Module 3: The AI world

The module covers applications of AI and machine learning that are already on the market (computer vision applications, web-search engines) or that will be available in the near future (autonomous vehicles, humanoid robots). The activities will focus on a critical and honest discussion on what can be achieved thanks to AI and machine learning, and what remains far from achievable in the field. Technology and mental models behind common AI technologies such as vocal virtual assistants or image recognition softwares will be investigated. Teachers attending this module will understand how such systems work, how they can recognize inputs (e.g. human voice or images) and respond to it. Activities in this module promote discussions about the advantages and limitations of such technology, reflecting on aspects such as privacy and biases in human - AI interactions raised by such technology. Teachers will be able to engage learners in activities and discussions involving ethical implications of AI and the responsible use of AI-based technology.

Topic 3.1 - Real-world applications of AI

It is important to stress out that, although AI is in continuous evolution and it is rapidly advancing, the Human role in its programming, delivering and designing is central. AI applications in the real world can have both positive and negative effects depending on the scope and objectives of said instruments.

The activities presented will encourage students to discuss opportunities and challenges brought about by existing applications of AI technologies. They will also explore possible current or future developments in the use of AI technologies in the real world through creative exercises. It is claimed that Artificial Intelligence (AI) will bring forth changes that will be much more profound than any other technological revolution in human history. Depending on the course that this revolution takes, AI will either empower our ability to make more informed choices or reduce human autonomy; expand the human experience or replace it; create new forms of human or make existing jobs redundant; help distribute well-being for many or increase the concentration of power and wealth in the hands of a few; expand democracy in our societies or put it in danger. AI-related technology is showing its positive impact in tracking and surveilling other concurrent societal changes such as, climate change, humanitarian crisis, health and medical advancement of disadvantaged communities.

Useful Resources

Article discussing **key questions** around the intersection between artificial intelligence (AI) and youth (ages 12-18) Hasse, A., Cortesi, S., Lombana-Bermudez, A., & Gasser, U. (2019). Youth and artificial intelligence: Where we stand. Berkman Klein Center Research Publication, (2019-3). https://dash.harvard.edu/bitstream/handle/1/40268058/2019-05_YouthAndAI.pdf?sequence=5&isAllowed=y

AI applications: 10 Real world artificial intelligence applications: A general list of AI applications in our societies. **https://www.edureka.co/blog/artificial-intelligence-applications/**

HumanE AI: HumanE AI is a network of European institutions that monitors the evolution of AI technology and its discourses while promoting the dissemination of an ethical and trustworthy AI. **https://www.ai4eu.eu/humane-ai-net-0**

12 Inspiring examples of AI for good: "Crisscrossed" has collected twelve examples of positive impact of AI technology across various fields https://www.crisscrossed.net/2018/12/19/12-inspiring-examples-of-artifical-intelligence-for-good/

Use of AI to tackle climate change. Climate Change AI (CCAI) is an organization composed of volunteers from academia and industry who believe that tackling climate change requires concerted societal action, in which machine learning can play an impactful role. https://www.climatechange.ai/about

Topic 3.2 - Ethics of AI

The main theme of this subsection focuses on the ethical implications of AI technologies in human-machine interaction. It will introduce some basic concepts in the field of ethics (accountability, respect, inclusion, equity, sustainability) and connect them with practical examples of AI applications in the real world. The centered question here is how to strike a balance between the evolution of AI technology while also protecting personal freedom. We have herein identified several issues that arise at the intersection of information technology, the private and public sector, societal behaviours and biases already encoded in today's societies. As a product of humans for humans, AI related technology is not exempted from reproducing the biases that populate the day by day interactions in our societies; indeed discussions about the algorithmic bias reflect the loopholes in the allegedly perfect AI systems and the mischievousness narration of AI as better version of human interactions. The lack of fairness and transparency that results from the performance of a computer system is algorithmic bias. Moreover, the involvement of personal on-line data and biometrics parameters becoming more and more available do pose a serious problem for the guarantee of the right to privacy, physical integrity and anonymity.

Consumer profiling, racial profiling and other ubiquitous activities devoted to the profiling of human activities online have the potential to break the constitutional protections; without the adequate protection and safeguarding mechanism, the collection of these sensitive data might result in a serious breach of human rights protection. Throughout the proposed activities, students will be encouraged to reflect on the relationship between humans, machines and ethics and to develop their own guidelines on some of the issues addressed in this Module.

Useful resources

Ethics of AI: How is research conducted when AI is involved?
Ebell, C., Baeza-Yates, R., Benjamins, R. et al. Towards intellectual freedom in an AI Ethics Global Community. AI Ethics (2021). https://doi.org/10.1007/s43681-021-00052-5

Economic impact of Artificial Intelligence: European Parliament's brief on the impact (social, economic and geo-political) of AI developments.
https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/637967/EPRS_BRI(2019)637967_EN.pdf

Responsible use of data in Education:
Centre for Democracy and technology, Responsible Use of Data and Technology in Education: Community Engagement to Ensure Students and Families Are Helped, Not Hurt

Stoilova, Mariya; Livingstone, Sonia; Khazbak, Rana (2021). Investigating Risks and Opportunities for Children in a Digital World: A rapid review of the evidence on children's internet use and outcomes, Innocenti Discussion Papers no. 2021-01, UNICEF Office of Research.
https://www.unicef-irc.org/publications/1183-investigating-risks-and-opportunities-for-children-in-a-digital-world.html

Facial recognition in schools:
There are two pilot projects in Sweden which focus their attention to the use of AI and facial students' recognition for administrative purposes allowing teachers to devote their time to teaching
https://www.electronicspecifier.com/products/artificial-intelligence/facial-recognition-tested-in-swedish-high-school
Video of WSJ on application of AI at school https://www.youtube.com/watch?v=JMLsHl8aV0g
Structural and cognitive change of schools and schooling, see Andrejevic and Selwyn, Facial Recognition technology in schools: critical questions and concerns,
https://www.tandfonline.com/doi/full/10.1080/17439884.2020.1686014

The Environmental cost of producing AI:
BBC The Documentary Podcast (2019). "Will AI kill development? Will robotisation prevent poorer countries taking the traditional route to prosperity?"
      https://www.bbc.co.uk/programmes/p075nqyy
Deutsche Welle Documentary (2021) "Invisibles – exploitation in the digital world of work"
https://www.youtube.com/watch?v=o-HphMeZR3k