

ITU-Academia Partnership Meeting

Budapest, Hungary
19-21 September, 2017

Developing Skills for the Digital Era: the Role of Academic Institutions

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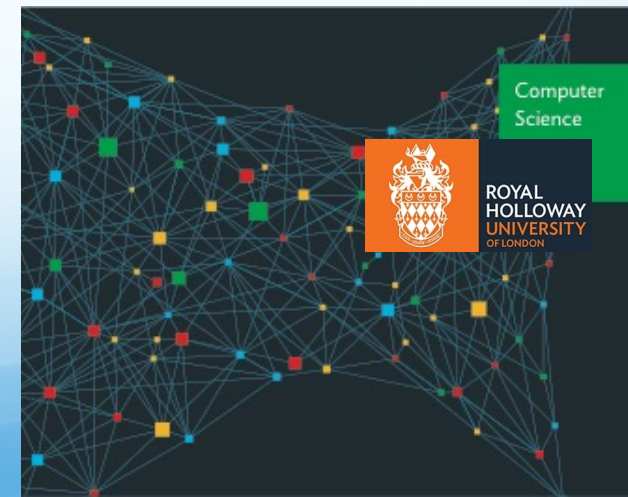


Role of Academic Institutions

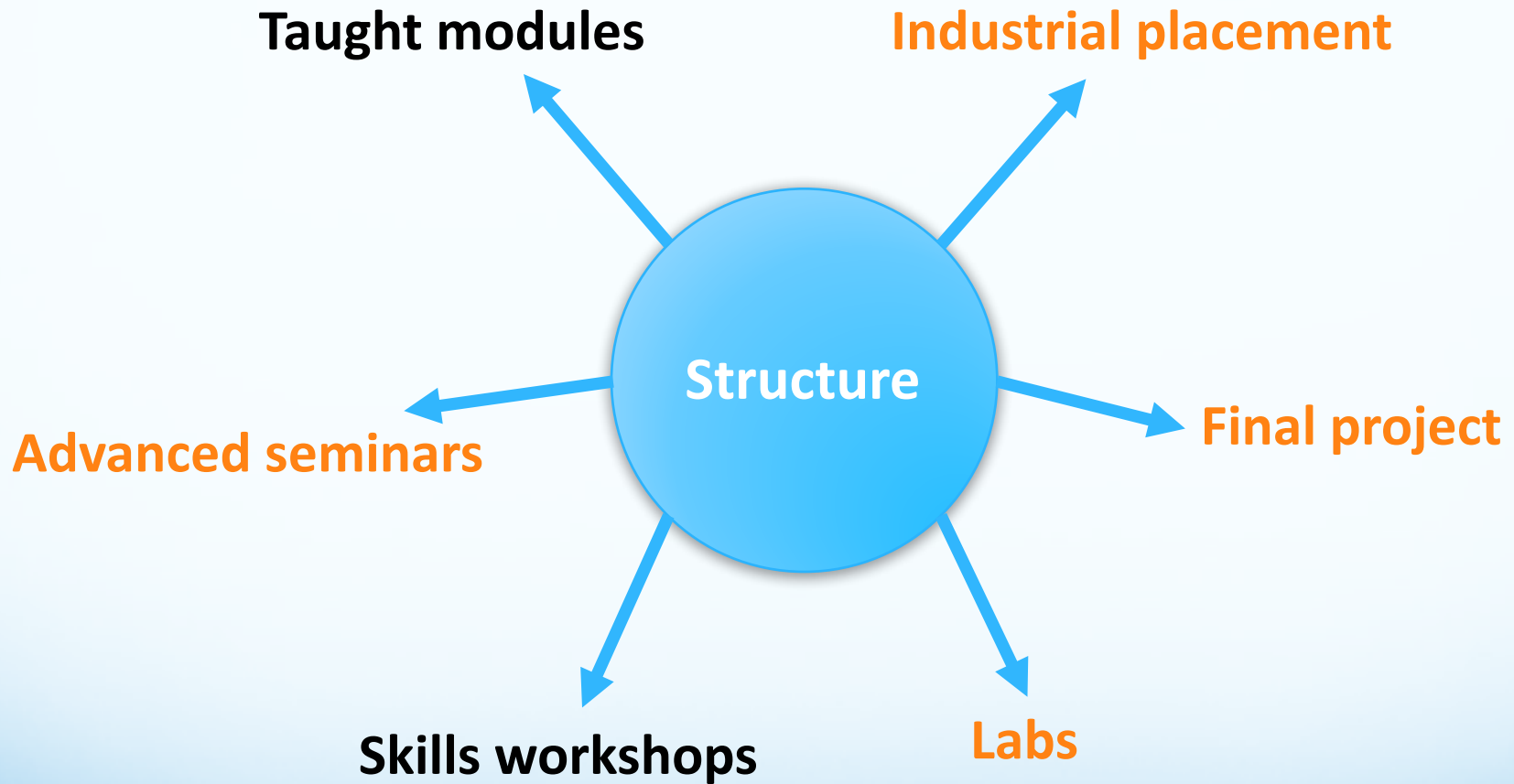
- **Timely discussion**
 - role of on-campus teaching in the MOOCs era
 - teaching emerging technologies
 - exploring ethical and societal challenges
- **My focus: IoT and AI**
 - new and transformative technologies
 - by 2020, the installed base of the IoT will exceed **26 billion units** worldwide [*Gartner*]
 - by 2020, **4.5 million** IoT developers will be needed [*VisionMobile*]
 - IoT demands technologies that are **unfamiliar** to most IT organizations [*Gartner*]

