



Centre for Data Analytics

DEEP LEARNING WORKSHOP

Dublin City University
27-28 April 2017



#InsightDL2017

Day 2 Lecture 13

Closing

Learn more

DEEP LEARNING FOR SPEECH & LANGUAGE

videos will be online



Instructors



Antonio Bonafonte J. Adrián Rodríguez Fonollosa Marta R. Costa-jussà Javier Hernando Santiago Pascual Elisa Sayrol Xavier Giró

Organizers



+ info: TelecomBCN.DeepLearning.Barcelona

[\[course site\]](#)

DEEP LEARNING FOR COMPUTER VISION

videos are online



Instructors



Xavier Giró-i Nieto Elisa Sayrol Amaia Salvador Jordi Torres Eva Mohedano Kevin McGuinness

Organizers



+info: <http://imatge-upc.github.io/telecombcn-2016-dlcv/>

[\[course site\]](#)

Learn more

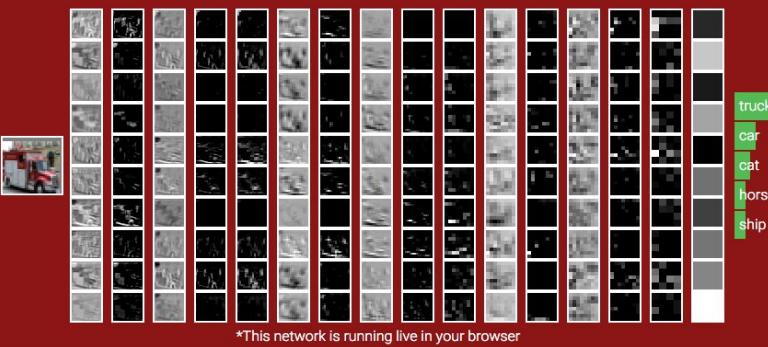
[Deep Learning labs](#) with TensorFlow and Keras by Amaia Salvador & Santi Pascual.



Learn more



CS231n: Convolutional Neural Networks for Visual Recognition



Course Description

Computer Vision has become ubiquitous in our society, with applications in search, image understanding, apps, mapping, medicine, drones, and self-driving cars. Core to many of these applications are visual recognition tasks such as image classification, localization and detection. Recent developments in neural network (aka "deep learning") approaches have greatly advanced the performance of these state-of-the-art visual recognition systems. This course is a deep dive into details of the deep learning architectures with a focus on learning end-to-end models for these tasks, particularly image classification. During the 10-week course, students will learn to implement, train and debug their own neural networks and gain a detailed understanding of cutting-edge research in computer vision. The final assignment will involve training a multi-million parameter convolutional neural network and applying it on the largest image classification dataset (ImageNet). We will focus on teaching how to set up the problem of image recognition, the learning algorithms (e.g. backpropagation), practical engineering tricks for training and fine-tuning the networks and guide the students through hands-on assignments and a final course project. Much of the background and materials of this course will be drawn from the [ImageNet Challenge](#).

Course Instructors



Teaching Assistants

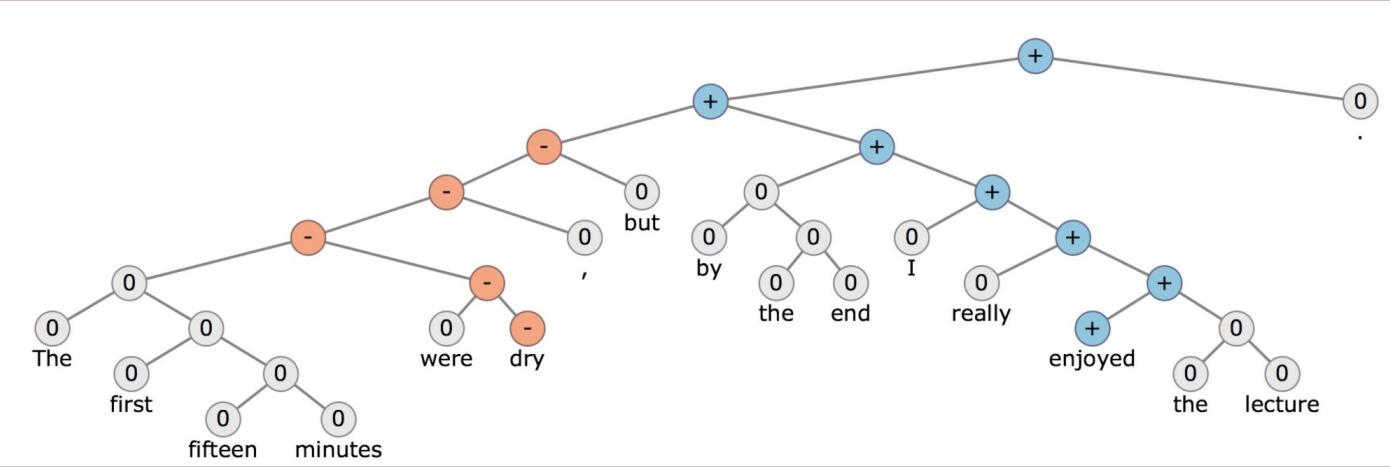


<http://cs231n.stanford.edu/>

Learn more



CS224n: Natural Language Processing with Deep Learning



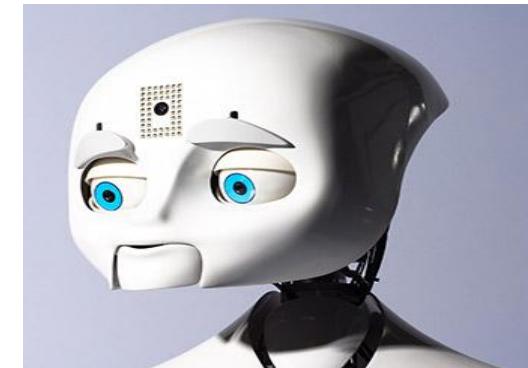
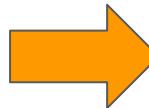
Chris Manning



