

# 第一部分

## TensorFlow 初印象



扫描二维码

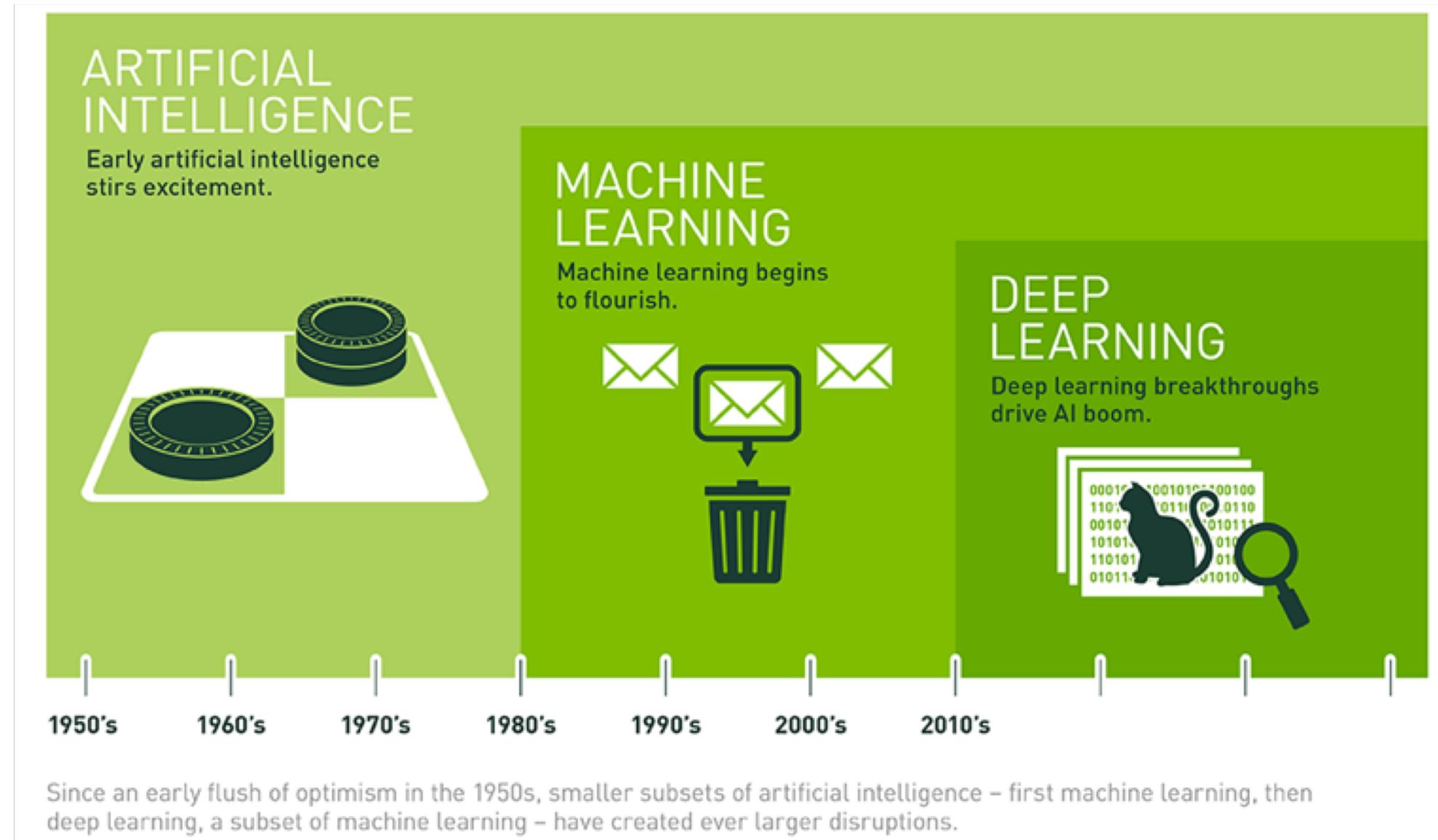
试看/购买《TensorFlow 快速入门与实战》视频课程

# 第一部分 目录

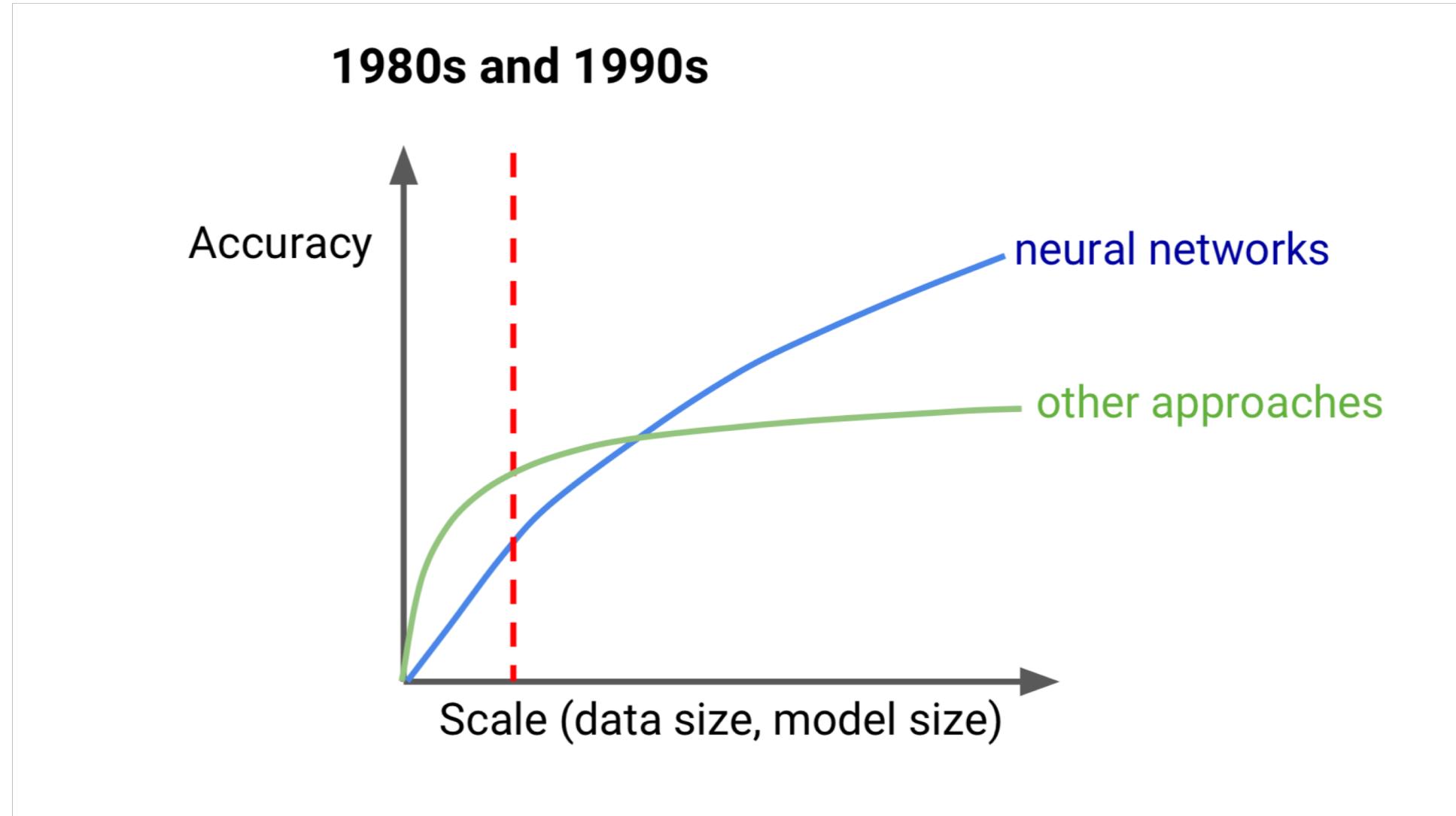
- TensorFlow 产生的历史必然性
- TensorFlow 与 Jeff Dean 的那些事
- TensorFlow 的应用场景
- TensorFlow 的落地应用
- TensorFlow 的发展现状

