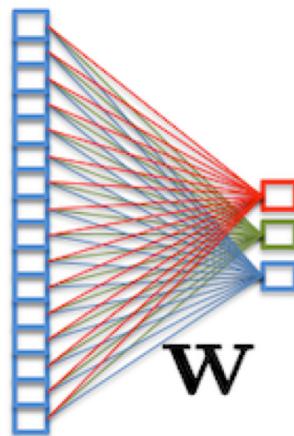


5IF - Deep Learning and differentiable programming

1.2 History of the field



1960s

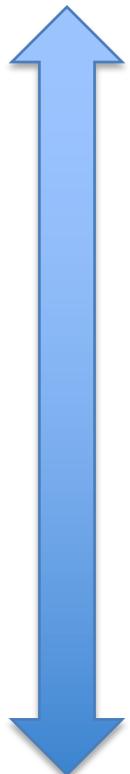


Alexey Ivakhnenko works on deep neural networks

1986



G. Hinton proposes the backpropagation algorithm in its current form



AI Winter



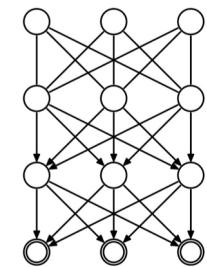
2006

Vision and speech communities do not use neural networks
Flat structures dominate
Handcrafted features dominate (SIFT, HoG, LBP etc.)

2006



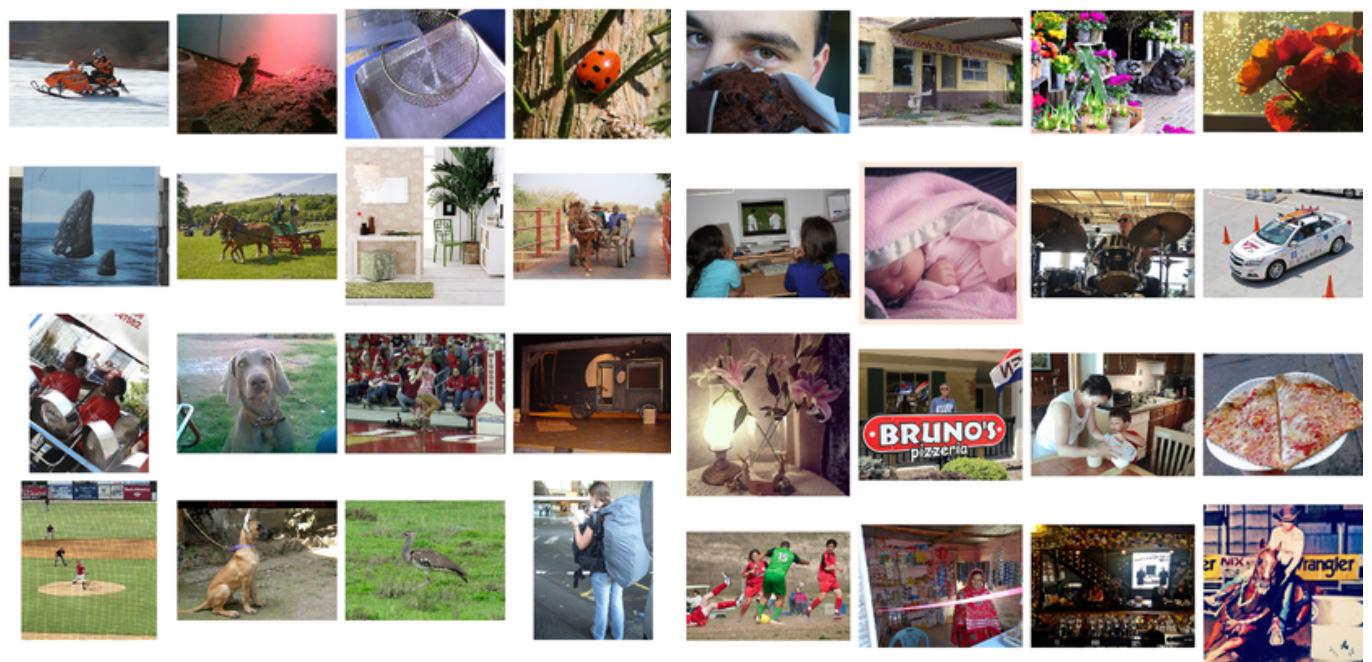
G. Hinton's proposes deep belief networks
Layerwise unsupervised training
GPUs and clusters
Large datasets!



