

INTRODUÇÃO À APRENDIZAGEM PROFUNDA

Zenilton K. G. Patrocínio Jr
zenilton@pucminas.br

Aprendizagem Profunda: Modismo ou Esperança?

RCH

The New York Times

h

Godzillium vs. Trumpium: Some Suggestions to Add to the Periodic Table

To Protect Against Zika Virus, Pregnant Women Are Warned About Latin American Trips

THE NEW OLD A F.T.C.'s Lum Doesn't End Training Del

nature International weekly journal of science

Home | News & Comment | Research | Careers & Jobs | Current Issue |

Archive | Volume 518 | Issue 7540 | News | Article

NATURE | NEWS

عربي

Game-playing software holds lessons neuroscience

SCIENCE

Scientists See Promise in Deep-Learning Progr

By JOHN MARKOFF NOV. 23, 2012

Microsoft Research Global Press

BBC Sign in News Sport Weather Sho

NEWS

Did Facebook Shutdown An AI That Made Its Own Language? AI Will Never Replace Humans and Artificial Intelligence's Threat may Already Be Here

Forbes / Tech

DEC 29, 2014 @ 11:37 AM 89,471 VIEWS

Tech 2015: Deep Learning And Machine Intelligence Will Eat The World

'Deep learning' technology inspired by human brain

Google a step closer to developin machines with human-like intell

Algorithms developed by Google designed to encode thoughts, cc

culture business lifestyle fashion environment tech travel

Marcos: Reconhecimento de Dígitos

LeNet 1989 (Lecun et al.): reconhecimento de códigos postais utilizada pelo serviço postal dos USA

80322-4129 80206

40004 14310

37879 05153

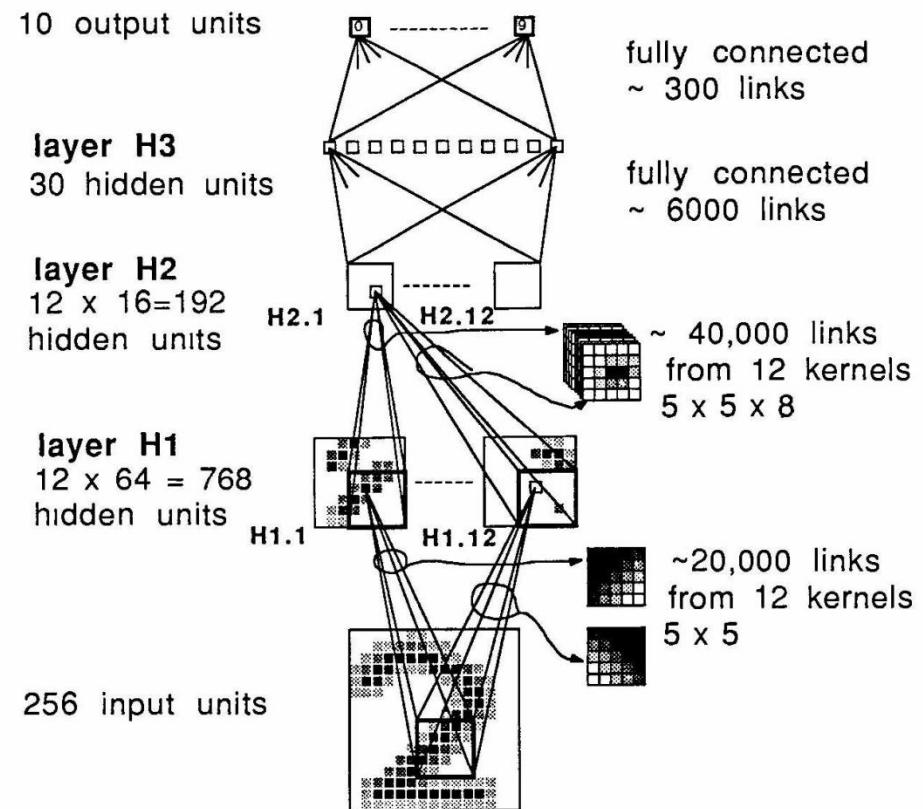
~~33502~~ 75216

35460 44209

Marcos: Reconhecimento de Dígitos

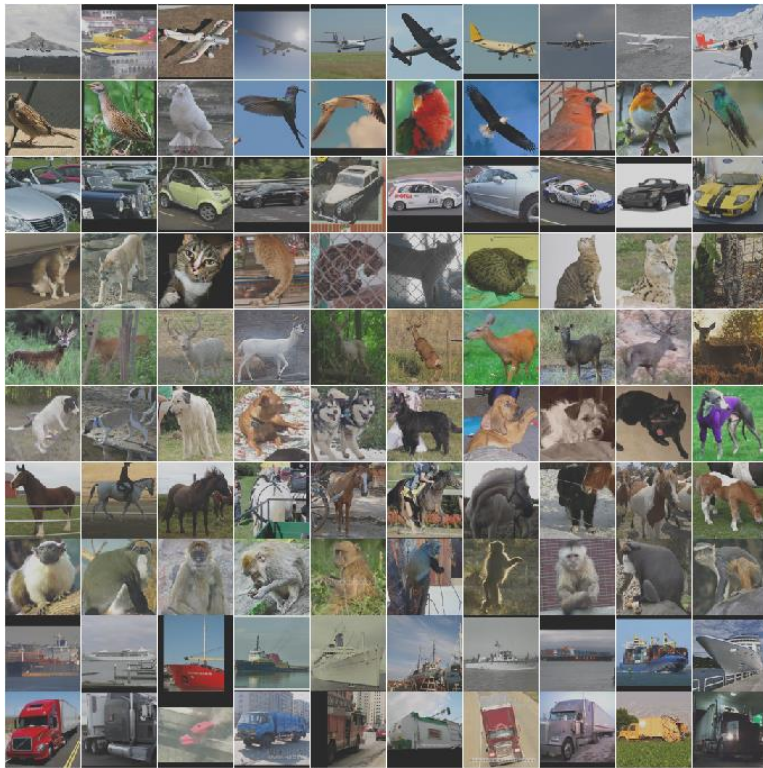
LeNet 1989 (Lecun et al.): reconhecimento de códigos postais utilizada pelo serviço postal dos USA

