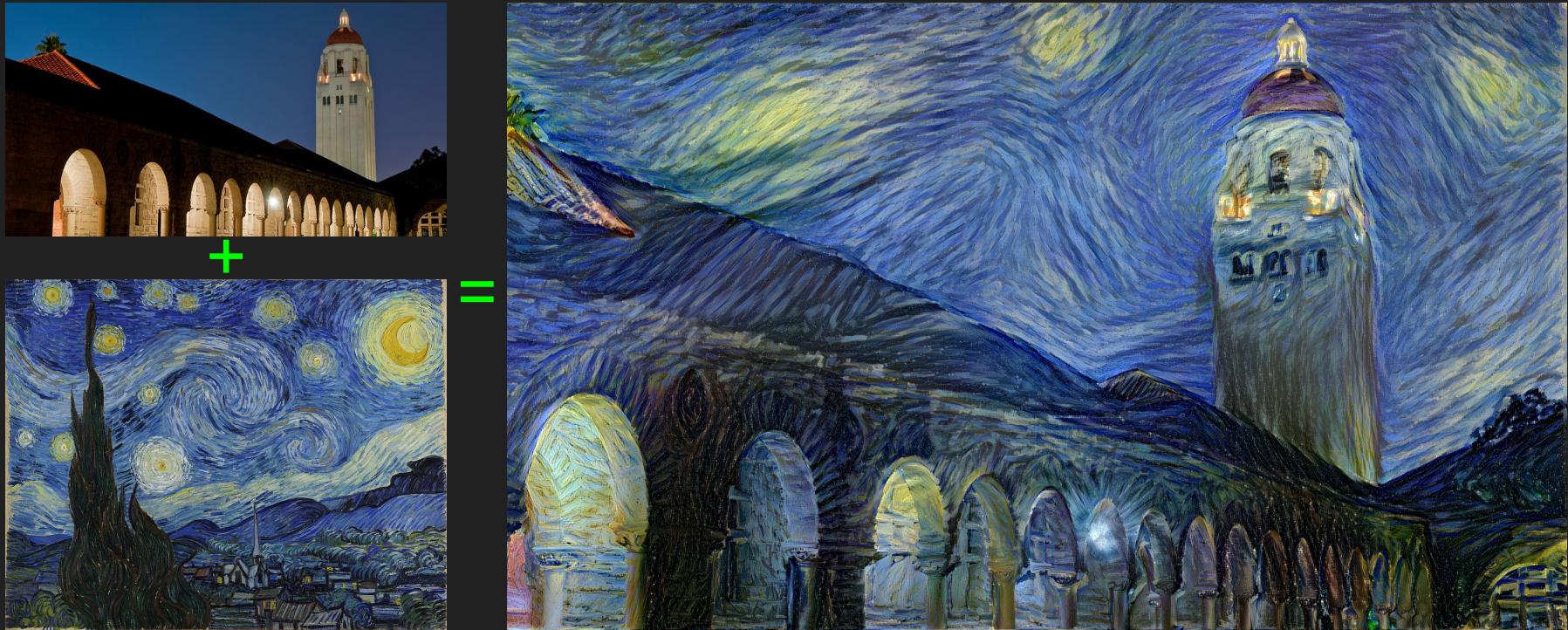
Woman with Glasses

Smiling woman - neutral woman + neutral man

=

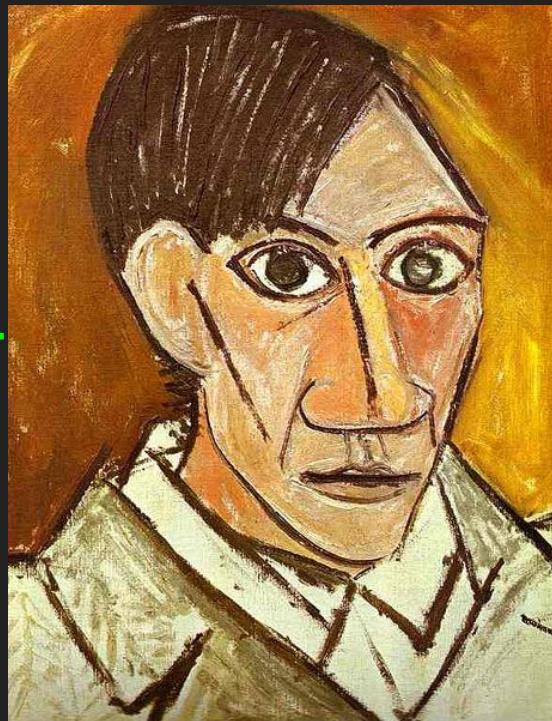
Smiling man

Example #7: Style Image

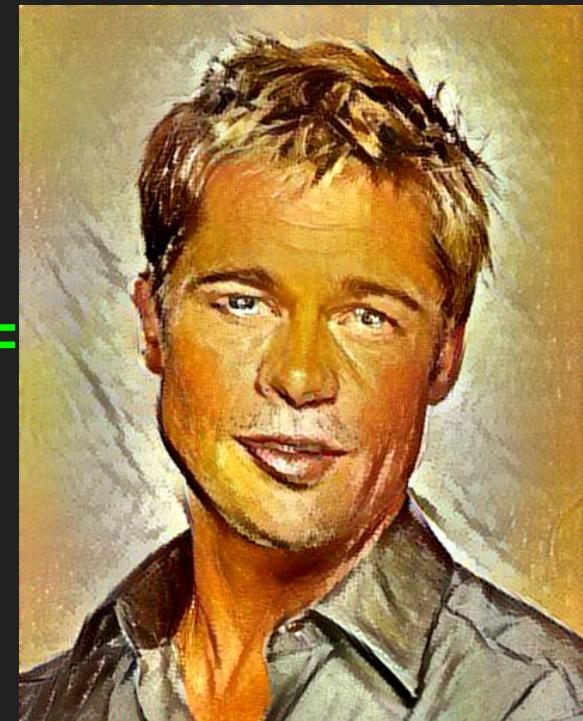




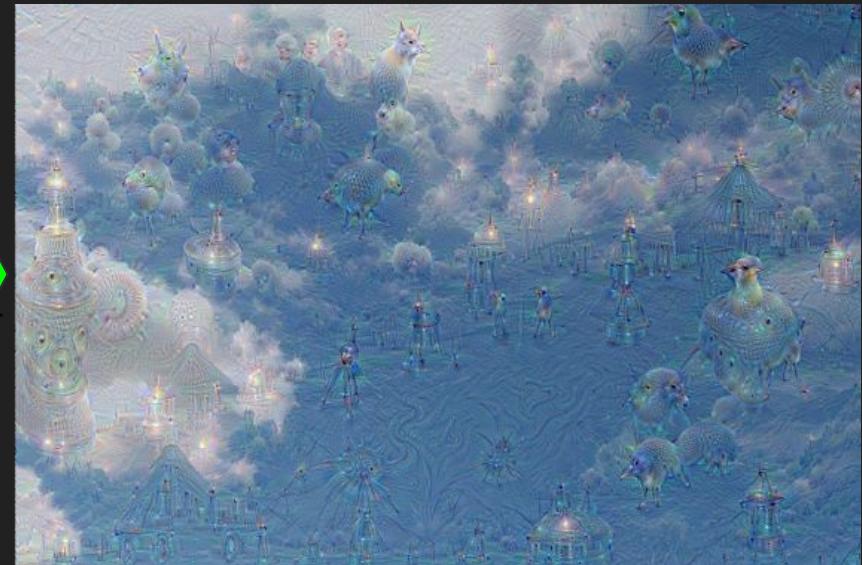
+



=



Example #8: Deep Dream of Neural Network



<https://github.com/google/deepdream>



Horizon



Trees



Leaves



Example #9: 超市货架上有多少瓶海飞丝？



微差事



微差事(WeiChaiShi.com)即是微小的任务，是一款将品牌公司的调研和营销以“任务”的形式众包给消费者的应用。

上亿的智能手机用户可以在上下班的时间，买东西或逛街的闲暇时间里完成简单的任务，并因此获得佣金。操作简单，多重收获，乐此不疲，这就是微差事！

Year 2016 - AlphaGo战胜人类棋圣



强AI时代降临？

比以前强

但是还不够强

Year 2017 - AlphaZero Winning AlphaGo 100-0

AlphaGo:

Needed humans to
learn from.

AlphaZero:

WITHOUT human
data.