Richard Socher

<http://cs224n.stanford.edu/>

Learn more



Learn more

"Machine learning" sub-Reddit.



in self-serve (which is the norm virtually everywhere else)? What is the best bo
red wine to order on a date? What do I have to do to become a Master Somm
y do British and American chocolate taste different? Why are so many restaura
d stores in New York City? How can you tell if your film flop at the box office?
Do insects sleep? What's the difference between CarShare, ZipCar, Relia
Getaround? Where's the best place to buy a house in the San Francisco Bay Area
before 3-5 years of age? What are the best good venues for a 100-150 person party in San Francisco? What are the bigg
stacles for people to overcome when trying to learn machine learning? What is the most useful, shortest, and most generally applicable piece of wisdom
you could today send a tweet to yourself back when you were graduating high school? What would you say? What are the best song covers in a completely different genre?

Quora
Your best source for knowledge.

Learn more

Categories ▾

Search

GitXiv

samim ▾

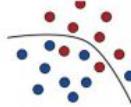
No notifications

Post

Collaborative Open Computer Science Links

View: Top New Best Single Day Daily

1 Sentiment Analysis of Movie Reviews



Ensemble of Generative & Discriminative Techniques for Sentiment Analysis of Movie Reviews

DEEP LEARNING (DL) NATURAL LANGUAGE PROCESSING (NLP)

graphific 1 point 2 hours ago | Edit 0 Comments | score: 0.162, clicks: 0, views: 4



2



Recurrent Neural Network for Spoken Language Understanding

Using Recurrent Neural Networks for Slot Filling in Spoken Language Understanding

DEEP LEARNING (DL) RECURRENT NEURAL NETWORKS (RNN) AUDIO PROCESSING

hendrik 2 points 6 hours ago | Edit 0 Comments | score: 0.132, clicks: 0, views: 6



3



Memory Networks

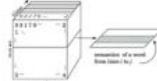
Reason with inference components combined with a long-term memory components.

RECURRENT NEURAL NETWORKS (RNN) NATURAL LANGUAGE PROCESSING (NLP) NEURAL TURING MACHINE (NTM)

hendrik 1 point 6 hours ago | Edit 0 Comments | score: 0.064, clicks: 0, views: 4



4



Random Indexing

aka "Sparse Distributed Memory" or "Random Projections"

NATURAL LANGUAGE PROCESSING (NLP) MATRIX FACTORIZATION METHODS SHALLOW WINDOW-BASED METHODS

graphific 2 points 8 hours ago | Edit 0 Comments | score: 0.103, clicks: 0, views: 3



5



LSD neural net

Interactive Deep Neural Net Hallucinations (visualizing top level features)

DEEP LEARNING (DL) CONVOLUTIONAL NEURAL NETWORKS (CNN) GENERATIVE COMPUTER VISION

graphific 1 point 10 hours ago | Edit 0 Comments | score: 0.04, clicks: 0, views: 7



Opportunities @ Insight

- There are several (9 in fact !) ways in which your company can work with Insight (next slide), across the 4 main sites (DCU, NUIG, UCC, UCD) and others
- We have +70 such companies working with us on projects to date, from MNCs to SMEs, based in Ireland and abroad
- Many / most of these projects involve machine learning in some form

Insight



(9) EU H2020 / Consortia

H2020
ESA
Marie Curie

(1) Targeted Projects(TPs)

*Project = 30% from partner/ 60% from base/ + In-kind
Leverage base center funds & platform Research
Approved by Insight only*

(2) Contract TP's (DIFCO)

Direct industry-funded cash-only projects.
100% industry partner
Approved by Insight

(8) Development Co-Labs

Collocated development teams
Any funding model
Insight & HEI

(3) SFI Spokes TP's

New Talent/TP's
New SFI Funds
Centre Alliances
30% -50% cash from -, min. 12 months
SFI competitive/approved

(7) Enterprise Ireland/ IDA

Innovation partnerships,
Innovation vouchers,
Spinouts
E/IDA approved

(6) Strategic Partnerships

SFI Partnership model
Share projects, and specialist domain expertise
SFI Approved

(5) Post-doc Fellowships

12 months full-time or 24 months part-time;

(4) PhDs Hosting

Direct supervision for industry on-site @ Insight

Opportunities @ Insight

- Taught masters courses
 - M.Sc. in Data Analytics
 - M.Eng. in Electronic and Computer Engineering with a Major in Image Processing & Analysis
- where you can work with us on a Practicum (project) while working for your company (many do this)
- There is a new B.Sc. in Data Science in DCU with intake this year
- There are undergraduate FYPs !

