SOCIAL & ECONOMIC CHALLENGE OF ARTIFICIAL INTELLIGENCE

Teachers(s): MIAILHE Nicolas
Academic year 2017/2018: Spring Semester

SHORT BIOGRAPHY:

Nicolas Miallhe is the co-founder and President of "The Future Society at Harvard Kennedy School" under which he also co-founded and leads the "AI Initiative". A recognized strategist, social entrepreneur, and thought-leader, he advises multinationals, governments and international organizations. Nicolas is a Senior Visiting Research Fellow with the Program on Science, Technology and Society (STS) at HKS. His work centers on the governance of emerging technologies. He also specializes in urban innovation and civic engagement. Nicolas has ten years of professional experience in emerging markets such as India, working at the nexus of innovation, high technology, government, industry and civil society. Before joining Harvard, he was Regional Director South Asia at Safran Sagem, the world leader in aerospace, defense and security. An Arthur Sachs Scholar, Nicolas holds a Master in Public Administration from the Harvard Kennedy School of Government. He also holds a Master in Geostrategy and Industrial Dynamics from Pantheon-Assas University in Paris and a Bachelor of Arts in Political Sciences from Sciences Po Strasbourg.

COURSE OUTLINE (REQUIRED)

Please find below a proposed outline based upon 12 sessions, to be filled in. Should you prefer to use a non-standard outline, please feel free to use the « non-standard course outline » area at the bottom of this document. In both cases please indicate required and/or recommended readings:

Session 1: Defining Artificial Intelligence

Required readings:

- Nicolas Miallhe & Cyrus Hodes, Making the AI revolution work for everyone, The Future Society, AI Initiative, Report to OECD, February 2017 – PART 1, CHAPTER A
• THE PARLIAMENTARY OFFICE FOR SCIENTIFIC AND TECHNOLOGICAL ASSESSMENT (OPECST), *Toward a Controlled, Useful and Demystified Artificial Intelligence*, April 2017 – Executive Summary in English
• What is machine learning (https://www.youtube.com/watch?v=bHvf7Tagt18)

**Recommended readings:**
- Can we build AI without losing control over it? (https://www.youtube.com/watch?v=8nt3edWLglg)
- What is a Deep Neural Network (https://www.youtube.com/watch?v=aircAruvnKk) and how it learns (https://www.youtube.com/watch?v=lHZwFHWa-w)

**Session 2: Contemporary dynamics and main players**

**Required readings:**
- James Manyika, Michael Chui, Mehdi Miremadi, Jacques Bughin, Katy George, Paul Willmott, and Martin Dewhurst, *Harnessing automation for a future that work*, McKinsey Global Institute, January 2017 – cover article
- McKinsey Global Institute, *Artificial intelligence, the next digital frontier*, June 2017 – Except Appendix

**Recommended readings:**
- McKinsey Global Institute, *Artificial intelligence, the next digital frontier*, June 2017 – Appendix
- Byford, Sam (2016) “DeepMind founder Demis Hassabis on How AI will Shape the
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  alphago-google -deepmind-ai
  Computers, (6) 99, 31-83. http://www.kushima.org/is/wp-
  content/uploads/2015/07/Good65ultraintelligent.pdf | classic work which first coined the concept of an
  ‘intelligence explosion’

Assignment for this session:
ESSAY to be submitted (by one third of the class) 2 days before the class discussing the readings

Session 3: Efficiency of public and private management

Required readings:
- Nicolas Miallhe & Cyrus Hodes, Making the AI revolution work for everyone, The Future Society, AI
  Initiative, Report to OECD, February 2017 – PART 2, CHAPTER A
- Mark Purdy & Paul Daugherty, How AI boosts industry profits and innovation, Accenture, 2017
- Ajay Agrawal, Joshua Gans, and Avi Goldfarb, “The Simple Economics of Machine Intelligence”,
  intelligence

