2IN1580 – Artificial intelligence and global health

Instructors: Bich-Lien Doan, Marie-Anne Lefebvre
Department: DÉPARTEMENT INFORMATIQUE
Language of instruction: ANGLAIS
Campus: CAMPUS DE RENNES, CAMPUS DE METZ, CAMPUS DE PARIS - SACLAY
Workload (HEE): 40
On-site hours (HPE): 27,00
Elective Category : Fundamental Sciences
Advanced level : No

Description

The European University ALLIANCE FOR GLOBALHEALTH (Eugloh) is composed of five universities (Saclay, Porto, Lund, Munich, Szeged). They share the ambition of combining their expertise and resources in Global Health to offer the best education and training to their students. A pilot university, not only innovative, but also fully conscious of its responsibilities and ready to face societal challenges, in particular those related to Global Health. Training students as future leaders, both as experts in their fields and responsible citizens: curious, creative, and adaptable to diverse ecosystems and cultural environments.A collaboration framework open to contributions from all players and all fields concerned by Global Health…..

(see the brochure at https://www.eugloh.eu/about/vision-and-objectives/plaquette-EUGLOH-EN-page-par-page%20(1)%20(1).pdf)

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During the week, students will receive a course on artificial intelligence to understand more specialized interventions in the use of AI models in health and wellness applications.
The following courses will be given in the form of lectures or interactive workshops, face-to-face and distance, mixing students from 5 European universities. This course will therefore both acquire skills and knowledge in AI and health, but also an intercultural and international openness through exchanges between research professors and students of the Eugloh alliance
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Quarter number
Intensive week at the beginning of SG6

Prerequisites (in terms of CS courses)
No prerequisites except the level of English to follow the lectures in English.

Syllabus

- Introduction (Prof : Fabrice Popineau) Artificial Intelligence (AI) is the most powerful technology humans have ever had access to. AI will revolutionize all aspects of our lives, of which healthcare is not the least. But what exactly is AI ? We will see that this question is more complex than one might think at first glance. From image classification to knowledge processing to medical robotics, we will see on selected examples that AI is diverse and cannot (yet) be reduced to a one-fit-all technology. We will review the main AI techniques, what they rely on and their field of application. As the field is constantly growing, many questions are still open.
- Wellness workshop at home (Prof : Catherine Soladié) No more TV couch where you receive formatted information. Replace it with a zone of action and interaction, to take care of yourself, your body and your mind, at home ! After discovering some examples of industrial or research concerts, we will invite you to imagine, in groups, tomorrow's solutions that will allow you to take care of your physical and mental health at home. What tools are needed ? What role can AI play ? How can information taken at home be returned to specialized services (sports coach, doctor, etc.) ? How acceptable can these solutions be for their users? Because well-

being is not reserved for gyms or yoga studios and health is not only a matter for physiotherapists or hospitals, we will propose to imagine how this can be integrated in your homes, in an ethical and responsible scientific approach.

- Course on parsimonious decomposition to aid diagnosis (Prof. Clément Elvira) Chronic liver diseases are a major health problem in our modern societies. However, nowadays the reference procedure for diagnosis is based on biopsy, a potentially dangerous method that cannot be repeated regularly. In this course, we will see how "parsimonious decomposition" methods can be used to exploit "vibrational spectroscopy" data in order to develop new non-invasive and inexpensive automatic diagnostic methods.
- Lectures given by experts in the field of AI and global health. (Eugloh Speakers)
- Course on Ethical Issues. (Prof. Dr. Effy Vayena, Deputy head of Institute of Translational Medicine). The Coronavirus pandemic has shaken our lives, reminding us of the fragility of existence, and bringing to the surface pressing ethical issues at individual, collective and international levels. Such issues include clinical ethics decisions regarding scarce healthcare resources allocation, the dilemma of protecting public health vs. suspending individual rights, and the research ethics question of testing vaccines without the usual precautions.

Class components (lecture, labs, etc.)
Interactive workshops, courses and conferences

Grading
Evaluation by a final test in the form of a quiz associated with the various interventions

Resources
Face-to-face/off-site at the Gif, Rennes or Metz campuses, off-site for teachers from other Eugloh universities

Description of the skills acquired at the end of the course

- C1.1 Study a problem as a whole, the situation as a whole. Identify, formulate and analyze a problem in its scientific, economic and human dimensions
- C6.7 Exploit the possible connections between objects and people
- C9.1 Analyze and anticipate the possible consequences of one's choices and actions with respect to oneself, others and the environment
- C9.4 Demonstrate rigour and critical thinking in the approach to problems from all angles, scientific, human and economic