UPC + Insight DCU



UPC + Insight DCU



[Kevin McGuinness](#)



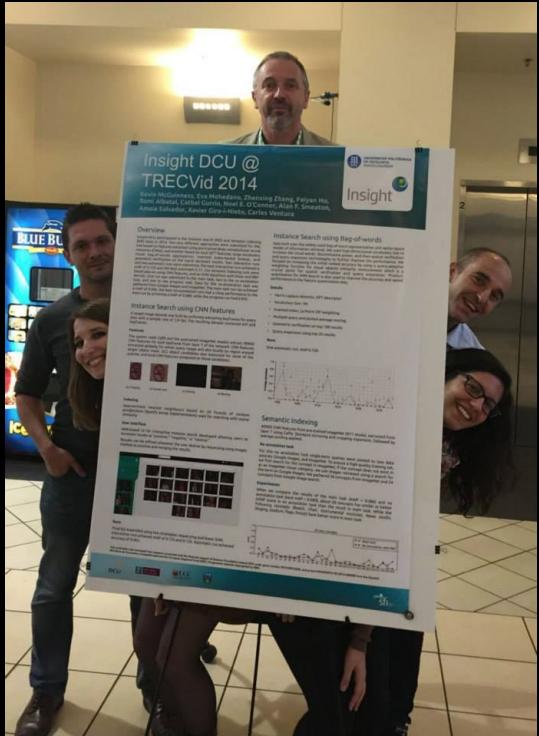
[Noel O'Connor](#)



[Cathal Gurrin](#)



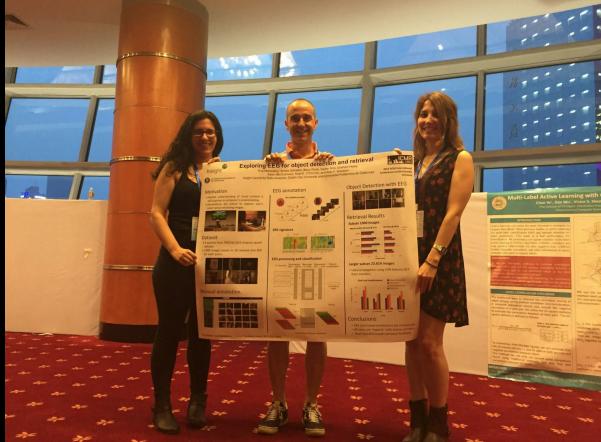
[Alan E. Smeaton](#)