My Experience

- **Master in the IoT**, Royal Holloway University of London
- **First** in the United Kingdom
- One of the first masters of this type in the **world**
- Run from 2016/17
- **10** students in 2016/17, **20** students in 2017/18
- **Lessons learnt** via questionnaires and talking to my students



Structure



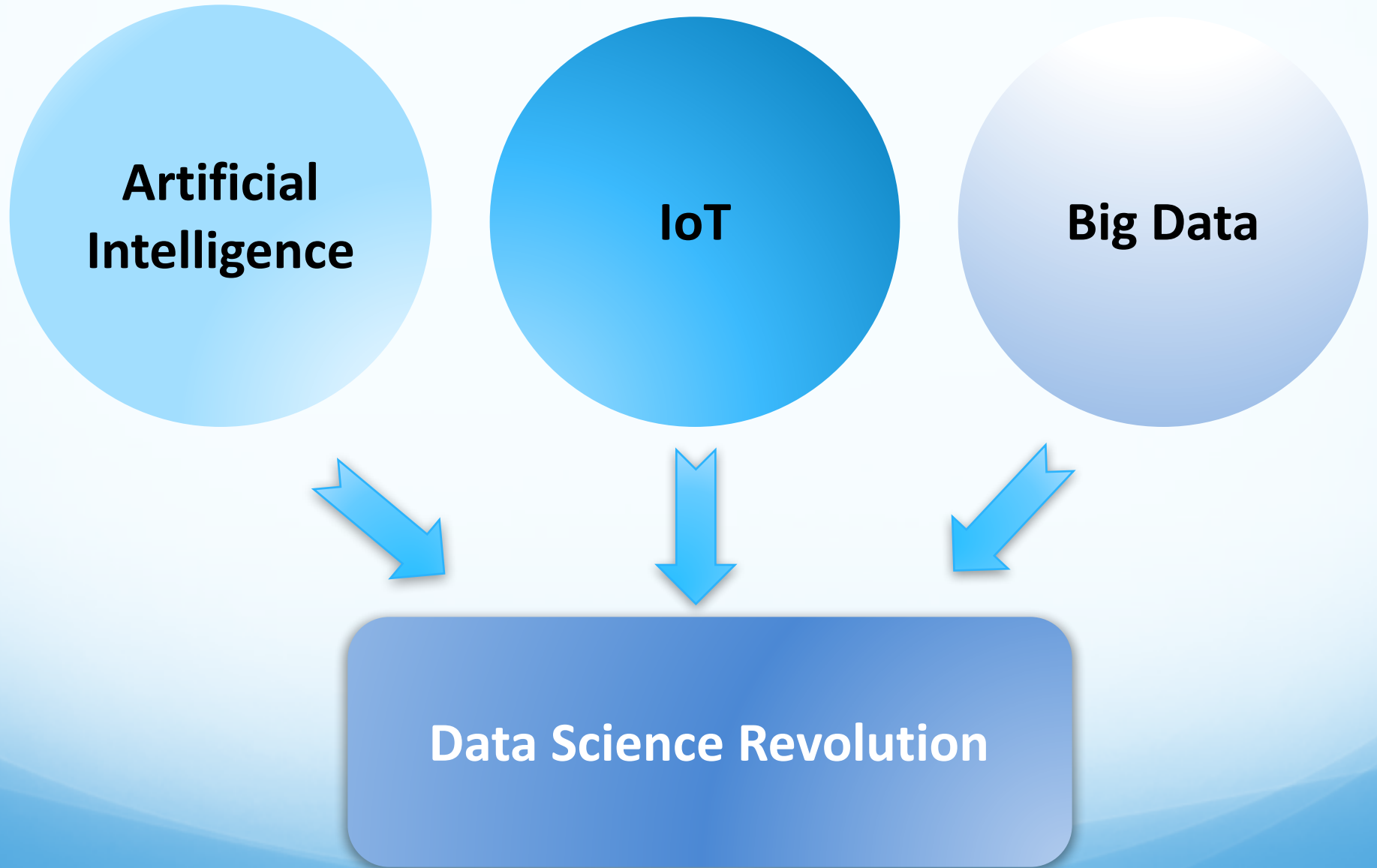
Skills Acquired

- Skills in three critical areas:
 - data analytics techniques
 - distributed and networked systems;
 - cybersecurity