Recommended readings:
https://deepmind.com/blog/deepmind-ai-reduces-google-data-centre-cooling-bill-40/

Session 4: A new wave of productivity gains and economic growth

Required readings:
- Nicolas Miallhe & Cyrus Hodes, Making the AI revolution work for everyone, The Future Society, AI
  Initiative, Report to OECD, February 2017 – PART 2, CHAPTER B
- McKinsey Global Institute, A future that works: automation, employment and productivity, January
  2017 – Executive Summary
- Mark Purdy & Paul Daugherty, Why Artificial Intelligence is the future of growth, Accenture, 2016
- Philippe Aghion, Benjamin F. Jones and Charles I. Jones, Artificial Intelligence and Economic Growth,
  Stanford University, October 2017 – Introduction, Conclusion & Section 5

Recommended readings:
- Philippe Aghion, Benjamin F. Jones and Charles I. Jones, Artificial Intelligence and Economic Growth,
  Stanford University, October 2017 – Full paper
- McKinsey Global Institute, A future that works: automation, employment and productivity, January
  2017 – Chapter 5

Assignment for this session:
ESSAY to be submitted (by one third of the class) 2 days before the class discussing the readings
Session 5: A revolution in healthcare?

Required readings:
- https://www.broadinstitute.org/blog/machine-learning-approach-improves-crispr-cas9-guide-pairing
- https://www.mskcc.org/blog/crispr-genome-editing-tool-takes-cancer-immunotherapy-next-level

Session 6: A revolution in transportation?

Required readings:

Session 7: AI and personalized education

Required readings:

GUEST LECTURER – Laurent Alexandre

Session 8: A safer world?

Required readings:
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Recommended readings:

Session 9: Balance of power and global regulation

Required readings:
- Nicolas Miailhe & Cyrus Hodes, Making the AI revolution work for everyone, The Future Society, AI Initiative, Report to OECD, February 2017 – PART 3, CHAPTER A
- Klint Finley, Here is how the end of net neutrality will change the Internet, Wired, October 2017

Recommended readings:
- Peter Galdis, A summary of the EU General Data Protection Regulation, DataIQ, October 2017 https://www.dataiq.co.uk/blog/summary-eu-general-data-protection-regulation
- Cade Metz, “Artificial Intelligence is setting up the Internet for a huge clash with Europe”, Wired Magazine, December 2016; https://blog.acolyer.org/2017/01/31/european-union-regulations-on-algorithmic-decision-making-and-a-right-to-explanation/

Session 10: The challenges of an increasing delegation to autonomous agents

Required readings:
- Nicolas Miailhe & Cyrus Hodes, Making the AI revolution work for everyone, The Future Society, AI Initiative, Report to OECD, February 2017 – PART 3, CHAPTER B
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- Alex Campolo, Madelyn Sanfilippo, Meredith Whittaker, Kate Crawford, Al Now Institute 2017 Report, November 2017 – Executive Summary & Intro
- Ian Goodfellow, Nicolas Papernot, Sandy Huang, Yuan Duan, Pieter Abeel, Jack Clark, “attacking machine learning with adversarial examples”, OpenAI, February 2017. https://openai.com/blog/adversarial-example-research/

Recommended readings:

Assignment for this session:
ESSAY to be submitted (by one third of the class) 2 days before the class discussing the readings

Session 11: Adapting Social Security and redistributive mechanisms

Required readings:
- Nicolas Miallhe & Cyrus Hodes, Making the AI revolution work for everyone, The Future Society, AI Initiative, Report to OECD, February 2017 – PART 3, CHAPTER B
- James Manyika, Michael Chui, Mehdi Miremadi, Jacques Bughin, Katy George, Paul Willmott, and Martin Dewhurst, Harnessing Automation for a Future that Works, McKinsey Global Institute, January 2017 – Chapter 4 and 6

Recommended readings:
Session 12: The case for 21st century education and skill development systems

**Required readings:**