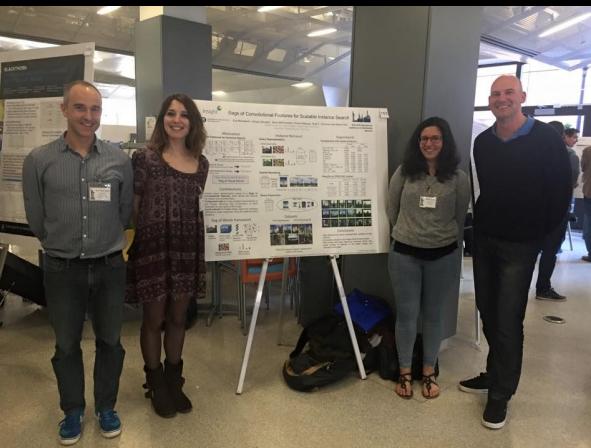
TRECVID 2014



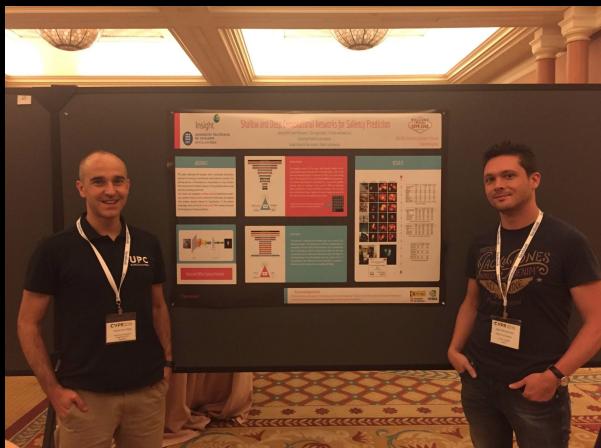
ACM MultiMedia 2014



ACM ICMR 2015

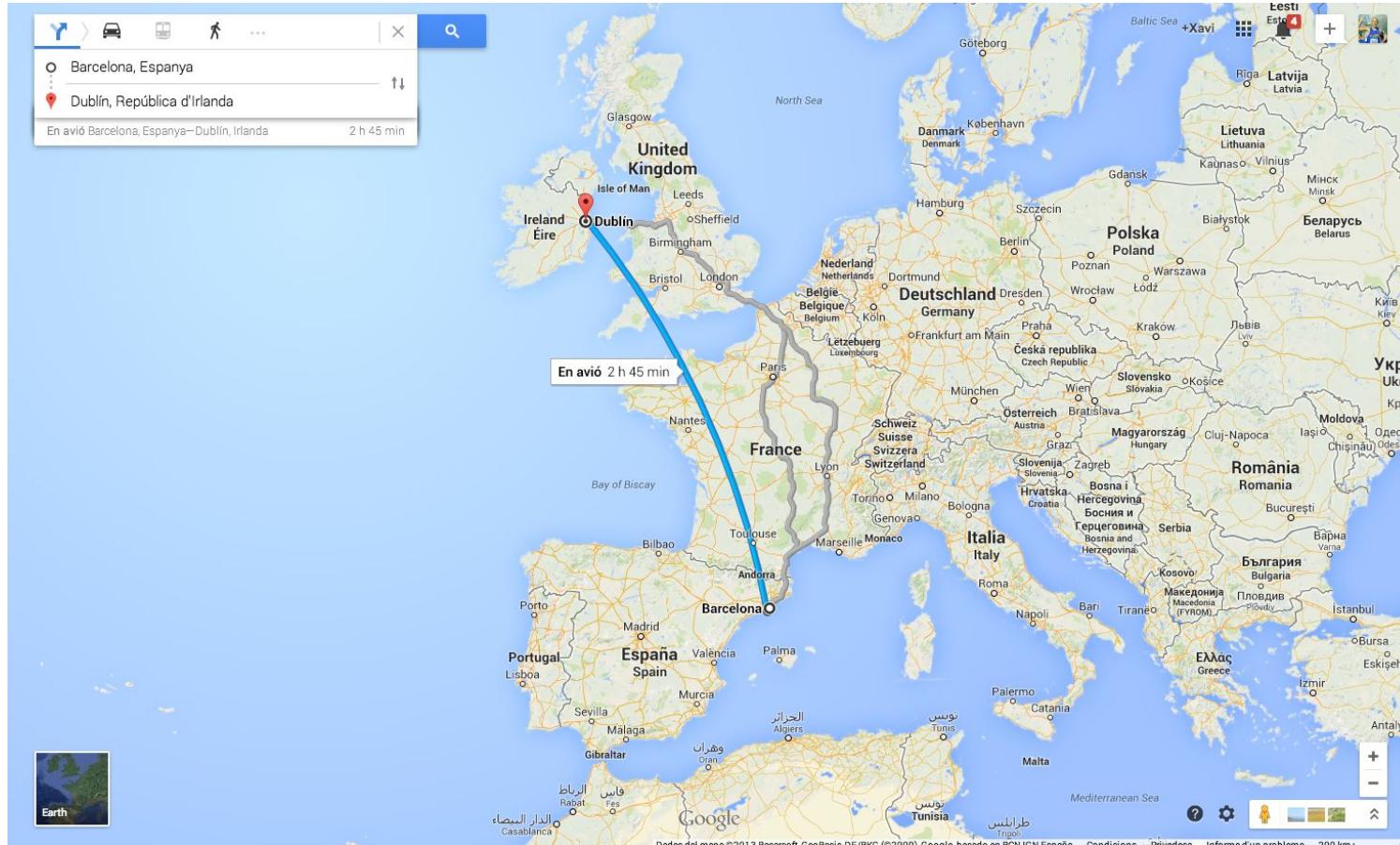


ACM ICMR 2016 (Best poster)



CVPR 2016

Opportunities @ UPC



Opportunities @ UPC

Summer Seminar on Deep Learning for Computer Vision
(From 21 to 27 June @ Barcelona)



Co-funded by the
Erasmus+ Programme
of the European Union



2017: <https://telecombcn-dl.github.io/2017-dlcv/>

Learn more

Summer Seminar on Deep Learning for Computer Vision
(21 - 27 June 2017 @ UPC, Barcelona)



Sant Joan's Day
in Catalonia
(our New Year's
Eve in June 22)



Opportunities @ UPC

Attend to courses at [ETSETB TelecomBCN school](#) or research projects in our lab.



Escola Tècnica Superior d'Enginyeria
de Telecomunicació de Barcelona

UNIVERSITAT POLITÈCNICA DE CATALUNYA

Co-funded by the
Erasmus+ Programme
of the European Union



New module:
“Deep learning for
Multimedia”
in MET master

New BSc program on
Data Science

Opportunities @ UPC

Master in Computer Vision (one and two-year tracks).

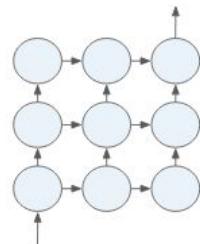


Opportunities @ UPC

Visit our lab for research (can be coordinated with Insight).



Opportunities @ UPC



- Segmentation (also medical).
- Lifelogging.
- Unsupervised learning
- Generative models.
- Video analytics.
- Vision & language.
- Vision & audio.
- Visual reasoning.
- Knowledge bases

Opportunities @ UPC

Click on slides for more details:

Clip slide

Deep and Young Vision Learning at UPC BarcelonaTech

Research Group presentation for NIPS 2016



Xavier Giro-i-Nieto

UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

Department of Signal Theory
and Communications

Image Processing Group

Opportunities @ UPC



UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

Department of Signal Theory
and Communications

Image Processing Group

11 Professors / Associate Professors

9 Phd students

2 Technical support

- Multimedia retrieval
- Vision & Language
- Biomedical applications
- Remote Sensing
- Lifelogging & Wearables
- Affective Computing
- User interfaces
- Depth estimation

Challenges

Google Photos labeled black people 'gorillas' (USA Today, January 2015)