# TensorFlow 产生的历史必然性

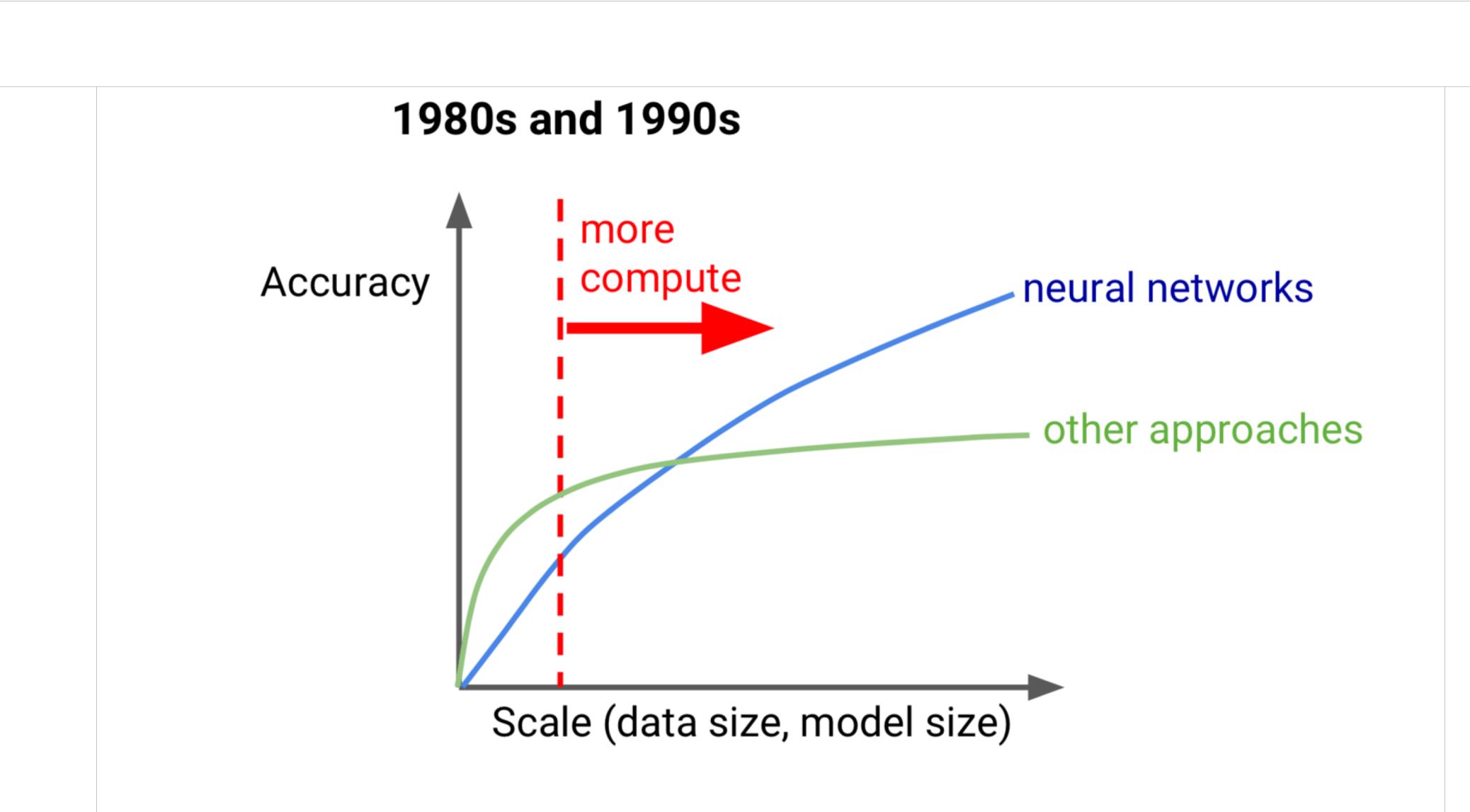
# AI 历史上的三次大发展



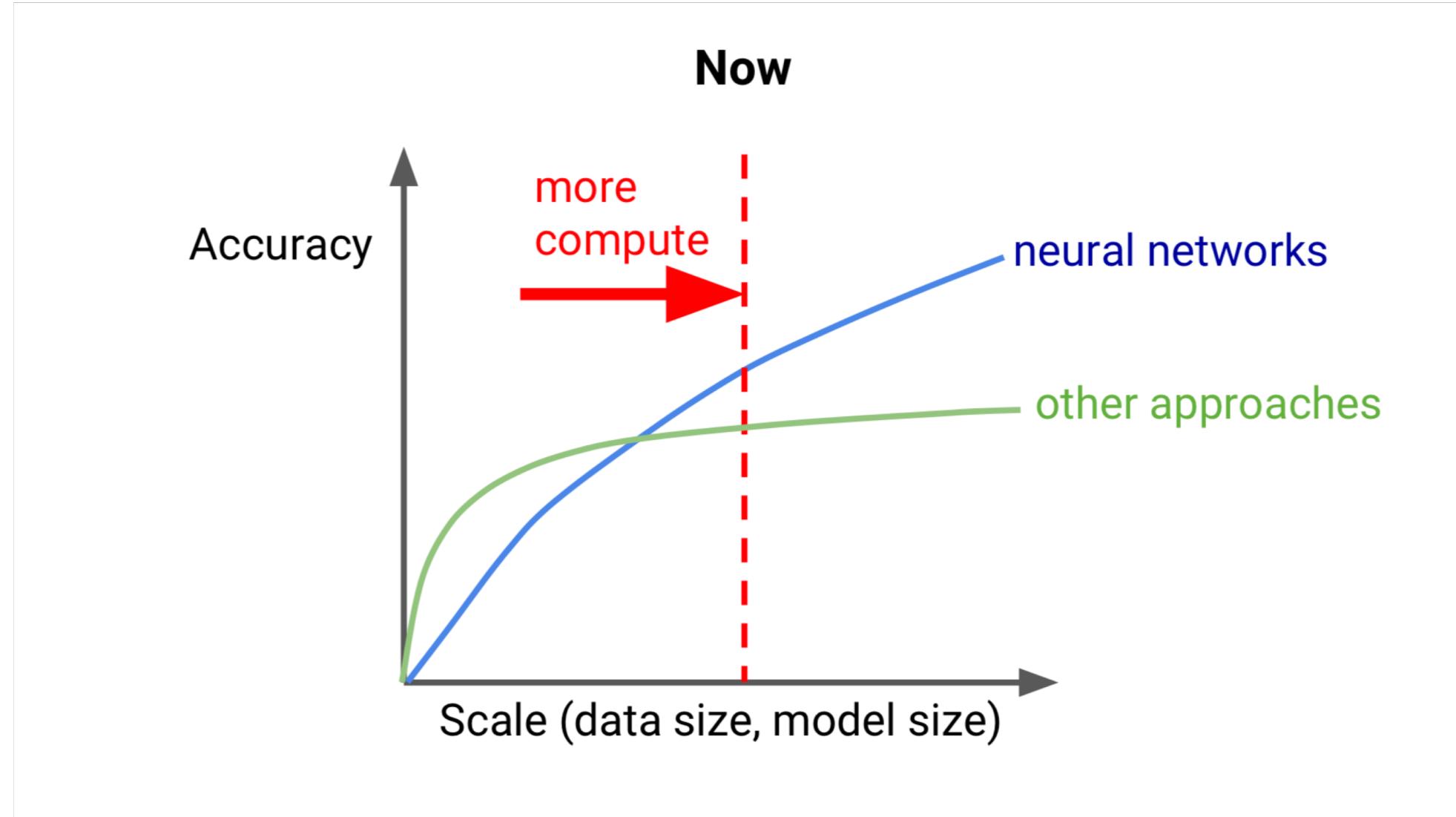
# 1980s : 感知机与特征工程



# 1990s：神经网络在图像和语音领域发力



# 算力和数据增长推动深度学习的繁荣发展



# 深度学习在 Google 的应用



# TensorFlow 与 Jeff Dean 的那些事

# “TensorFlow 之父” — Jeff Dean

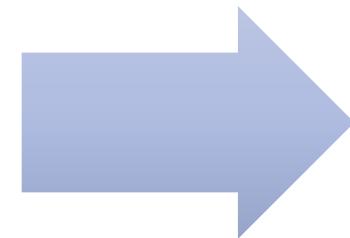
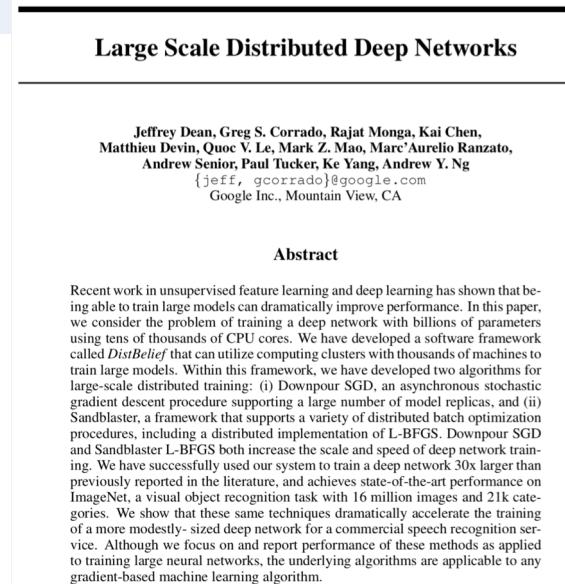
- Head of **Google Brain**
- Google Senior Fellow
- ACM Fellow
- AAAS Fellow
- Creator of **TensorFlow**
- Creator of DistBelief
- Designer of MapReduce
- Designer of BigTable
- ...



# TensorFlow 的前世今生

2012年 Google DistBelief  
第一代深度学习平台

- 谷歌搜索
- 谷歌广告
- 谷歌地图
- 谷歌街景
- 谷歌翻译
- Youtube
- ...



2015年 Google TensorFlow  
第二代深度学习平台(开源)

- Airbnb
- Google
- Intel
- Uber
- 京东
- 小米
- ...