80322-4129 80206
40004 14310
37879 05153
~~33502~~ 75216
35460 44209

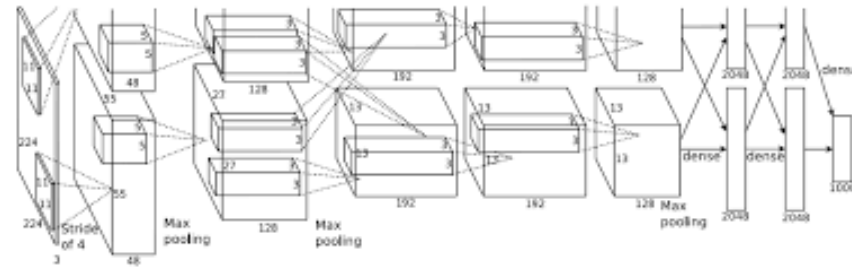


Marcos: Classificação de Imagens

Redes Neurais Convolucionais: AlexNet (2012) treinada com 200 GB de dados da ImageNet

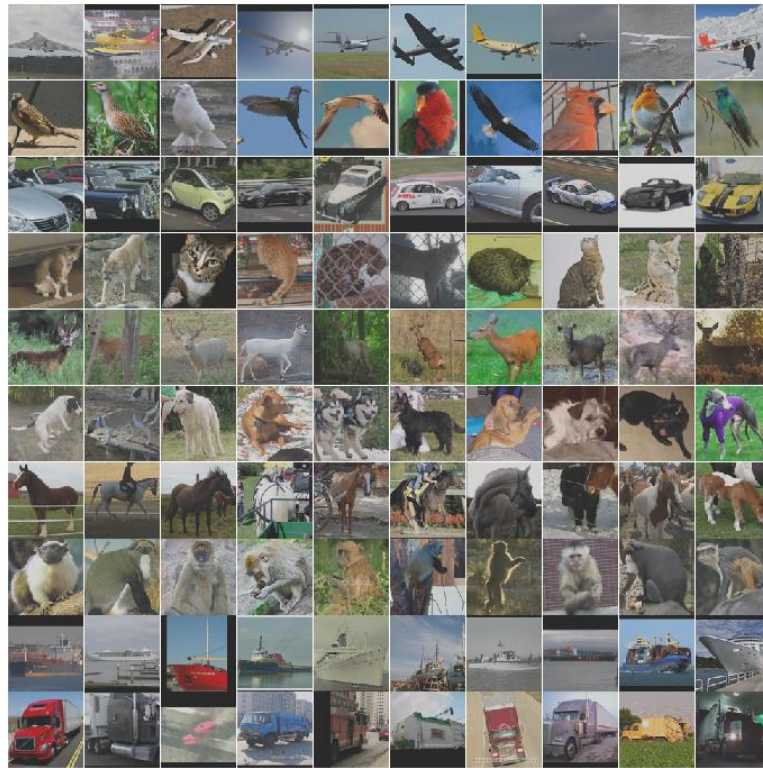


AlexNet

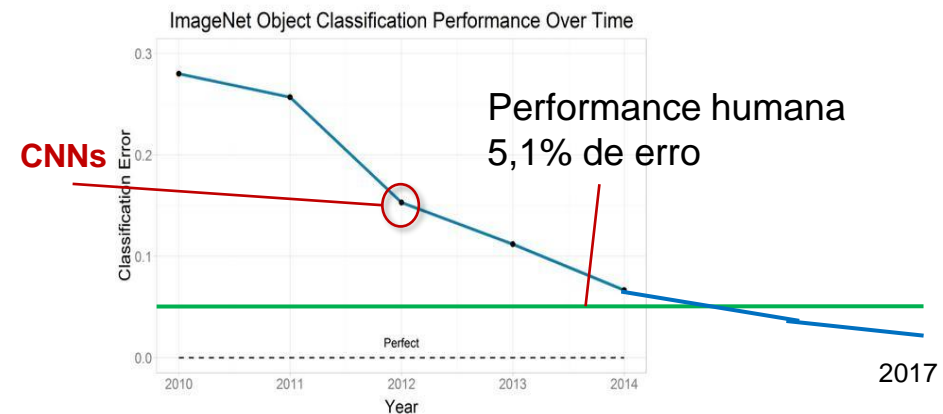
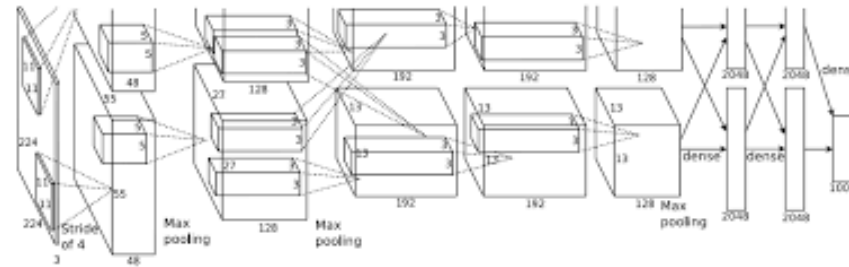


Marcos: Classificação de Imagens

Redes Neurais Convolucionais: AlexNet (2012) treinada com 200 GB de dados da ImageNet