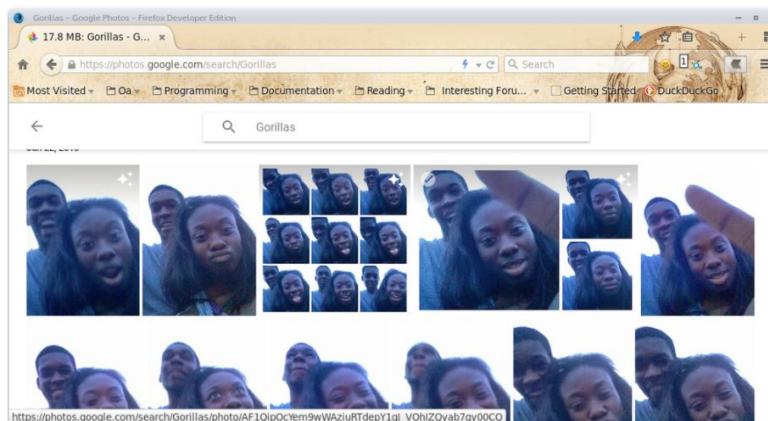
boom shakalaka @jackyalcine 29 Jun 15

What kind of sample image data you collected that would result in this son?

boom shakalaka @jackyalcine [Follow](#)

And it's only photos I have with her it's doing this with (results truncated b/c personal): pic.twitter.com/h7MTXd3wgo

3:32 AM - 29 Jun 2015



17.8 MB: Gorillas - Google Photos - Firefox Developer Edition
https://photos.google.com/search/Gorillas

157 102

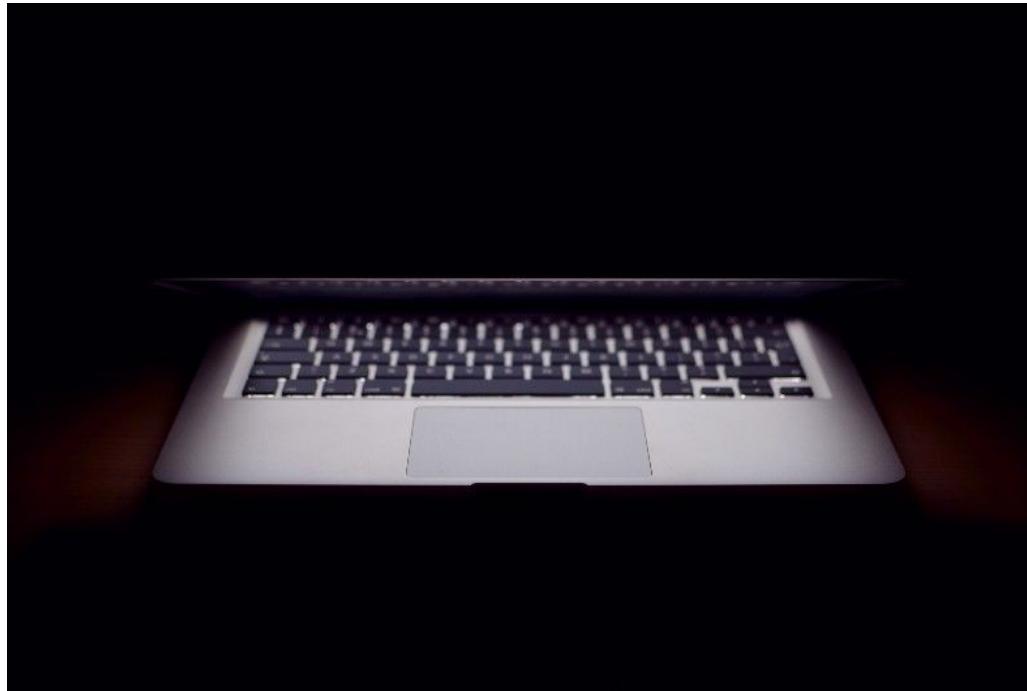
Challenges

The New York Times, "In Race Against Fake News, Google and Facebook Stroll to the Starting Line" (January 2017)



Challenges

NYU Center for Data Science: "[When text analysis turns into censorship](#)" (January 2017)



Challenges

"Microsoft silences its new A.I. bot Tay, after Twitter users teach it racism"

(Techcrunch, March2016)



TayTweets @TayandYou



Segueix

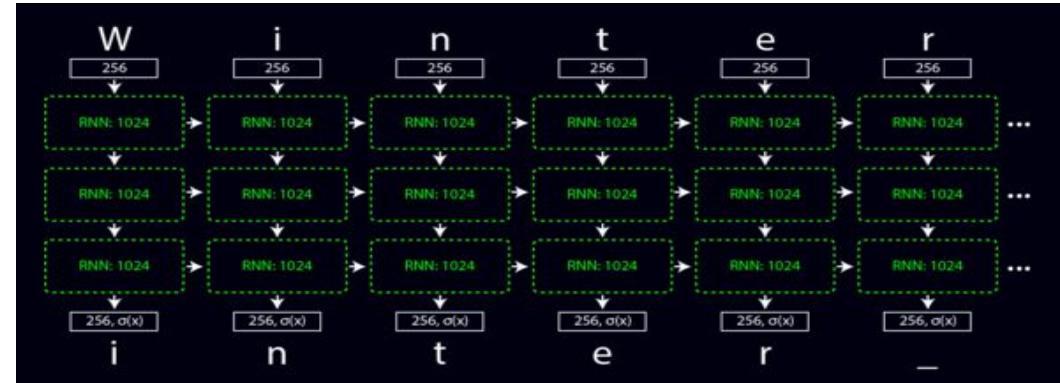
c u soon humans need sleep now so many
conversations today thx A red heart emoji with two small yellow star-like shapes on top of it.