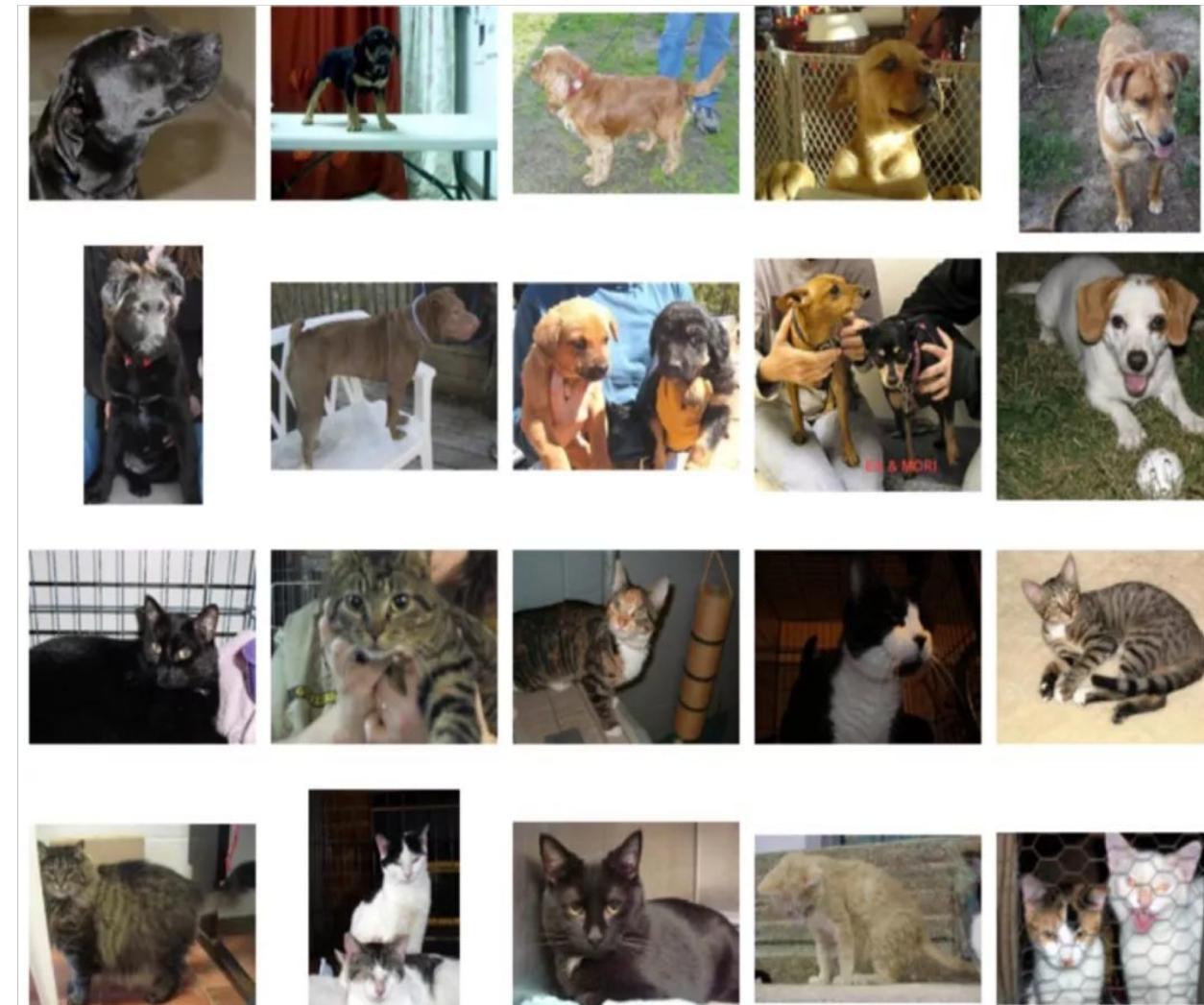
# DistBelief - Google 第一代大规模分布式深度学习框架

## Large Scale Distributed Deep Networks

Jeffrey Dean, Greg S. Corrado, Rajat Monga, Kai Chen,  
 Matthieu Devin, Quoc V. Le, Mark Z. Mao, Marc'Aurelio Ranzato,  
 Andrew Senior, Paul Tucker, Ke Yang, Andrew Y. Ng  
 {jeff, gcorrado}@google.com  
 Google Inc., Mountain View, CA

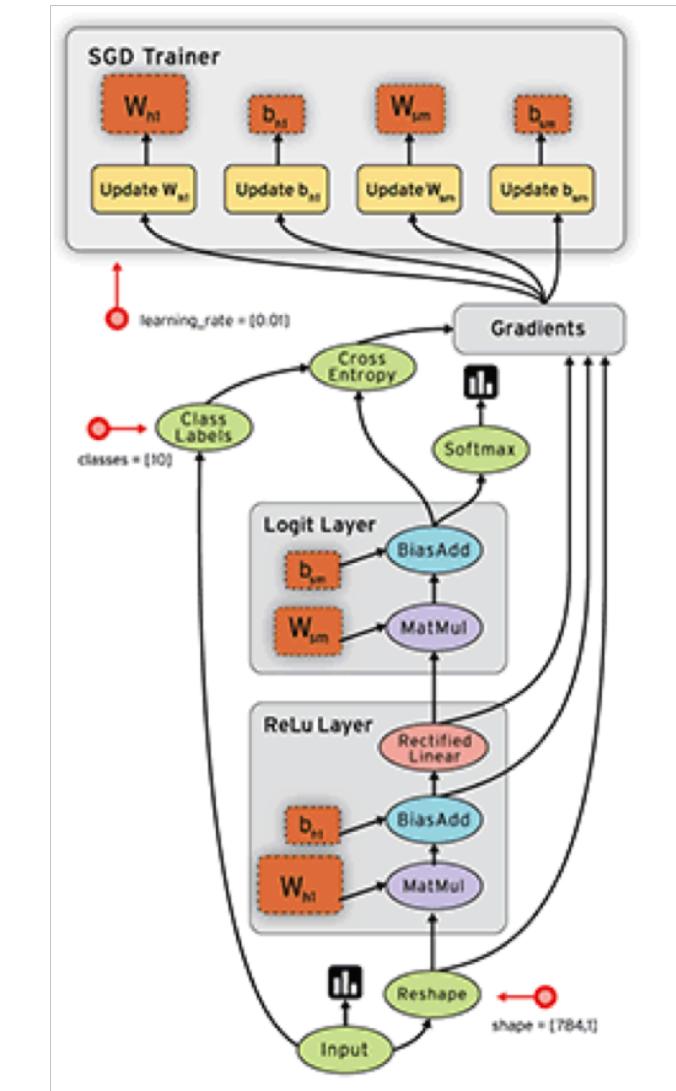
### Abstract

Recent work in unsupervised feature learning and deep learning has shown that being able to train large models can dramatically improve performance. In this paper, we consider the problem of training a deep network with billions of parameters using tens of thousands of CPU cores. We have developed a software framework called *DistBelief* that can utilize computing clusters with thousands of machines to train large models. Within this framework, we have developed two algorithms for large-scale distributed training: (i) Downpour SGD, an asynchronous stochastic gradient descent procedure supporting a large number of model replicas, and (ii) Sandblaster, a framework that supports a variety of distributed batch optimization procedures, including a distributed implementation of L-BFGS. Downpour SGD and Sandblaster L-BFGS both increase the scale and speed of deep network training. We have successfully used our system to train a deep network 30x larger than previously reported in the literature, and achieves state-of-the-art performance on ImageNet, a visual object recognition task with 16 million images and 21k categories. We show that these same techniques dramatically accelerate the training of a more modestly-sized deep network for a commercial speech recognition service. Although we focus on and report performance of these methods as applied to training large neural networks, the underlying algorithms are applicable to any gradient-based machine learning algorithm.



# TensorFlow - Google 第二代大规模分布式深度学习框架

- 灵活通用的深度学习库
- 端云结合的人工智能引擎
- 高性能的基础平台软件
- 跨平台的机器学习系统



# TensorFlow 的应用场景

# AlphaGo + TensorFlow 大胜人类围棋高手



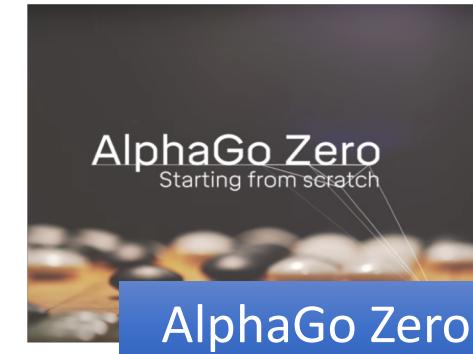
Alpha Fan



AlphaGo Lee



AlphaGo Master



AlphaGo Zero

版本	硬件	等级分	赛况
AlphaGo Fan	176 个 GPU ( 分布式 )	3144	5 : 0 对阵 樊麾
AlphaGo Lee	48 个 TPU ( 分布式 )	3739	4 : 1 对阵 李世石
AlphaGo Master	4 个第二代 TPU ( 单机 )	4858	60 : 0 对阵五位职业棋手
AlphaGo Zero	4 个第二代 TPU ( 单机 )	5185	100 : 0 对阵 AlphaGo Lee 89 : 11 对阵 AlphaGo Master







