Lille, Paris, Sophia

 Spring 2024

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**AI, Society and Sustainability**

Academic year 2023-2024

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**Lille Version: Material to be found at:**

<https://people.scs.carleton.ca/~bertossi/CourseLille24/new.htm>

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**Course description**

It is increasingly accepted that AI has evolved from being merely a development standpoint in computer science. Recent reports and academic publications show that we are clearly on the path towards pervasive AI, and society and sustainability are two of the areas in which AI is showcasing a wider range of applications and implications. For instance, recent research shows that combining AI and sustainable development can assist all industries in designing a better planet that meets current needs without jeopardizing future generations due to climate change or other major challenges. AI is an ally of sustainable development in that it may help us build more efficiently, use resources more sustainably, and reduce and manage waste more effectively, among other things. However, the reported potential impacts of AI on sustainable development indicate both positive and negative impacts. Beyond environmental issues, AI can impact society in many other ways. In fact, AI is expected to have a short and long-term impact on global productivity, equality and inclusion, job skills, healthcare, etc. This course will introduce students to the main opportunities and challenges in some of the key areas where AI is more pervasive.

**Objectives**

The course has two objectives: first, it provides students with an overview of the multifaceted nature of AI and its potential link to societal challenges; and second, it reveals how and to what extent organizations are dealing with them.

**Contents**

This course is a required core course for the PGE L3 Program. The content focuses on AI's impact on four key areas: philosophy, healthcare, ergonomics of AI technologies and environmental sustainability. Case studies supplement theory and serve as a foundation for developing and assessing critical thinking skills.

**Teaching Method**

The course will be based on lectures and in-class activities (group and individual). It will also involve out-of-class preparation in the form of readings. Students will be evaluated individually via a multiple-question quiz that will be organized by the Programme Grande Ecole administration together with the other exams. Students will be asked to give group presentations that will count toward their overall grade. Students will receive feedback on the quality of their ongoing work during in-class activities and group discussions.

**Course design**

A few essential points concerning our classes:

1. **Attendance is mandatory.** If you have to miss a class, we expect you to notify the instructor by email in advance.
2. **Classes start on time.** We do arrive punctually to class and we expect you to do the same.
3. We plan to be prepared for every class and we expect you to do the same. The reding list for a given session will be provided to you no later than the end of the previous session. The study requires an interactive learning environment. Students are expected to actively contribute and participate in class discussions and exercises. Readings are also necessary to answer the quiz. You will learn much more efficiently if you read up for your classes beforehand.
4. **In-class discussion matter**. Readings about case studies are important because can stimulate the debate and make learning a more engaging experience.
5. **Regularly check your SKEMA email box** for communications and updates.

**Assessment methods**

What follows is the breakdown of the overall evaluation:

* 10 points final quiz (individual)
* 8 points group presentation
* 2 points attendance

A few essential points concerning **group work**:

**Lille Version: Group presentation have to be delivered as a video to the instructor two weeks after the end of the course. Send an email with attachment or a link to place from where to download.**

1. *Group composition*. Each group must be composed of 4 students. Students in a group must belong to the same tutorial session. Groups will be allocated randomly by the professor.
2. *Group presentations*. Every group member is expected to fully contribute to group discussions and presentations related to both in-class exercises and the analysis of the two cases.
	1. Presentation should not last more than 10 minutes
	2. You can have as many slides as you wish.
	3. Each group member should speak.
	4. Presentation must include introduction, one or more real-world examples related to the topic, a critical assessment where you consider positive and negative aspects related to the topic.
	5. Cover small number of aspects and goo deep, rather than cover many aspects superficially.
	6. Avoid too much text on slides and use diagrams and images (wisely)
	7. Don’t forget to include references.
3. *Evaluation criteria (for presentations)*:
	1. *Clarity*: is topic well-defined and well-explained?
	2. *Structure*: is presentation structured in a logical manner?
	3. *Quality*: is data/information relevant and reliable?
	4. *Delivery*: is the delivery smooth, engaging and well-timed?

**Course material**

All readings are available online. Slides will be sent to you at the end of each session either by e-mail or via the K2 platform.