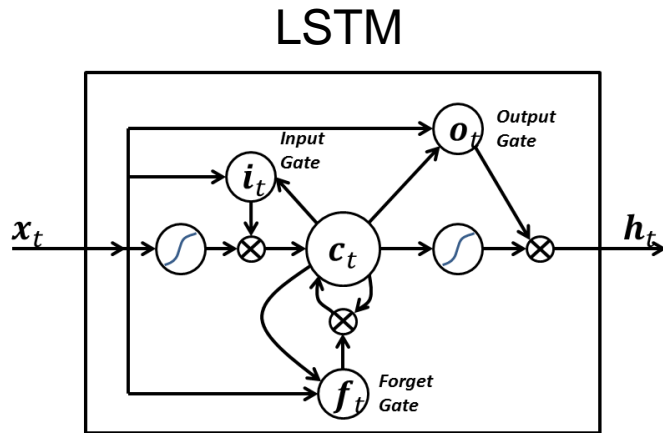


AlexNet



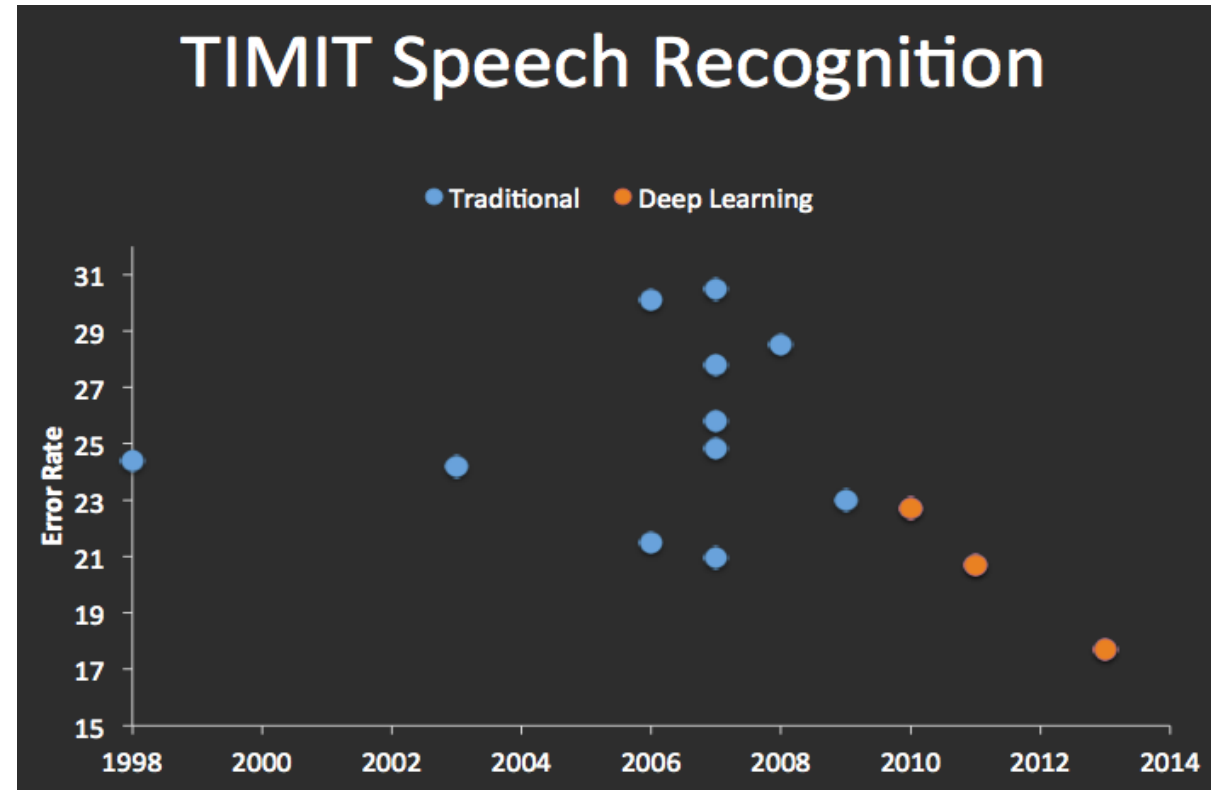
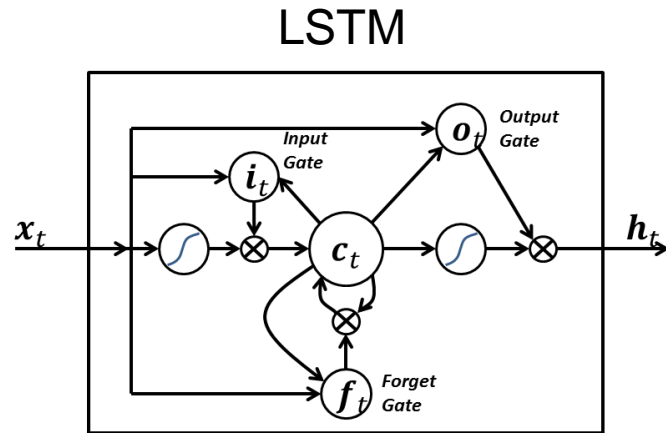
Marco: Reconhecimento de Fala

Redes Neurais Recorrentes: LSTMs (1997)