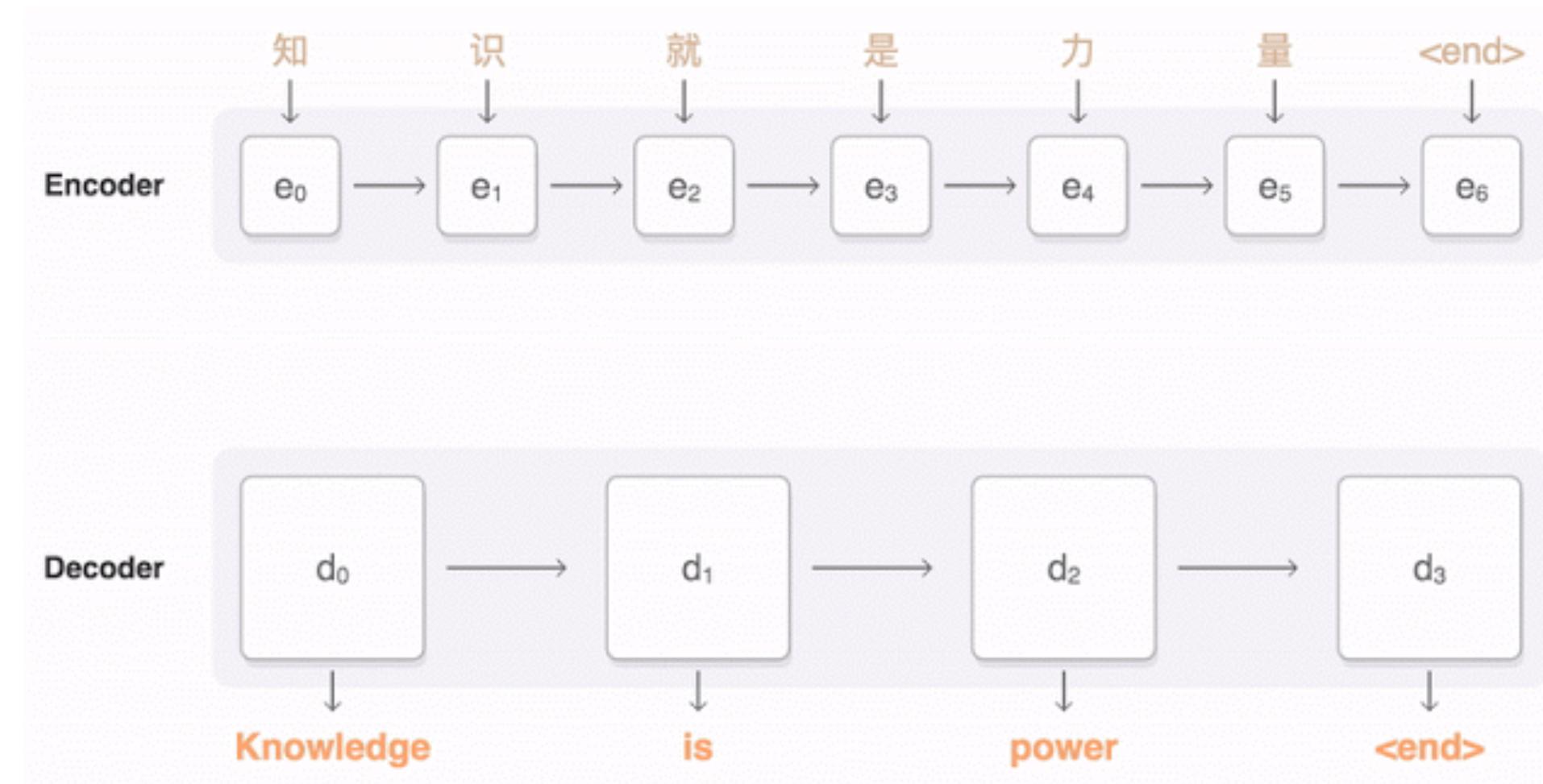
身份证自动输入与人脸图像比较



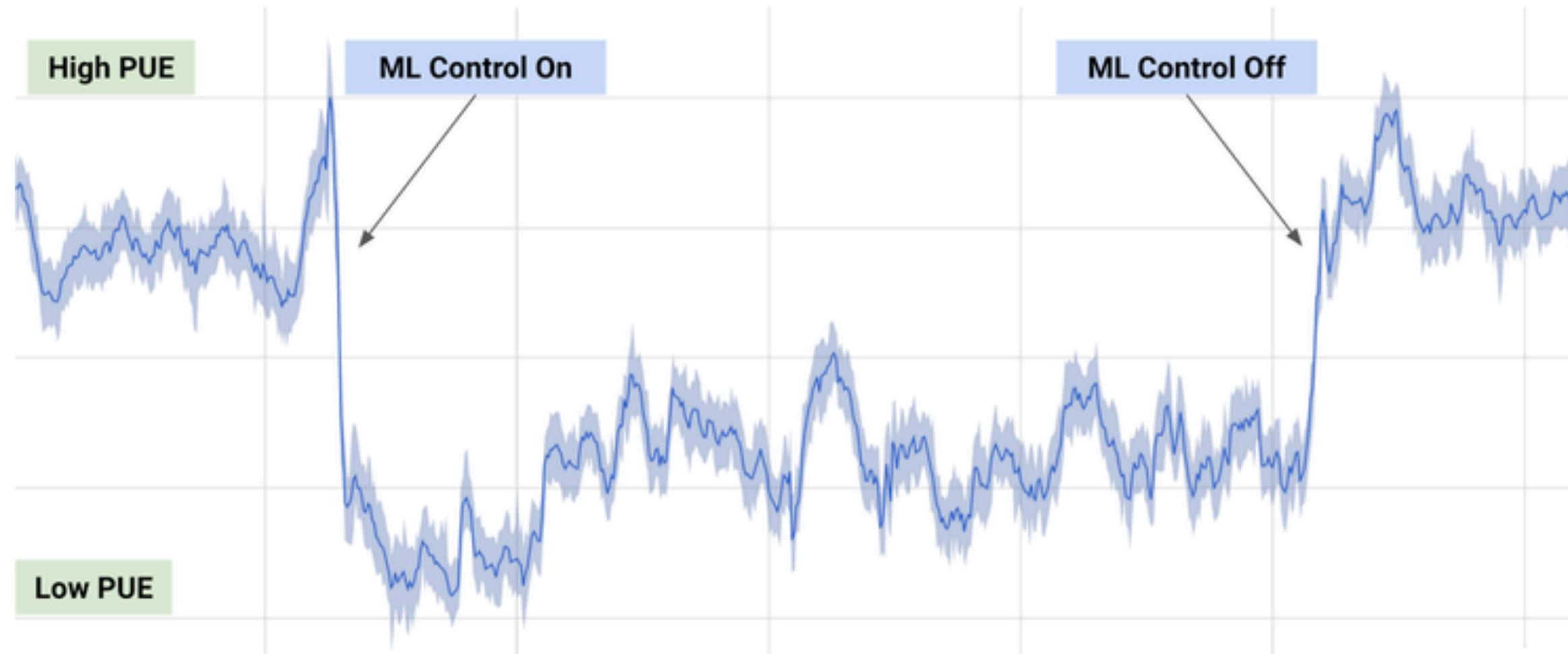
OCR+自动化审核

# TensorFlow 的落地应用

# Google 神经网络机器翻译 ( GNMT )



# 减少数据中心能源消耗



$$\text{PUE} = \frac{\text{Total Facility Energy}}{\text{IT Equipment Energy}} = 1 + \frac{\text{Non IT Facility Energy}}{\text{IT Equipment Energy}}$$