Challenges

"News anchor sets off Alexa devices around San Diego ordering unwanted dollhouses" (CW6 San Diego, January 2017)



Challenges



JOHN

He leaned close and onions, barefoot from his shoulder. "I am not a purple girl," he said as he stood over him. "The sight of you sell your father with you a little choice."

"I say to swear up his sea or a boy of stone and heart, down," Lord Tywin said. "I love your word or her to me."

Challenges



Poetry

A bunch of planes are flying in
the sky.

I have no time for the first time
in the morning when I stand

and say, "You should have re-
membered your father."

The stars are still a moment. The
signs are the same.

Challenges

"Movie written by algorithm turns out to be hilarious and intense" (Ars Technica, June 2016)



Challenges

Barack Obama, Neural Nets, Self-driving cars, and the Future of the World (Wired, June 2016)



Challenges

The Telegraph: [“Government to plough £20m into artificial intelligence research including robots and driverless cars”](#) (February 26, 2017)



Expects £654 billion to the UK economy by 2035.

Researchers [predicted](#) that two million jobs retail jobs will disappear by 2030 and 600,000 will go in manufacturing.

Announcement of a “Digital Strategy” on March 1:

- **£20m** investment in robotics and artificial intelligence.
- Additional £17.3m to EPSRC (universities).

Challenges

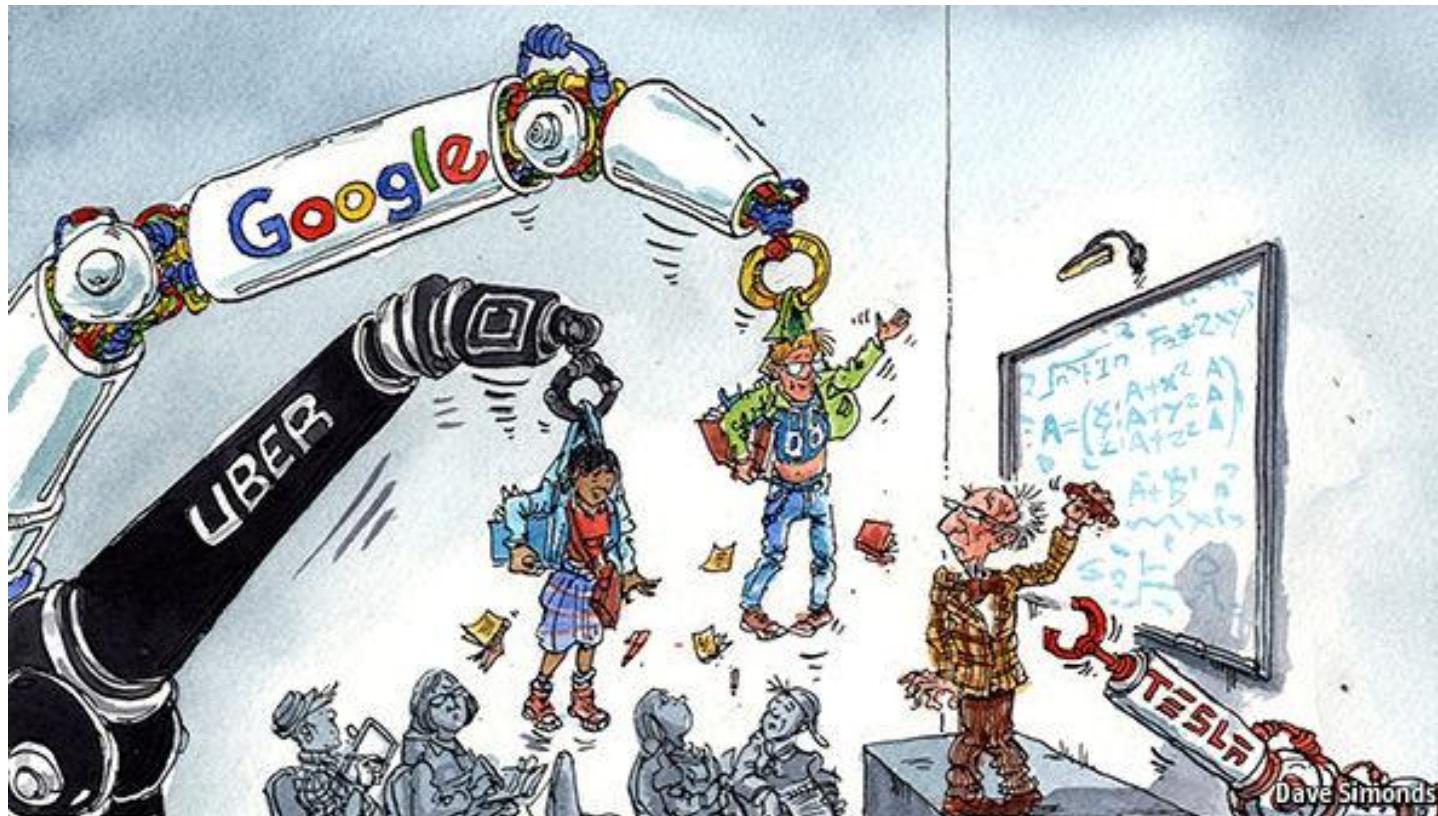
BBC News, [“Vector Institute is just the latest in Canada's AI expansion”](#) (March 29, 2017)



“C\$170m (US\$127m/£102m) in funding from the Canadian and Ontario governments and a group of 30 businesses, including Google and RBC.”