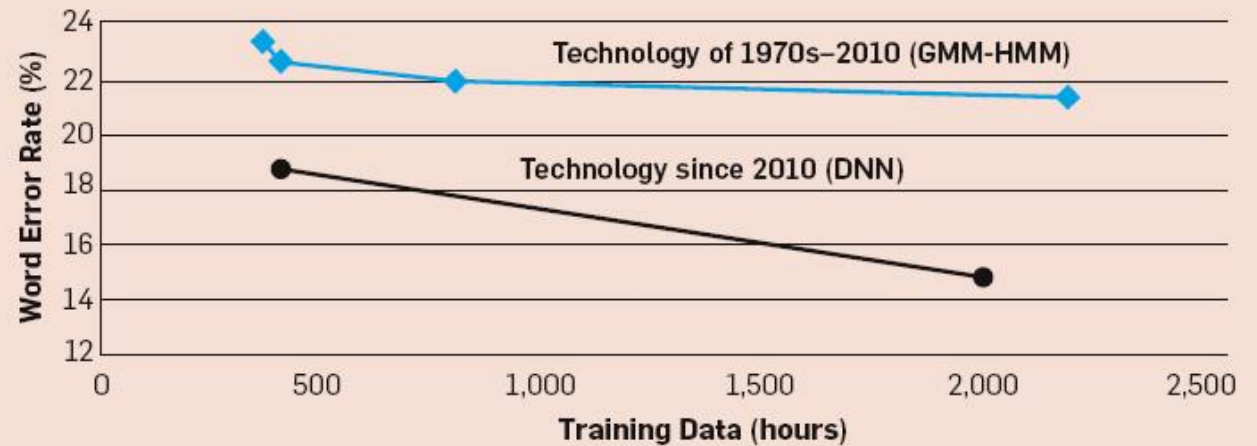
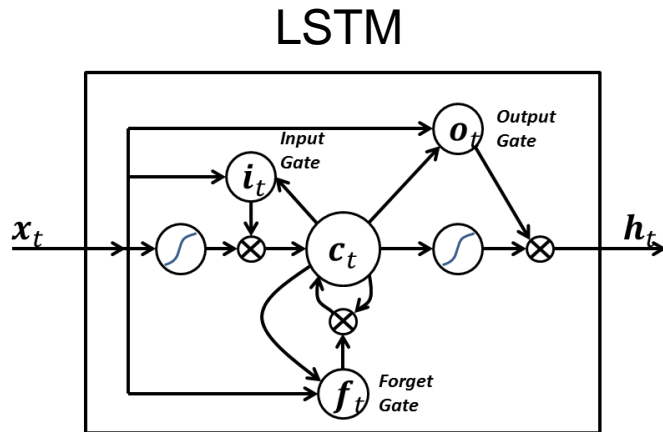
Marco: Reconhecimento de Fala

Redes Neurais Recorrentes: LSTMs (1997)



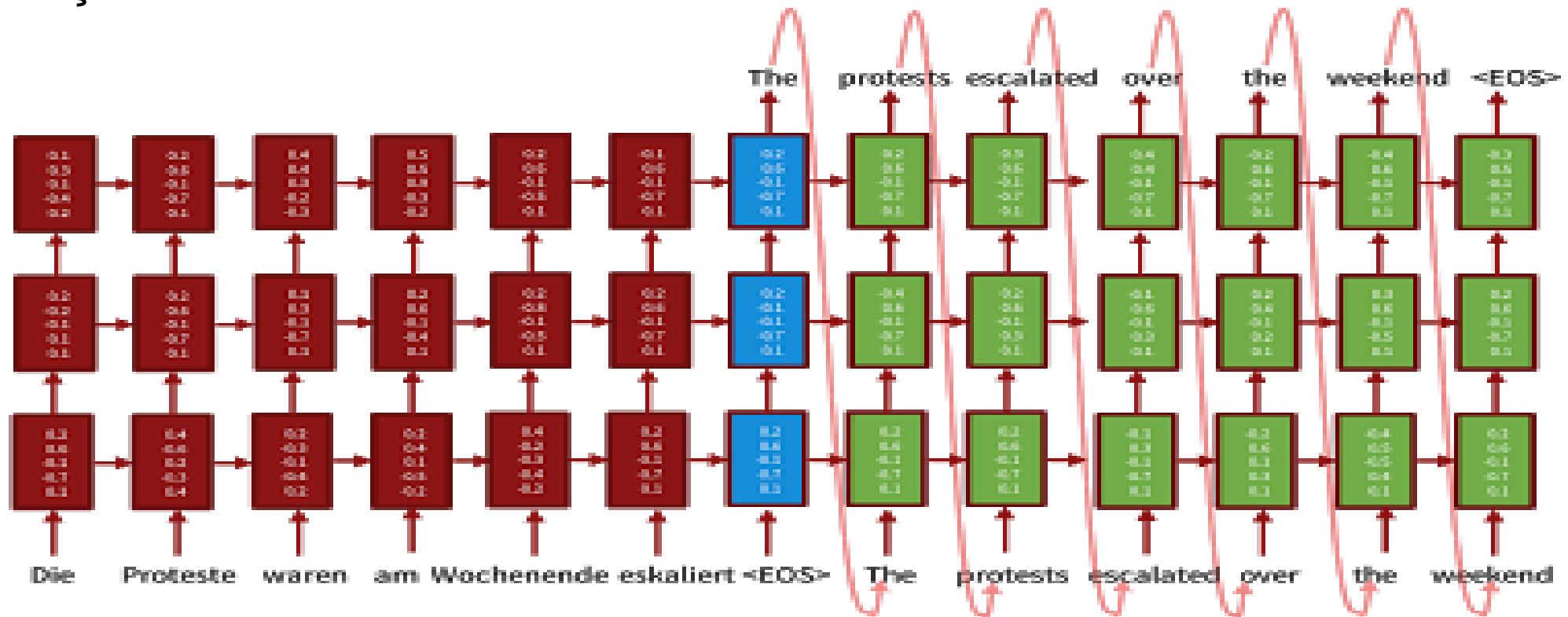
Marco: Reconhecimento de Fala

Redes Neurais Recorrentes: LSTMs (1997)