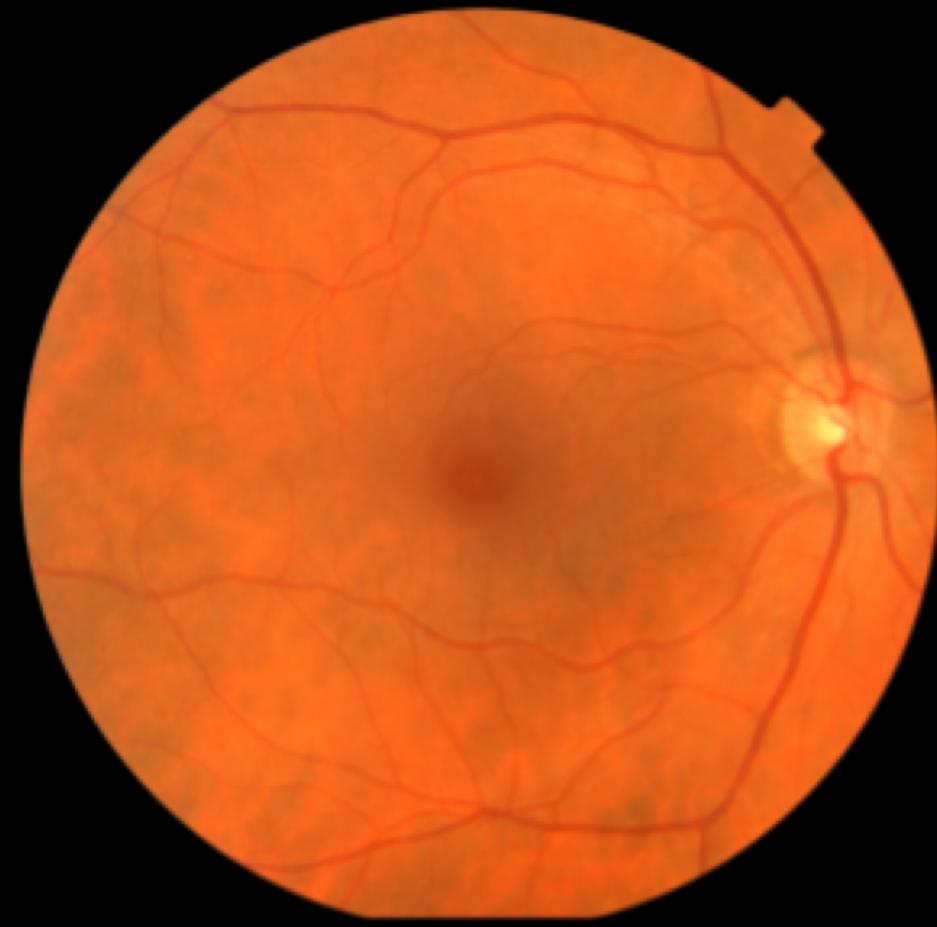
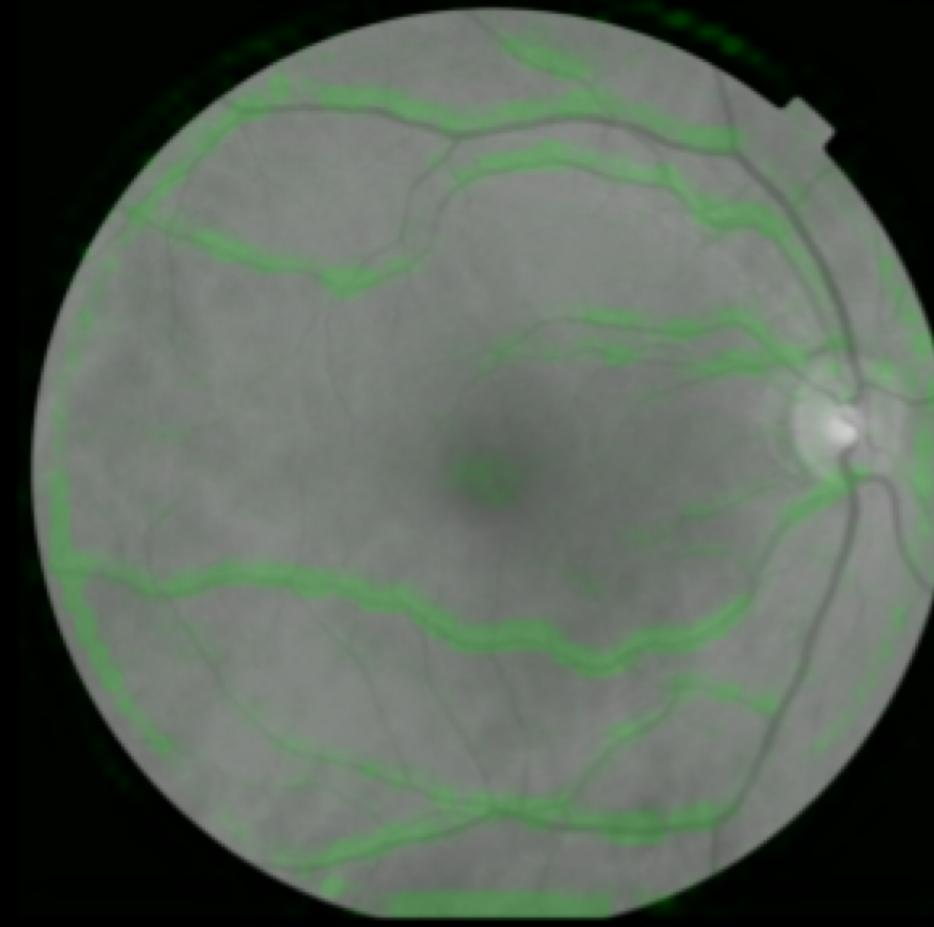