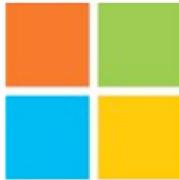
2009



Li Fei-Fei (Stanford) introduces ImageNet, a large scale dataset
1,461,406 annotated images
1000 classes
Manual annotation and careful verification
Crowd-sourcing with Amazon Mechanical Turk



11/2011



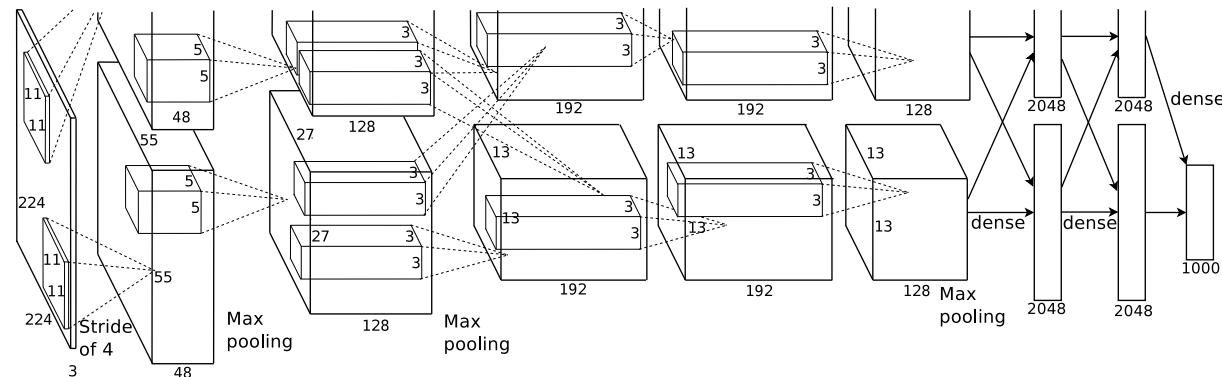
Break-through of Microsoft in speech recognition with deep neural networks

10/2012



G. Hinton's group wins ImageNet / ILSVRC

Rank	Name	Error rate	Description
1	U. Toronto	0.15315	Deep learning
2	U. Tokyo	0.26172	Hand-crafted features and learning models.
3	U. Oxford	0.26979	
4	Xerox/INRIA	0.27058	Bottleneck.



AlexNet

03/2013



G. Hinton joins Google



09/2013



Clarifai wins ImageNet / ILSVRC (PhD student at NYU)

Classification task:

First 20 entries: deep learning

Rank	Name	Error rate	Description
1	NYU	0.11197	Deep learning
2	NUS	0.12535	Deep learning
3	Oxford	0.13555	Deep learning

Detection task:

Rank	Name	Mean Average Precision	Description
1	UvA-Euvision	0.22581	Hand-crafted features
2	NEC-MU	0.20895	Hand-crafted features
3	NYU	0.19400	Deep learning

12/2013



Y. LeCun directs Facebook's new AI lab



01/2014



Google acquires DeepMind for 400M\$

05/2014



A. Ng directs Baidu's new AI lab



09/2014



Google wins ImageNet / ILSVRC

Classification task:

First 20 entries: deep learning

Rank	Name	Error rate	Description
1	Google	0.06656	Deep learning
2	Oxford	0.07325	Deep learning
3	MSRA	0.08062	Deep learning

Detection task:

Rank	Name	Mean Average Precision	Description
1	Google	0.43933	Deep learning
2	CUHK	0.40656	Deep learning
3	DeepInsight	0.40452	Deep learning
4	UvA-Euvision	0.35421	Deep learning
5	Berkley Vision	0.34521	Deep learning

09/2014



Hinton NIPS paper mentions internal google dataset with
100 000 000 labelled images and 18 000 classes

04/2015		Clarifai acquires 10M\$ venture capital
12/2015		Microsoft research wins ImageNet 2015
12/2015		Google introduces its deep learning and cloud based « vision API »
12/2015		Creation of « Open AI », non-profit organisation on AI. Director: Ilya Sutskever (worked with Hinton, Ng, Google)
07/2015- 03/2016		Public perception of deep learning increased; articles appear in « Le Monde », « The NY Times »; Portrait of Yann LeCun on « France 2 », « France Culture » etc.
02/2016		Y. LeCun is nominated at <i>Collège de France</i>
03/2016		Deepmind's AI defeats the best Go players with deep neural networks

Y. LeCun is nominated at *Collège de France*



**COLLÈGE
DE FRANCE**
1530

3/2017



Event "France IA" with E. Macron, C. Villani etc.

3/2018



The académique conference NeurIPS is sold out in 11 minutes and 38 seconds

2018



Autonomuous driving is an important subject.
Neural Networks are omni-present

Waymo (ex Google)

Tesla

Uber

Toyota

Nvidia

Comma AI

Convergence of models