**Course schedule**

1. **Session 1 –** Introduction; Philosophy of AI
2. **Session 2 –** Societal impact of AI
3. **Session 3 –** AI’s impact on healthcare sector
4. **Session 4 –** User experience and ergonomics of AI technologies
5. **Session 5 –** Environmental sustainability and AI
6. **Session 6 –** Impact of AI on business
7. **Session 7 –** Recap, and group presentations

**Reading list**

**Session 1:**

* McCarthy, J. (2006). The philosophy of AI and the AI of Philosophy. In Gabbay, D.M., Thagard, P., and Woods, J., Philosophy of Information, Elsevier, 2008, Chapter 17. Available at: <http://jmc.stanford.edu/articles/aiphil2/aiphil2.pdf>
* Muller, V.C. (2012). Introduction: Philosophy and Theory of Artificial Intelligence. Minds and Machines, 22: 67-69. Available at: <https://link.springer.com/article/10.1007/s11023-012-9278-y>
* Neubauer, A. C. (2021). The future of intelligence research in the coming age of artificial intelligence–With a special consideration of the philosophical movements of trans-and posthumanism. *Intelligence*, *87*, 101563. Available at: <https://www.sciencedirect.com/science/article/pii/S0160289621000477>

**Session 2:**

* Bryson, J.J. (2019). The Past Decade and Future of AI’s Impact on Society. Available at: <https://www.bbvaopenmind.com/en/articles/the-past-decade-and-future-of-ais-impact-on-society/>
* Evans-Greenwood, P., Hanson, R., Goodman, S., and Gentilin, D. (2021). A moral license for AI. *Deloitte Insights*. Available at: <https://www2.deloitte.com/us/en/insights/focus/cognitive-technologies/artificial-intelligence-impact-on-society.html>
* Babutsidze Z. and Vincileoni D. (2022) Behavioral changes associated with interacting with bots on Twitter. Proceedings of the 54th Hawaii International Conference on System Sciences (HICSS-55), pp. 3013-3010. Available at: <https://scholarspace.manoa.hawaii.edu/server/api/core/bitstreams/c950bb9f-8016-4e1a-8691-9e45bd45a11b/content>

**Session 3:**

* Coppola, F., Faggioni, L., Gabelloni, M., De Vietro, F., Mendola, V., Cattabriga, A., ... & Golfieri, R. (2021). Human, all too human? An all-around appraisal of the “Artificial Intelligence Revolution” in medical imaging. *Frontiers in Psychology*, *12*, 710982. Available at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2021.710982/full>
* Triberti, S., Durosini, I., & Pravettoni, G. (2020). A “third wheel” effect in health decision making involving artificial entities: a psychological perspective. *Frontiers in Public Health*, *8*, 117. Available at: <https://www.frontiersin.org/articles/10.3389/fpubh.2020.00117/full>

**Session 4**: TBA

**Session 5**:

* How Can Artificial Intelligence Combat Climate Change? (2023) <https://world101.cfr.org/global-era-issues/climate-change/how-can-artificial-intelligence-combat-climate-change>
* How AI Can Be a Powerful Tool in the Fight Against Climate Change (2022) <https://cdn-assets.inwink.com/de3a211c-d522-4534-8cb8-65999ca21469/c62eeb95-4510-4dbc-9256-41cecffec46d?sv=2018-03-28>
* Harnessing Artificial Intelligence to Accelerate the Energy Transition (2021) <https://www3.weforum.org/docs/WEF_Harnessing_AI_to_accelerate_the_Energy_Transition_2021.pdf>
* Deploying High-Performance, Energy-efficient AI (2024) [https://www.technologyreview.com/2024/01/10/1086259/deploying-high-performance-energy-efficient-ai](https://www.technologyreview.com/2024/01/10/1086259/deploying-high-performance-energy-efficient-ai/)

**Session 6**:

* « How to Build Knowledge Graphs that Enable AI-Driven Enterprise Applications”. [Gartner](https://people.scs.carleton.ca/~bertossi/Lille24/GartnerReprintKGs.pdf), 2022.
* “The State of AI”. William R. Murray. [Medium](https://people.scs.carleton.ca/~bertossi/Lille24/TheStateOfAI.pdf), Mar 16, 2022.
* « How Entreprises Are Using Open Source LLMs 16 Examples ». Matt Marshal, [Venture Beat](https://people.scs.carleton.ca/~bertossi/Lille24/HowEnterprisesAreUsingOpenSourceLLMs16ExamplesVentureBeat.pdf), 2024.
* « Why AI Matters: Opportunities, risks and regulation ». [Economist Intelligence](https://people.scs.carleton.ca/~bertossi/Lille24/why-AI-matters.pdf) (EIU), 2023.