Image of retina



Blood pressure predictions  
focus on blood vessels

# 使用 TensorFlow 的公司



AMD



UBER



kakao



ebay

Google



Coca-Cola



QUALCOMM



网易 NETEASE



3DR

腾讯社交广告  
Tencent Social AdsAIRBUS  
DEFENCE & SPACE

ARM

BAKER  
HUGHES  
a GE company

BITMAIN

# 使用 TensorFlow 的公司



JD.COM 京东

kika

Lenovo

LinkedIn



MEDIATEK



musical.ly

NERSC

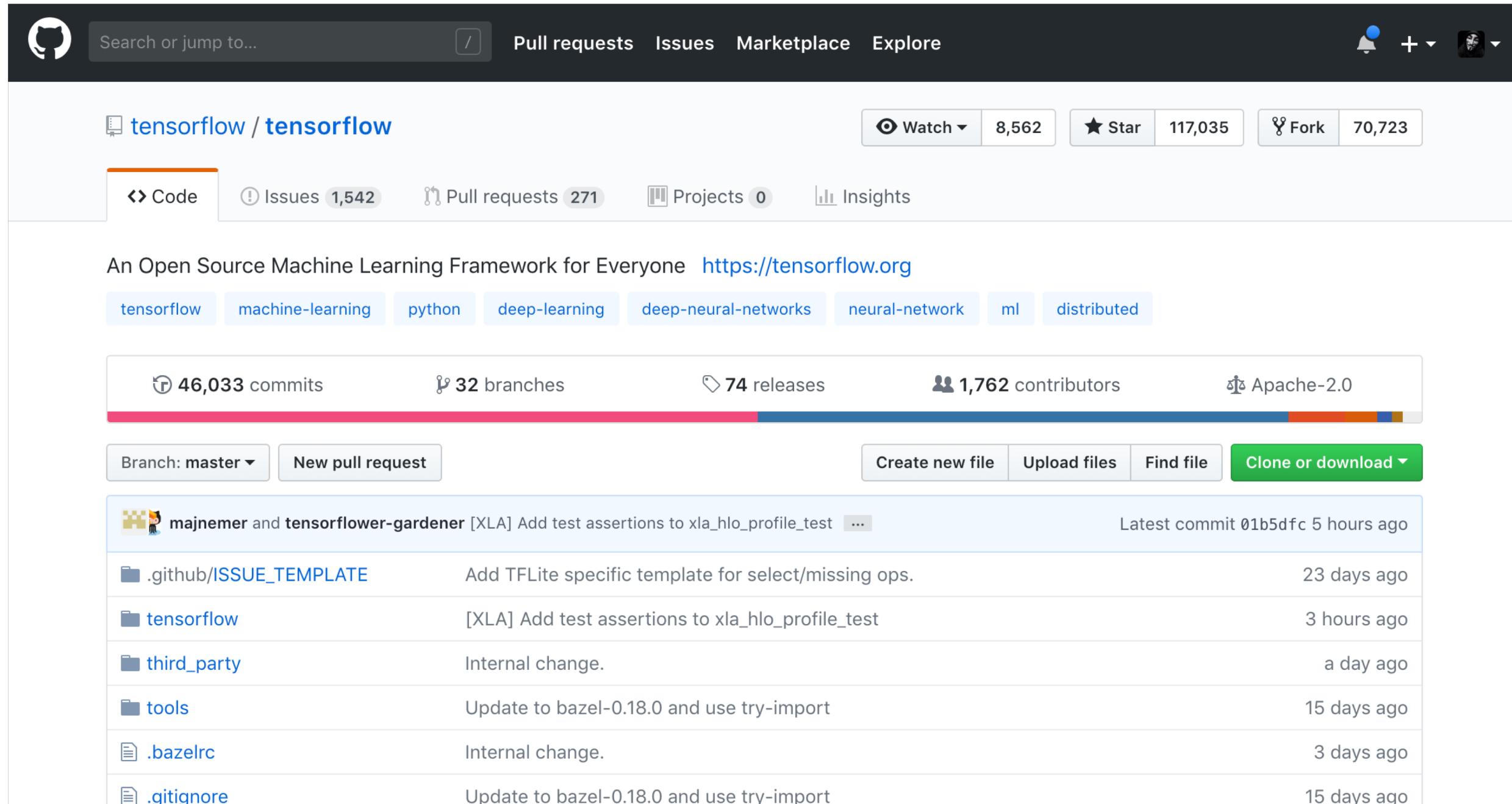


Sogou 搜狗



# TensorFlow 的发展现状

# TensorFlow 开源社区



The screenshot shows the GitHub repository page for TensorFlow. At the top, there's a search bar, a navigation bar with links to Pull requests, Issues, Marketplace, and Explore, and a user profile icon. Below the header, the repository name "tensorflow / tensorflow" is displayed, along with metrics: Watch (8,562), Star (117,035), and Fork (70,723). A navigation bar below the repository name includes tabs for Code (selected), Issues (1,542), Pull requests (271), Projects (0), and Insights.

An Open Source Machine Learning Framework for Everyone <https://tensorflow.org>

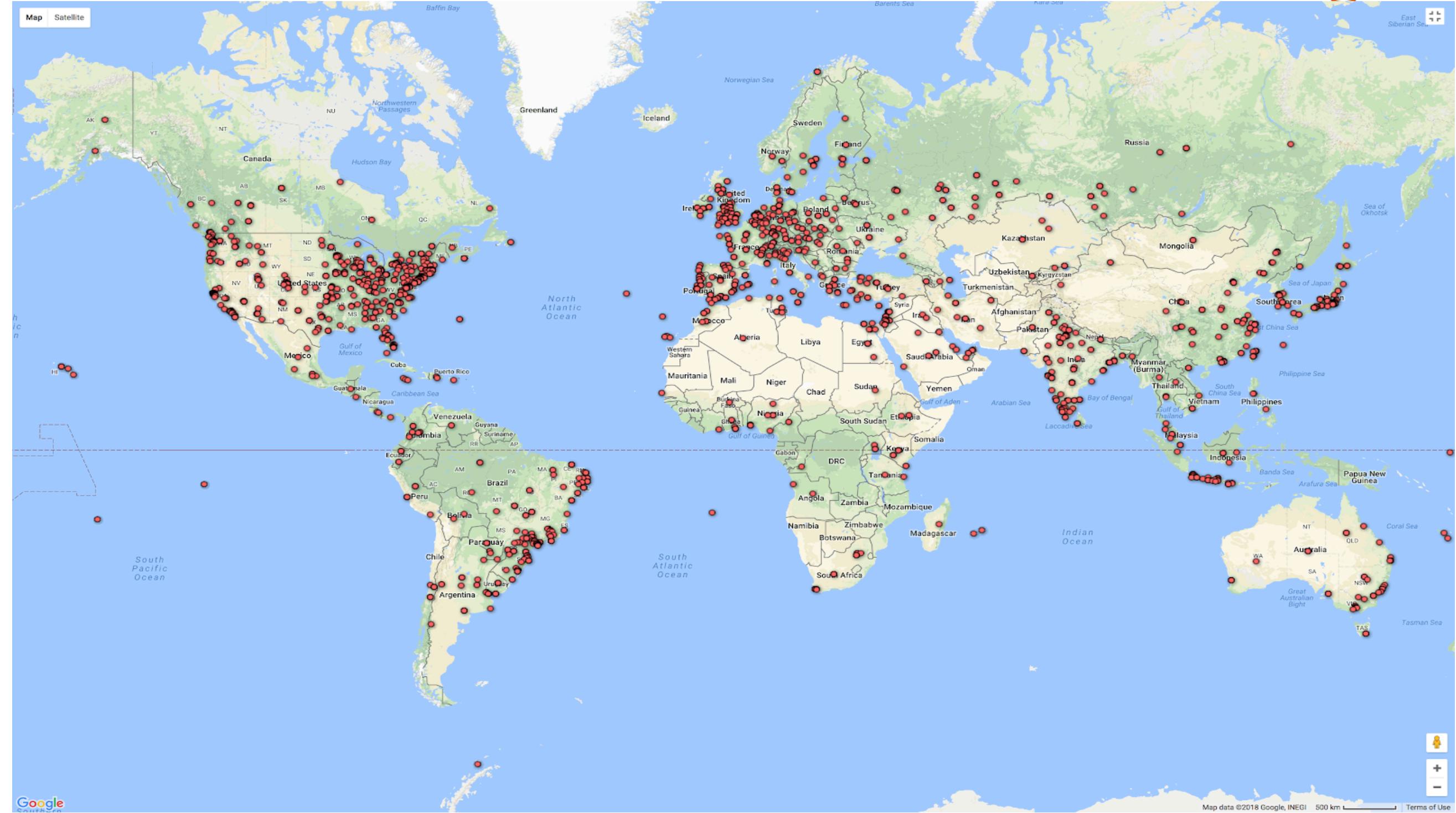
Key repository tags: tensorflow, machine-learning, python, deep-learning, deep-neural-networks, neural-network, ml, distributed.