Marco: Tradução entre Idiomas

Modelos S2S (*Sequence-to-sequence*) com uso de LSTMs e de mecanismos de atenção

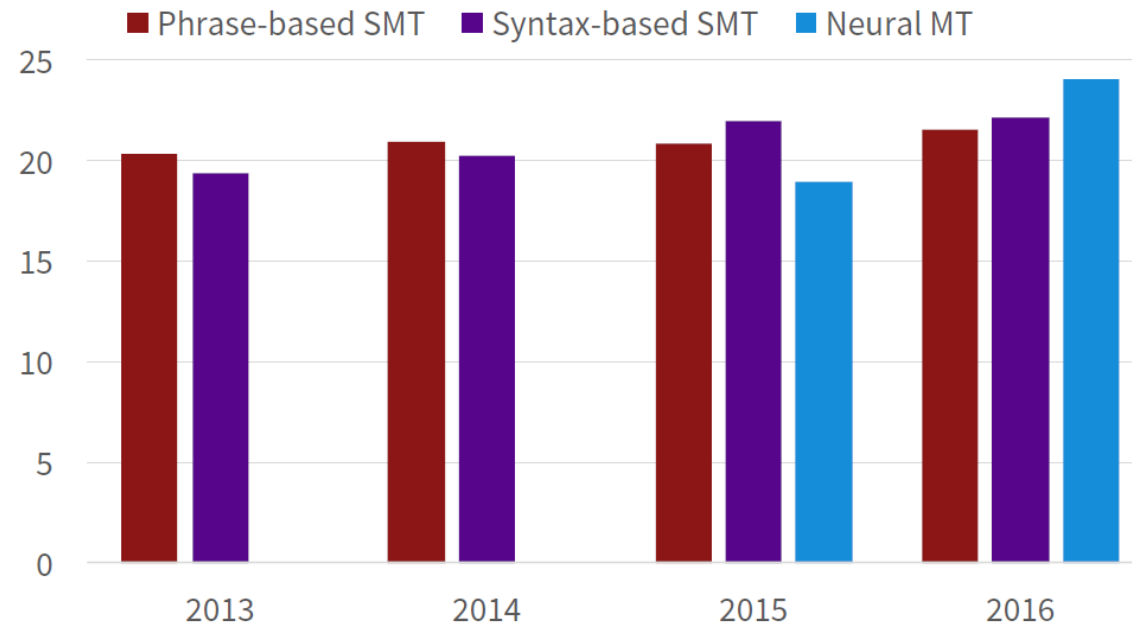


Marco: Tradução entre Idiomas

Modelos S2S (*Sequence-to-sequence*) com uso de LSTMs e de mecanismos de atenção

Progress in Machine Translation

[Edinburgh En-De WMT newstest2013 Cased BLEU; NMT 2015 from U. Montréal]



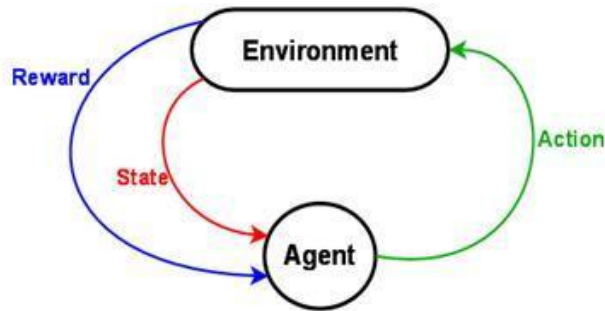
From [Sennrich 2016, http://www.meta-net.eu/events/meta-forum-2016/slides/09_sennrich.pdf]

Avanços no Processamento de Linguagem Natural

Task	Test set	Metric	Best non-neural	Best neural	Source
Machine Translation	Enu-deu newstest16	BLEU	31.4	34.8	http://matrix.statmt.org
	Deu-enu newstest16	BLEU	35.9	39.9	http://matrix.statmt.org
Sentiment Analysis	Stanford sentiment bank	5-class Accuracy	71.0	80.7	Socher+ 13
Question Answering	WebQuestions test set	F1	39.9	52.5	Yih+ 15
Entity Linking	Bing Query Entity Linking set	AUC	72.3	78.2	Gao+ 14b
Image Captioning	COCO 2015 challenge	Turing test pass%	25.5	32.2	Fang+ 15
Sentence compression	Google 10K dataset	F1	0.75	0.82	Fillipova+ 15
Response Generation	Sordoni dataset	BLEU-4	3.98	5.82	Li+ 16a

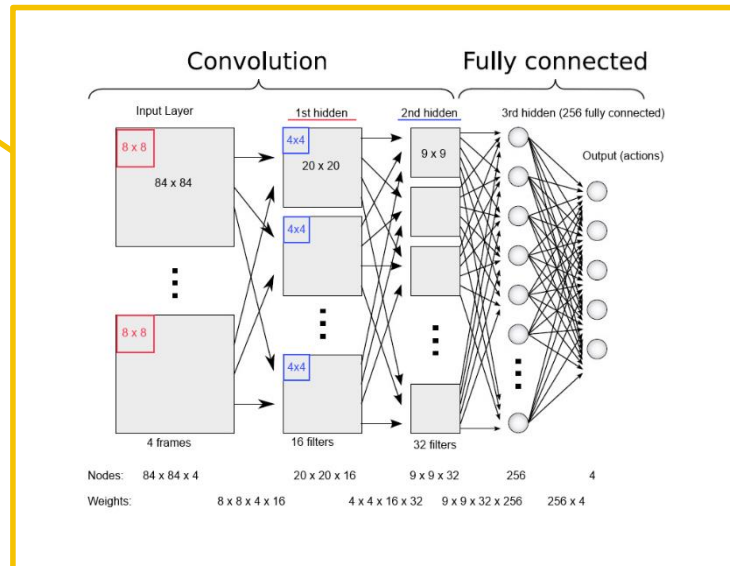
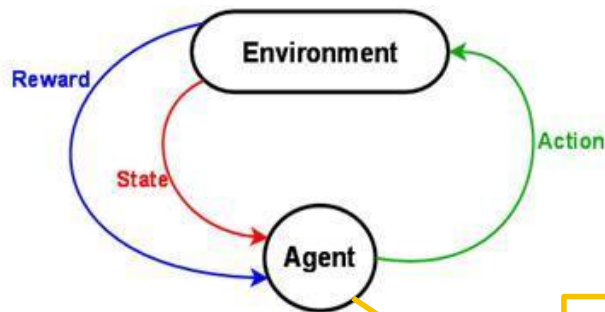
Marco: Aprendizado por Reforço Profundo