Year 2018 - OpenAI's Dota 2 AI steamrolls world champion e-sports team



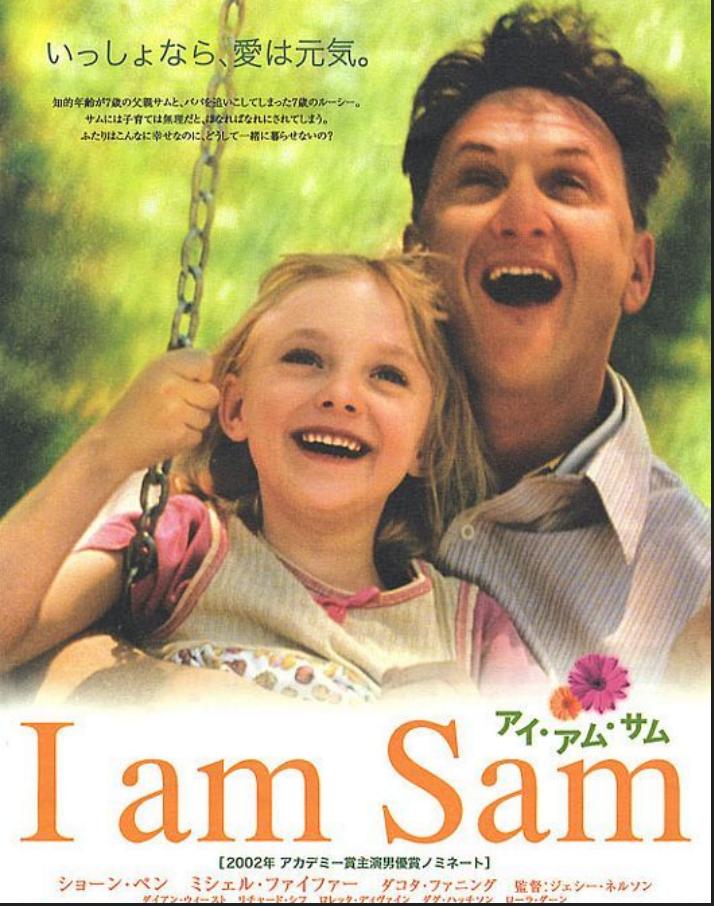
OpenAI Five

Year 2019 - Boston Dynamics' Robot Dogs Casually Pulling a Truck



いっしょなら、愛は元気。

知的年齢が7歳の父親サムと、パパを追いこしてしまった7歳のルーシー。
サムには子育ては無理だとおなればなれにされてしまう。
ふたりはこんなに幸せなのに、どうして一緒に暮らせないの?



成年男子Sam只有6岁的智商，在星巴克工作；
职责是给桌子上的糖、搅拌棒归类并整理整齐。

V.S.



An army of robot arms jointly learning to
grasp somewhere inside Google.

今天的人工智能，就是90年代的互联网

1993年，我的电脑：

- Network: 9.6Kbps Modem
- CPU: 386DX-40MHz
- Ram: 4MB
- Video: 640x480x256(color)
- Hard disk: 210MB

20年后，我的电脑：

- Network: 100Mbps Fiber(10,000X)
- CPU: I7 4Ghz 8 core(65,536X)
- Ram: 32GB(8,192X)
- Video: GTX 1080, 8 TFLOPS(10,000X+)
- Hard disk: 1TB SSD(5,000X)

2019年，我们接触的人工智能：

- 图片识别
- 自然语言理解
- 翻译
- 语音识别
- 自动驾驶

20年后，我们身边的人工智能：

- ?
- ???
- ????
- !!!!!
- 将会是无法想象的强大



没有海量数据，也可以做机器学习！

“A message that I hear often is that "deep learning is only relevant when you have a huge amount of data". While not entirely incorrect, this is somewhat misleading.”

- [Francois Chollet, Author of Keras, June 2016](#)

Transfer Learning

- Image classification? **Hundreds of**
- Face recognition? **A few**

新机会将属于时代中每一个奔跑的聪明人 : Internet



8 Apr 2000, QQ

11 Nov 1998, Google

AI Revolution

Thanks!

Q & A

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PreAngel



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洪泰智造工场

PLUGANDPLAY

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BUSINESS SCHOOL
香港科大商学院

亚杰商会

北京大学
创业训练营

eguan
易观国际

CEIBS

清华大学美術学院

Academy of Arts & Design, Tsinghua University

快创商学院

新知·蜕变·睿智

TEEC

清华企业家协会