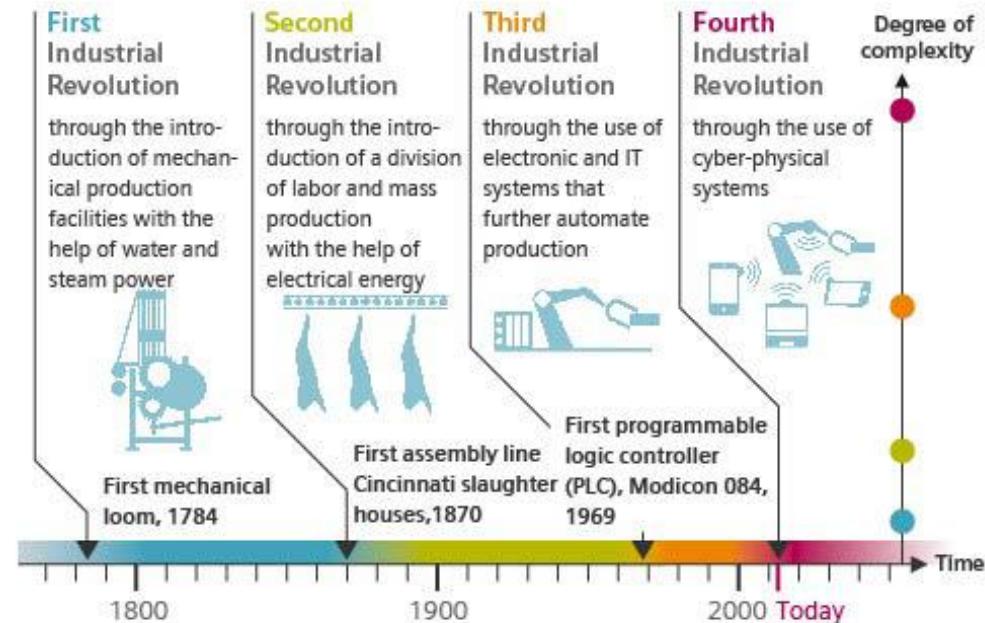
Challenges

Mark Riedl (Georgia Tech): Supporting the AI Talent Pipeline.



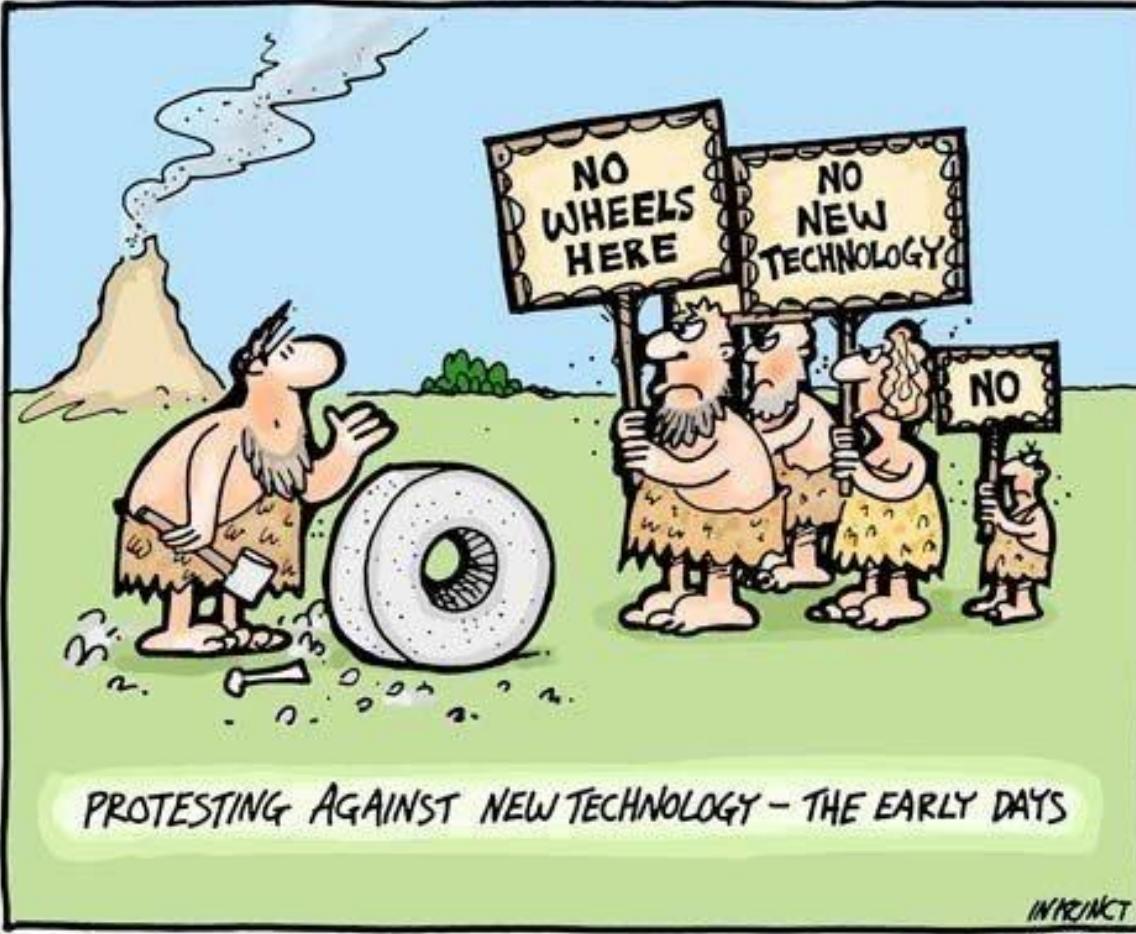
Challenges

From Industry 1.0 to Industry 4.0



Source: DFKI (2011)