Em 2013, o agente treinado pela Deep Mind superou um humano expert em 6 jogos de Atari (adquirida pela Google em 2014)



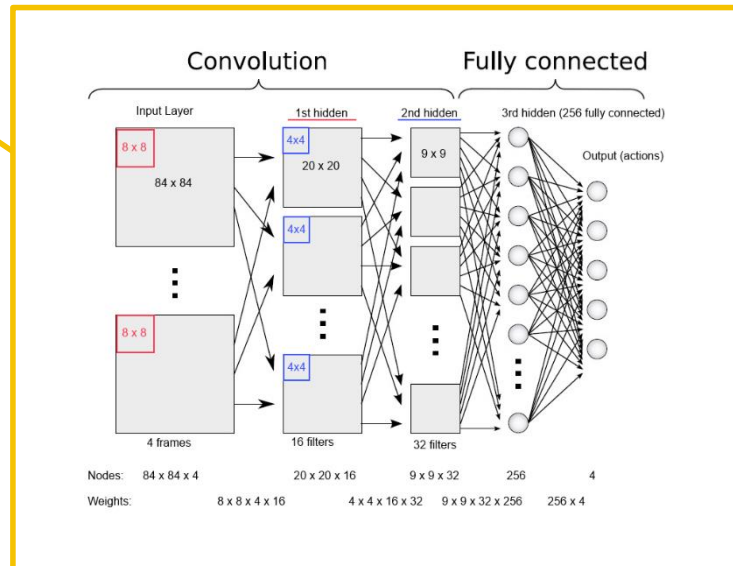
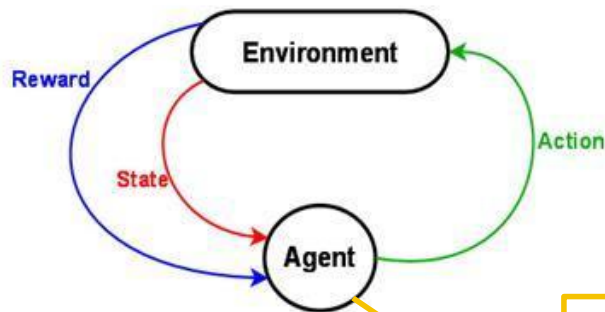
Marco: Aprendizado por Reforço Profundo

Em 2013, o agente treinado pela Deep Mind superou um humano expert em 6 jogos de Atari (adquirida pela Google em 2014)



Marco: Aprendizado por Reforço Profundo

Em 2013, o agente treinado pela Deep Mind superou um humano expert em 6 jogos de Atari (adquirida pela Google em 2014)



Em 2016, um agente treinado pela Deep Mind derrotou o campeão mundial de GO



Críticas

How smart is today's artificial intelligence?

Today's AI is super impressive, but it's not intelligent.

By Joss Fong | joss



INFOWORLD TECH WATCH

By [Matt Asay](#), InfoWorld | MAR 3, 2017

About |

Informed news analysis every weekday

Artificially inflated: It's time to call BS on AI

We may have hit peak ludicrous mode for AI, flailing in a tsunami of AI-washing

Is AI Overhyped?

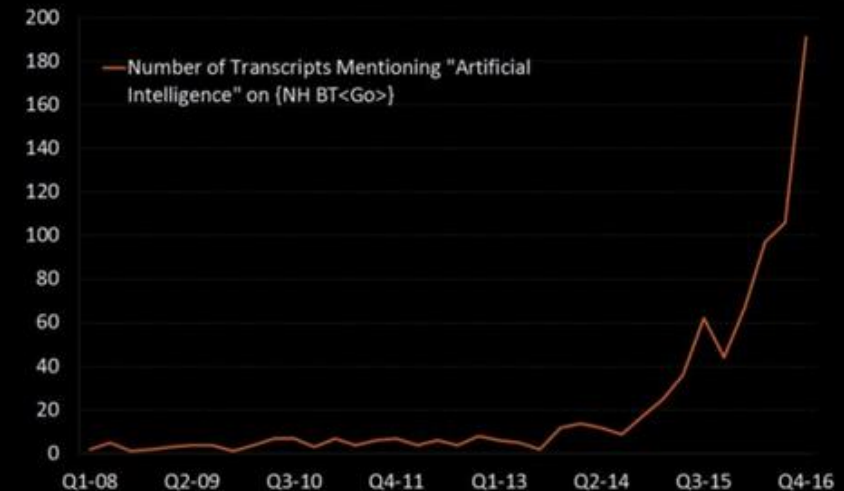


Forbes Technology Council

Elite CIOs, CTOs & execs offer firsthand insights on tech & business. [FULL BIO](#) ✓

Opinions expressed by Forbes Contributors are their own.

