

Lessons learned from teaching Data Science

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Hello!

My name is **Gianluca** [dʒanˈluːka]

What I do nowadays

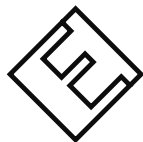
I'm a Data Scientist at



Microsoft

in Algorithms and Data Science

I also run my own company



Estimand.com

that provides

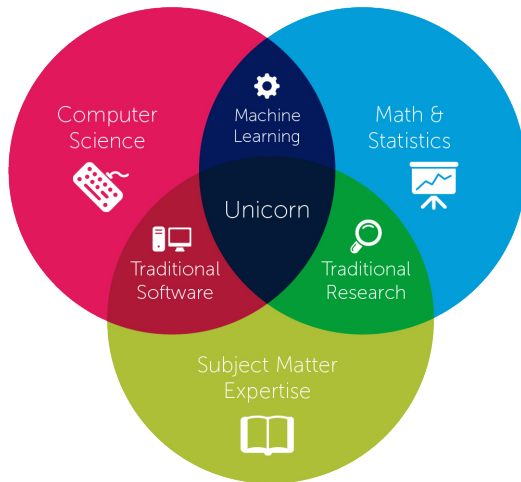
Data Science training and mentoring

It all started at
Imperial College
London

Today I want to talk to you about...

1. The skills gap in Data Science
2. The Data Science potential
3. How we implement all this

What I mean by 'Data Science'



From S. Geringer (originally from D. Conway)

Data-driven decision-making

- Focus is on the problem-solving process
- Multidisciplinary but domain-centric
- Tools are secondary

*The shortage of data scientists is becoming
a serious constraint in some sectors.*

— T. H. Davenport and D. J. Patil
Harvard Business Review (2012)

How do we close the skills gap?

Higher Ed

‘Traditional’ degrees

- Lots of theory
- Take a while to catch up
- More recognition?

Up-skilling

Bootcamps, MOOCs...

- Mostly hands-on
- Adapt faster
- ‘Show your skills’

How do we close the skills gap?

How do we ensure...

- Relevance?
- Quality?
- Consistency?

How do we realise
the potential of Data Science?

~~How do we realise~~
What even is
the potential of Data Science?

Data Science promises...

- Automation
- Risk minimisation
- Innovation

How do we realise this potential?

Data Science needs to be
embedded
within companies and processes

How do we realise this potential?

This means...

- Build, don't buy
- Cultivate internally, don't outsource
- Humans in the loop

How do we realise this potential?

1. Numeracy
2. Culture
3. Adoption

Numeracy

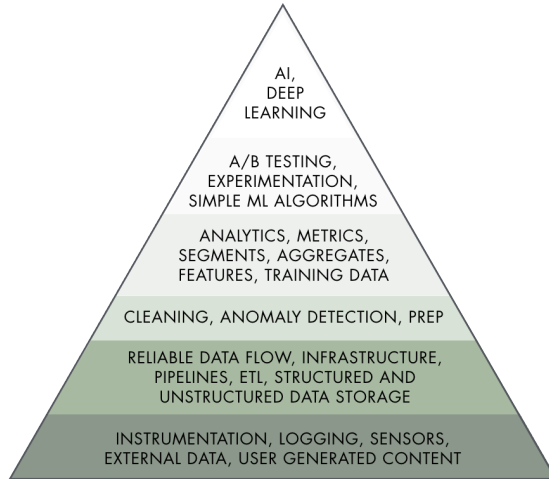


IN CS, IT CAN BE HARD TO EXPLAIN
THE DIFFERENCE BETWEEN THE EASY
AND THE VIRTUALLY IMPOSSIBLE.

From xkcd

- Realise what's possible
- Determine existing capacity
- Understand the Data Science process

Don't try to run before you can walk



From M. Rogati

The ROI of Data Science projects
is very difficult to predict!

- Power law-like distribution of returns
- Failure is *always* an option

Embrace a **high-risk, high-reward innovation culture**

- Iterate quickly → fail fast
- Operationalise

If it's not used in production...

If it's not used in production...

It never happened!

How to realise the Data Science potential

- Embed Data Science starting at the top
- Build and re-build... fast
- Actually use it!

How to realise the Data Science potential

How?

You need
good people and good teams

Attracting and retaining good people

- Have a roadmap
- Hire for potential
- Let them choose their tools
- Give them resources
- Nurture their curiosity

Data Analyst

- Understands the business
 - Values automation
- Teach them the pragmatism of the Software Engineer

Software Engineer

- Understands the tech
 - Knows automation
- Train them to recognise what matters to the business

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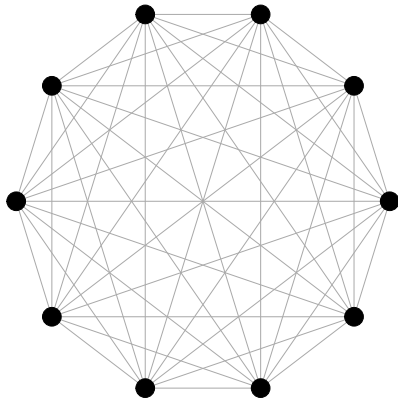
Are we up-skilling them properly?

A successful Data Science team is...

- Diverse
- Flexible
- Collaborative

Communication complexity

Communication
complexity is
quadratic
in the number of
team members



Make sure there's **shared understanding**

Particularly of...

- The Data Science workflow
- Software Engineering best practices

Take-aways

- Embed Data Science and its process
- Have a roadmap
- Don't look for unicorns