

DEEP LEARNING FOR COMPUTER VISION

Summer Seminar UPC TelecomBCN, 4 - 8 July 2016



Instructors



Xavier
Giró-i-Nieto



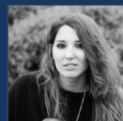
Elisa
Sayrol



Amaia
Salvador



Jordi
Torres



Eva
Mohedano



Kevin
McGuinness

Organizers



UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH



**Barcelona
Supercomputing
Center**
Centro Nacional de Supercomputación



Dublin City University
Ollscoil Chathair Bhaile Átha Cliath



Centre for Data Analytics



GPU
CENTER OF
EXCELLENCE

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



+ info: TelecomBCN.DeepLearning.Barcelona

Day 1 Lecture 1

Welcome

Instructors

Xavier Giro-i-Nieto

Associate Professor at Universitat Politècnica de Catalunya (UPC)

- Web: <https://imatge.upc.edu/web/people/xavier-giro>



UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

Department of Signal Theory
and Communications

Image Processing Group



SONY



COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

Instructors

Elisa Sayrol

Associate Professor at Universitat Politècnica de Catalunya (UPC)



Web: <https://imatge.upc.edu/web/people/elisa-sayrol>



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Instructors

Amaia Salvador

PhD Candidate

Image Processing Group (GPI), Universitat Politècnica de Catalunya

<https://imatge.upc.edu/web/people/amaia-salvador>



Escola d'Enginyeria de Terrassa
UPC - ESEIAAT



Image Processing Group
Signal Theory and Communications Department
Universitat Politècnica de Catalunya. BARCELONATECH



INP ENSEEIHT



Instructors

Jordi Torres

Professor at Universitat Politècnica de Catalunya (UPC)

- Web: <http://www.JordiTorres/Barcelona>
- Twitter: [@JordiTorresBCN](https://twitter.com/JordiTorresBCN)



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Eva Mohedano

PhD Candidate

Insight Centre for Data Analytics

<https://www.insight-centre.org/users/eva-mohedano>



Instructors

Kevin McGuinness

Research Fellow at Dublin City University (DCU)
Insight Centre for Data Analytics

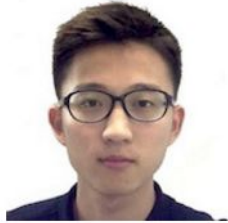
<https://www.insight-centre.org/users/kevin-mcguinness>



Management

Instructor	Area
Xavier Giró	Coordination
Kevin McGuinness	Lectures
Elisa Sayrol	Logistics & Evaluation
Jordi Torres	Lab
Amaia Salvador	Project
Eva Mohedano	Web and online material

Teaching assistants / contributors



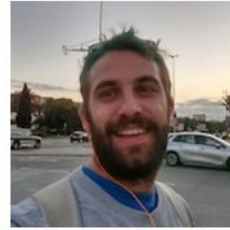
Junting
Pan



Míriam
Bellver



Albert
Jiménez



Andrea
Ferri



Alberto
Montes

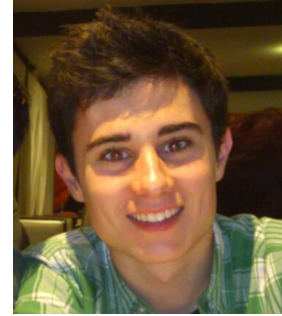


Maurici
Yagües

Acknowledgments



UNIVERSITAT POLITÈCNICA
DE CATALUNYA



Acknowledgments



 COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK



Microsoft
Research



 NICTA



 Ifh
st. pölten



 DCU
Dublin City University
Ollscoil Chathair Bhaile Átha Cliath



 UNIVERSITAT DE
BARCELONA

Densely linked slides



Deep Learning



What society thinks I do



What my friends think I do



What other computer scientists think I do



What mathematicians think I do



What I think I do

```
from theano import *
```

What I actually do

Motivation

The best job in the world: Data scientist.

25 Best Jobs in America



Want a new job? Glassdoor is here to help, identifying the 25 Best Jobs in America for 2016. The jobs that make this list have the highest overall Glassdoor Job Score, determined by combining three key factors – number of job openings, salary and career opportunities rating. These jobs stand out across all three categories.