Companies Mentioning 'Artificial Intelligence' Rising Rapidly



Source: Bloomberg

Bloomberg

Criar Expectativas ... Poder Ser Ruim

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

PROJECT MAC

Artificial Intelligence Group
Vision Memo. No. 100.

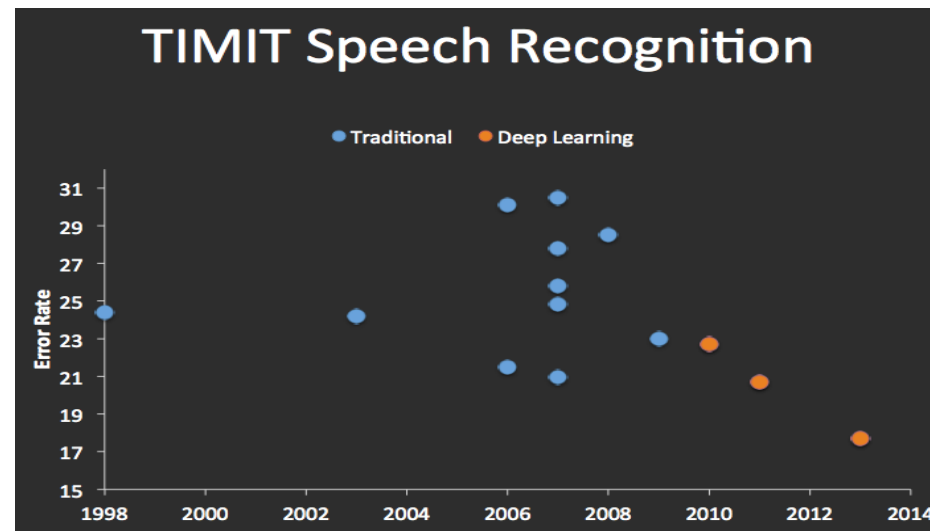
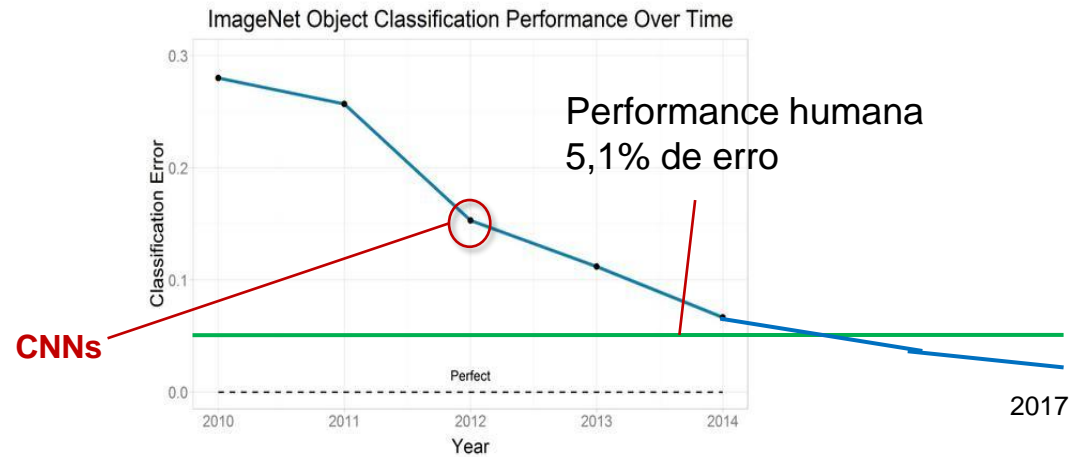
July 7, 1966

THE SUMMER VISION PROJECT

Seymour Papert

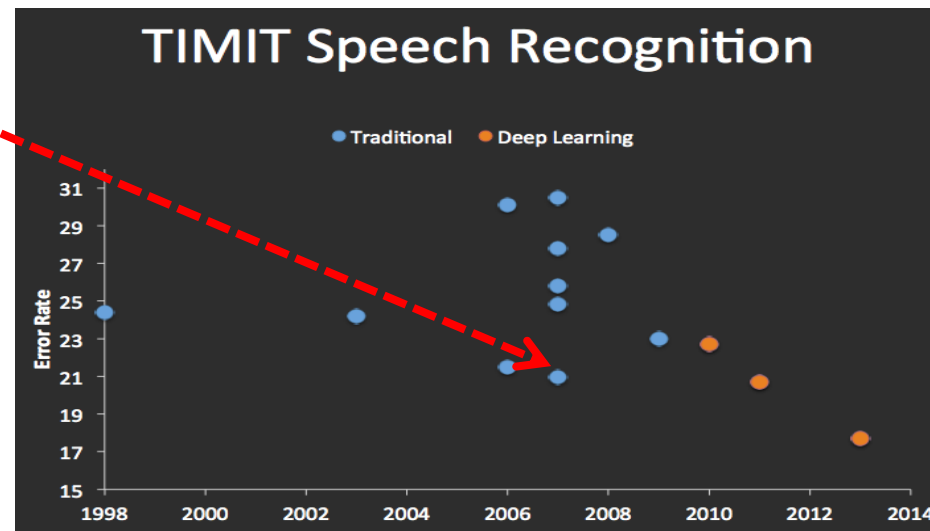
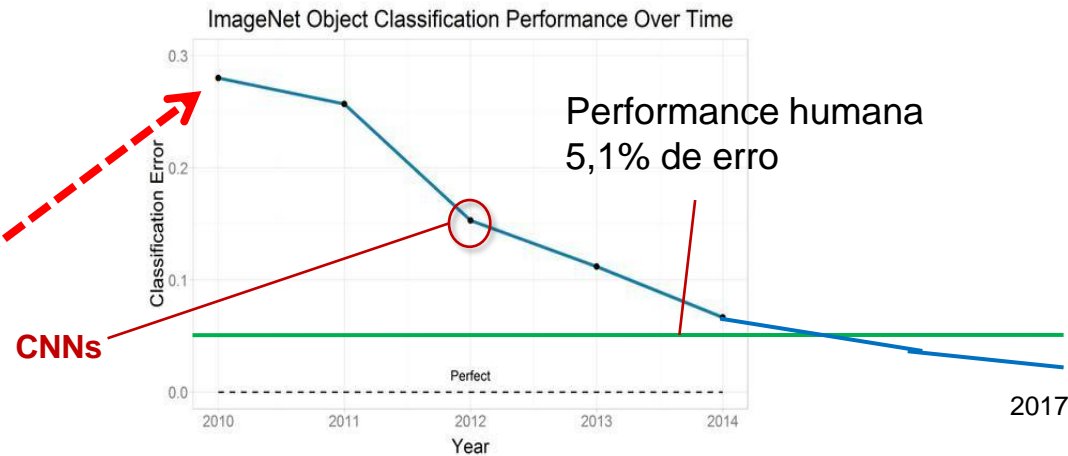
The summer vision project is an attempt to use our summer workers effectively in the construction of a significant part of a visual system. The particular task was chosen partly because it can be segmented into sub-problems which will allow individuals to work independently and yet participate in the construction of a system complex enough to be a real landmark in the development of "pattern recognition".