Statistics: 46,033 commits, 32 branches, 74 releases, 1,762 contributors, Apache-2.0 license.

Branch: master ▾ New pull request Create new file Upload files Find file Clone or download ▾

Recent commits:

Author	Commit Message	Time Ago
majnemer and tensorflow-gardener	[XLA] Add test assertions to xla_hlo_profile_test	Latest commit 01b5dfc 5 hours ago
.github/ISSUE_TEMPLATE	Add TFLite specific template for select/missing ops.	23 days ago
tensorflow	[XLA] Add test assertions to xla_hlo_profile_test	3 hours ago
third_party	Internal change.	a day ago
tools	Update to bazel-0.18.0 and use try-import	15 days ago
.bazelrc	Internal change.	3 days ago
.qitignore	Update to bazel-0.18.0 and use try-import	15 days ago



From TensorFlow Dev Summit 2018

# TensorFlow 社区持续贡献

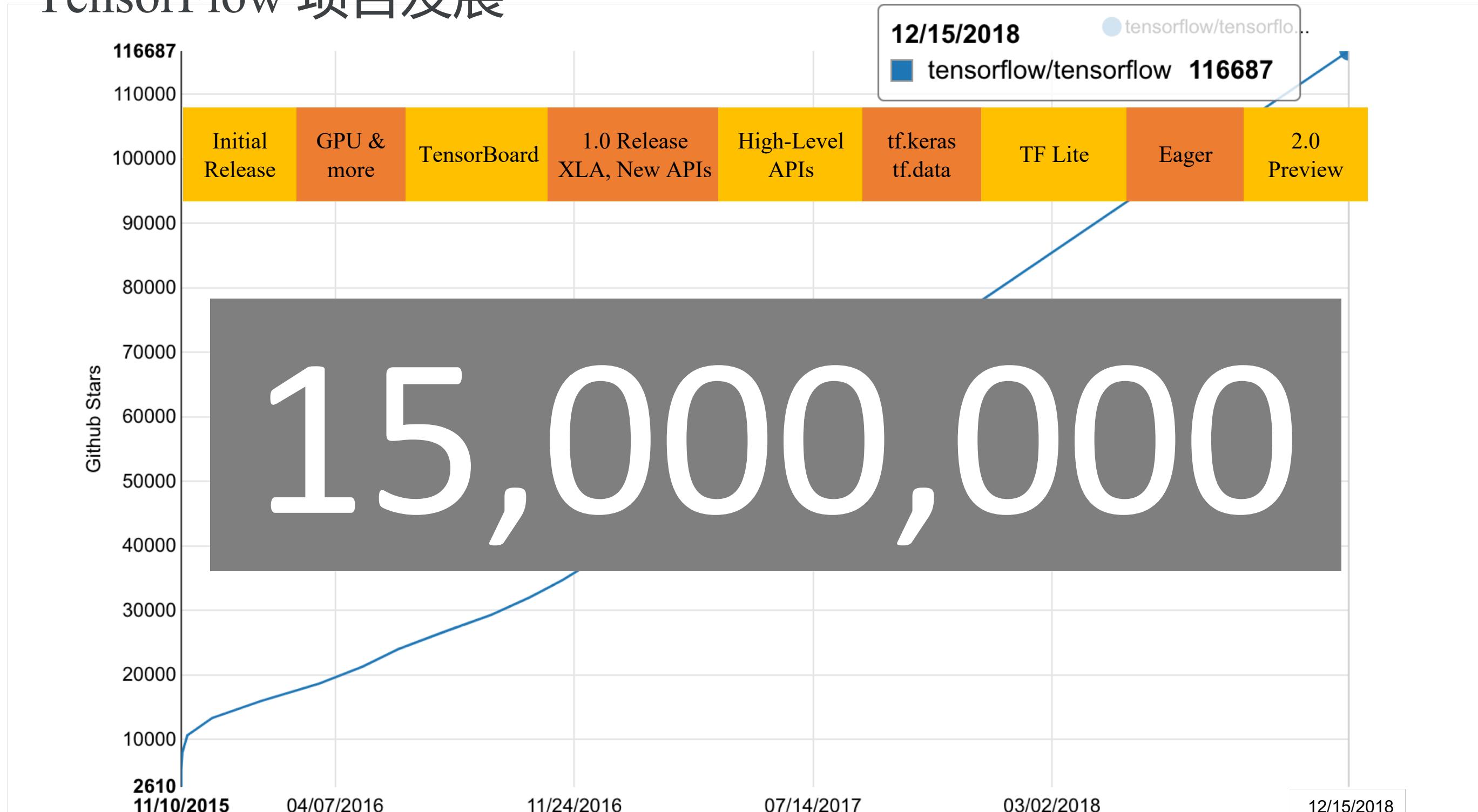
Nov 1, 2015 – Dec 15, 2018

Contributions: Commits ▾

Contributions to master, excluding merge commits



# TensorFlow 项目发展



# TensorFlow 活跃社区

116,000+  
stars

70,500+  
forks

8,500+  
watches

45,000+  
commits

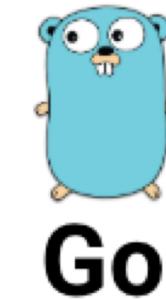
9,300+  
pull requests

1,750+  
contributors

# TensorFlow 多语言接口



C++



julia

C#



JS



扫描二维码

试看/购买《TensorFlow 快速入门与实战》视频课程