United States ▼ 2016 ▼



1



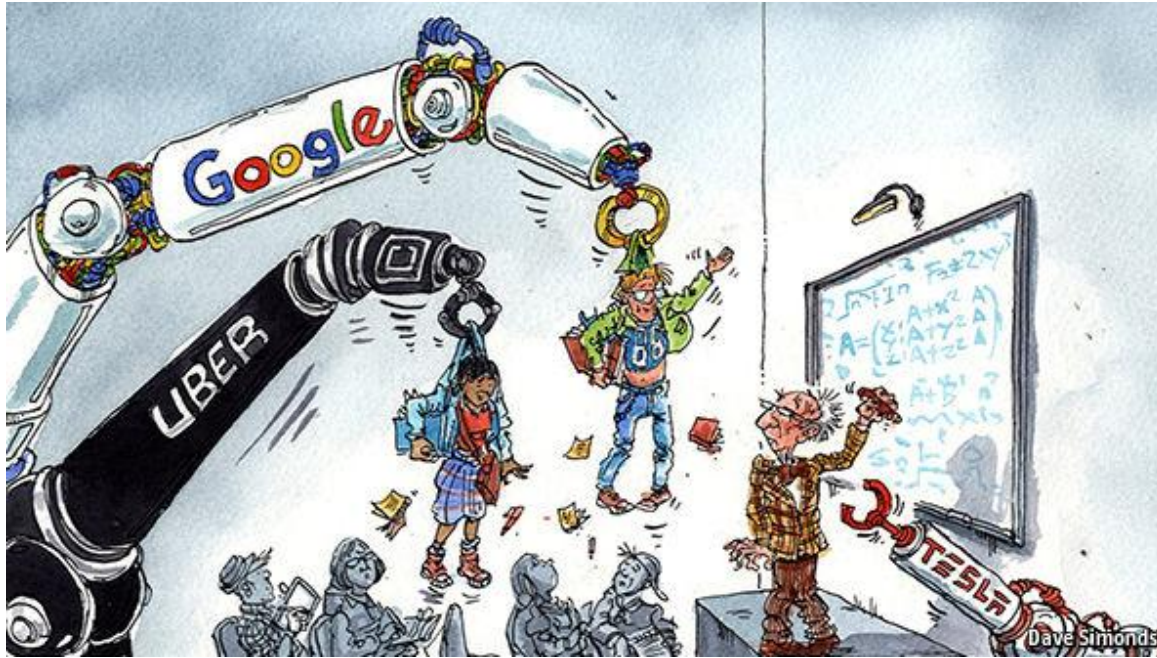
Data Scientist

Job Openings	1,736
Median Base Salary	\$116,840
Career Opportunity	4.1
Job Score	4.7

Source: [25 Best jobs in America](#) (Glassdoor)

Motivation

The Economist, [“Million-dollar babies”](#) (02/04/2016)



Motivation

Nature, [“AI talent grab sparks excitement and concern”](#) (26/04/2016)



Motivation

Exponential increase of generated multimedia content..



Motivation

...keeping a record of the memorable personal moments...



Pope Francis @ Philippines, 2015 (Source: AP Photo/Bullit Marquez)

Motivation

...keeping a record of the memorable personal moments...



Pope Francis @ Ecuador, 2015 (Source: AP)

Motivation

...(or not).



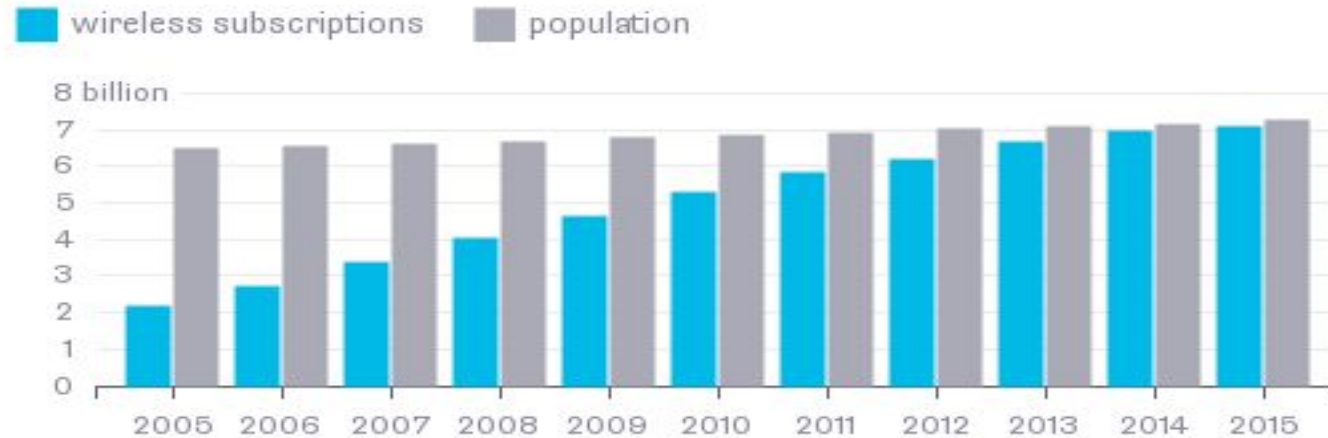
Pope Francis @ USA, 2015

Motivation

This data growth is motivated by ubiquitous mobile access to...

A Cell Phone in Every Pocket

Worldwide, there are almost as many mobile phones as people



Sources: International Telecommunication Union; U.S. Census Bureau

BloombergView

Motivation

...the **Internet (for visual data transmission)**...



Source: [Cisco Visual Networking Index \(VNI\)](#)

Motivation

...and **people** !

Person of
the Year
(2006)



Motivation

Need computer vision tools to extract knowledge from these large amount of rich visual data.



Course sites

plazza

<https://plazza.com/class#summer2016/230360>



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 UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH		 Barcelona Supercomputing Center Centro Nacional de Supercomputación
 Dublin City University Oireachtas Bhaile Átha Cliath	 Insight Centre for Data Analytics	 GPU CENTER OF EXCELLENCE Co-funded by the Erasmus+ Programme of the European Union

+ info: TelecomBCN.DeepLearning.Barcelona

<http://telecombcn.deeplearning.barcelona>

Schedule: Project & Tensorflow

Monday to Thursday

	BSc Students without project	Project Teams 1 & 2	Project Teams 3, 4, 5
3-4	Lectures		
4-5	TensorFlow		Project
5-6	Lectures		
6-7	Project (optional)	Project	Tensorflow

Friday

	BSc Students without project	Project Teams 1 & 2	Project Teams 3, 4, 5
3-4	Project expo Teams 3, 4 & 5		
4-5	TensorFlow		Closing
5-6	Project expo Teams 1 & 2		
6-7	Closing		Tensorflow

Grading

	BSc	MSc
Online Tests	60%	30%
Lab	30%	30%
Project	-	30%
Communication	-	10%
Attendance	10%	-10% x miss day

Grading: Online tests



[\[Online test preview\]](#)