Outline

| | Taught modules | Credits |
|---|--|---------|
| Term 1 | Data analysis | 20 |
| | Interconnected devices | 10 |
| | Advanced distributed systems | 20 |
| | Electives | (+) |
| Term 2 | Wireless, sensor and actuator networks | 20 |
| | Smart cards, RFIDs and embedded systems security | 20 |
| | Electives | (+) |
| Exams | | |
| Placement (for Year-in-Industry degree), up to one year | | |
| Individual project / dissertation (12 weeks) – 60 credits | | |

IoT in Context



Beyond Technical Skills

- IoT is not all about technology!
- **Business models** for the IoT
- Successful **case studies** of IoT companies
- How to create an **IoT start-up?**
- **Risks** and **ethical** challenges
- **Soft** skills
 - presentation skills
 - communication skills
 - teamwork



Risks and Issues of IoT

- Privacy
- Security
- Lack of actual benefits
- Maintenance and dependability
- Sustainability
- Bias
- Ethical challenges
- Social isolation



"We should be careful to make a world we actually want to live in." – *Stu Card*.

Risks and Issues

Dependability



Privacy

Nest is permanently disabling the Revolv smart home hub

Starting May 15th, the Revolv hub and app won't work

By Nick Statt on April 4, 2016 03:40 pm [Email](#) [@nickstatt](#)



Security

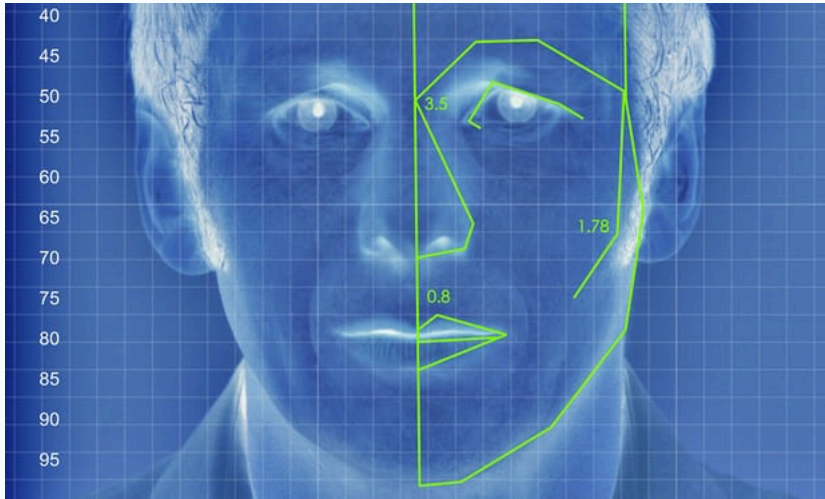
Obsolescence

FDA tells hospitals to ditch IV pumps that can be hacked remotely

by Jessica Conditt | @jessconditt | July 31st 2015 At 8:42pm



Ethical Challenges



Wang, Y., & Kosinski, M. (in press)
Deep neural networks are more accurate than humans at detecting sexual orientation from facial images
Journal of Personality and Social Psychology

Datta A., Tschantz M., Datta A. (2015)
Automated Experiments on Ad Privacy Settings: A Tale of Opacity, Choice, and Discrimination
Proceedings on Privacy Enhancing Technologies



Role of Academic Institutions

- Encourage and support **entrepreneurship**
- Promote development of algorithms in AI and IoT that are **safe, reliable** and **fair**
- Advertise three ethical principles:
[by Prof Virginia Dignum – “AI for Good” Summit]
 - **Accountability**
 - **Responsibility**
 - **Transparency**
- Advocate **multidisciplinary** approach
- Motivation more than information!

How? Project Work

- Project work at the core of our degree program
- Students gain **hands-on experience** in using a wide range of techniques, paradigms, and tools
- **Team work**
- **Mandatory requirements:**
 - consider **ethical** and **societal** impact of the project
 - how to **market** it
 - consider the point of view of **all** the stakeholders



Thanks!

Questions?