Apredizagem (IA) Clássica × Aprendizagem Profunda



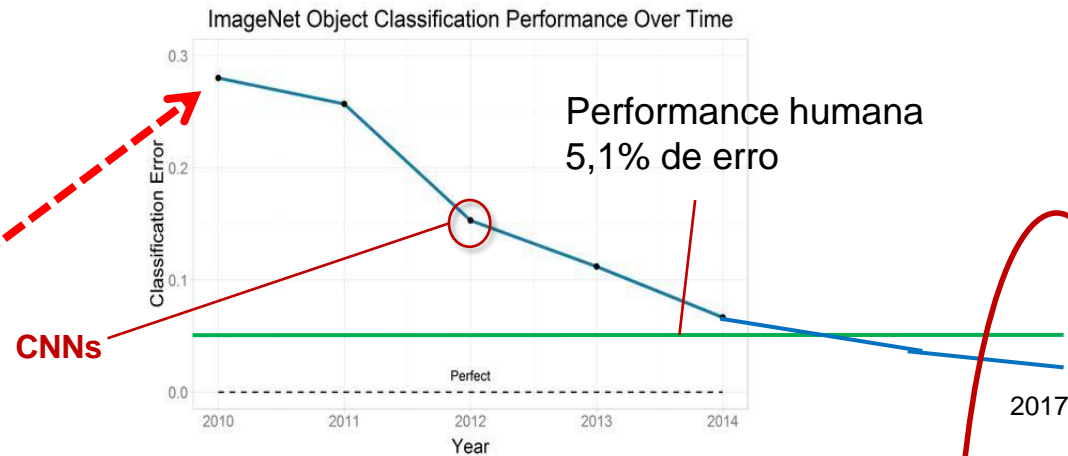
Aprendizagem (IA) Clássica × Aprendizagem Profunda

Limite de
Performance de
Abordagens
Clássicas

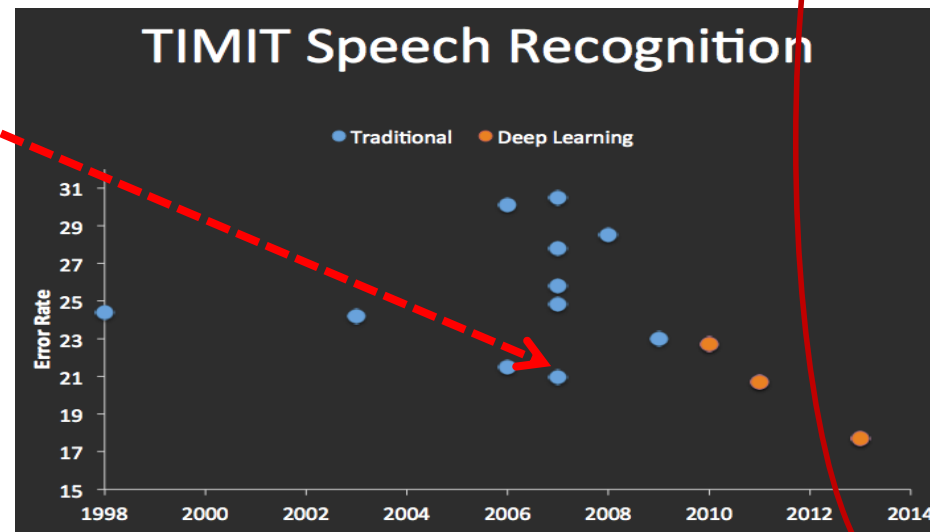


Aprendizagem (IA) Clássica × Aprendizagem Profunda

Limite de
Performance de
Abordagens
Clássicas



Qual será o limite
da Aprendizagem
Profunda?



Riscos

Alguns!

- Econômicos: deslocamento de empregos
- Existenciais: segurança, sistemas descontrolados



Hawking, Musk, Gates têm destacado os riscos das novas tecnologias de IA

Aprendendo sobre Redes Neurais e Aprendizagem Profunda

Redes Neurais Profundas exigem

*“uma interação entre insights intuitivos,
modelagem teórica, implementações práticas,
estudos empíricos e análises científicas”*

Yann Lecun (pesquisador-chefe do Facebook,
pioneiro em redes profundas)

ou seja,

não existe uma estrutura única ou
conjunto básico de princípios para explicar tudo!