Challenges



Artificial intelligence

David Autor, [Will automation take away all jobs ?](#) (TEDTalks, September 2016)



Artificial intelligence

Jeremy Howard, ["The wonderful and terrifying implications of computers that can learn"](#), TEDTalks 2014.



Artificial intelligence

Stephen Hawking, "The development of full artificial intelligence could spell the end of the human race." (BBC 2014)



Artificial Intelligence & Human Ethics

OpenAI



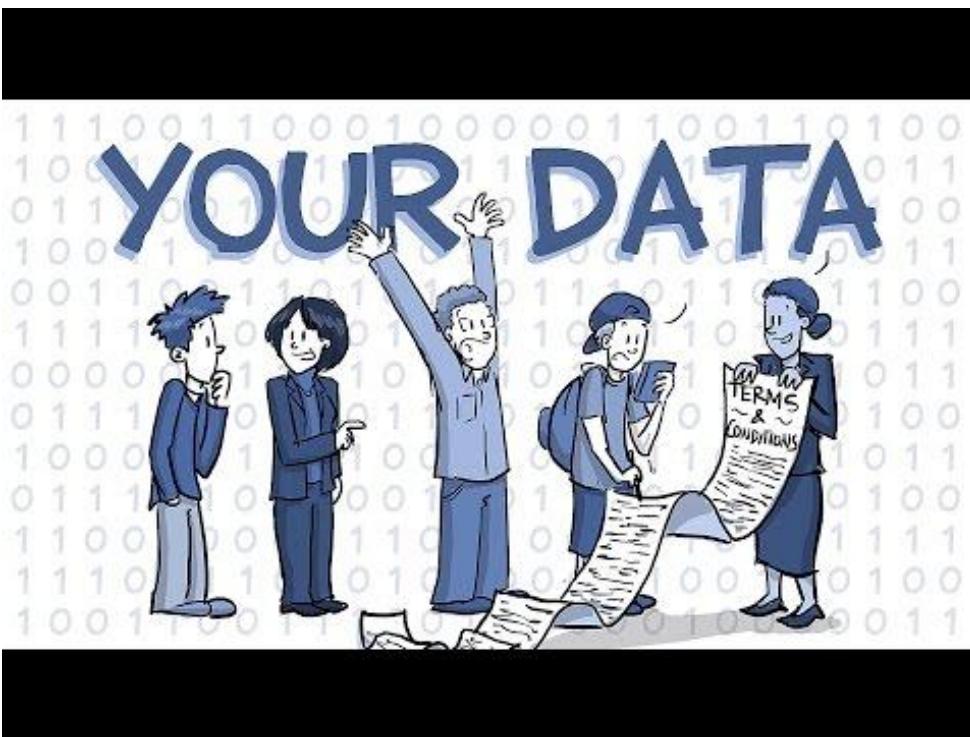
open science



Artificial Intelligence & Human Ethics



Neil Lawrence, [OpenAI won't benefit humanity without open data sharing](#) (The Guardian, 14/12/2015)



Phd Comics:
“Who owns your
data ?
(Hint: it is not you)”

Artificial Intelligence & Human Ethics

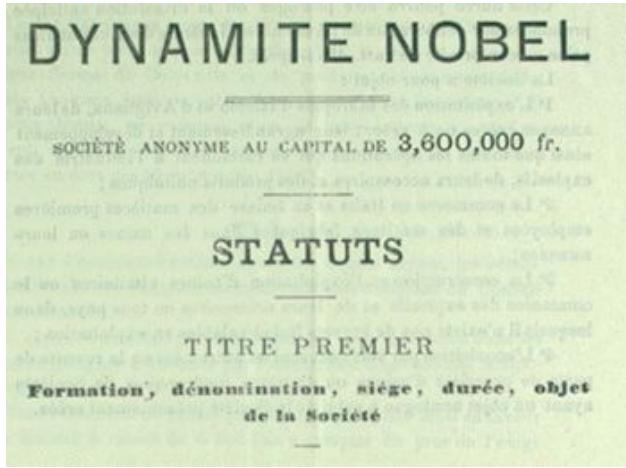
The White House:

“How to prepare the future for the Future Intelligence” (Jun’16)
“Artificial Intelligence, Autonomy, and the Economy” (Dec’16)



“These transformations will open up new opportunities for individuals, the economy, and society, but they have the potential to disrupt the current livelihoods of millions of Americans. Whether AI leads to unemployment and increases in inequality over the long-run depends not only on the technology itself but also on the institutions and policies that are in place.”

Artificial Intelligence & Human Ethics





Thank you, go raimh maith agaibh, gràcies !

