Artificial Intelligence and Global Health

Coordinator : Bich-Liên Doan
Department of Computer Sciences
Language : English
Dates : From November 27th to the December 01st 2023
Location : CentraleSupélec at University of Paris-Saclay
Number of hours : 27
ECTS : 2,5
Participants : 60

Context of the course and objectives

The European University Alliance for Global Health (EUGLOH) is composed of nine universities (Porto, Lund, Munich, Szeged, Tromso, Alcala, Novi Sad, Hamburg and Paris-Saclay). 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…..

This course is part of this alliance and offers students from the 9 European partner universities an introduction to AI issues applied to health and well-being.
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 the 9 European partner 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.

Prerequisites :
None

Pedagogical content examples :
   o **Introduction** 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.

- **Course on AI and applications to global heath**
- **Course on parsimonious decomposition to aid diagnosis.** 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.
- **Managing and improving non-elective surgical patient flows – A Predictive analytics**
  Non-elective surgical procedures have been on the rise during the last decades, creating new challenges and issues for hospital managers. Using predictive analytics approaches we have been able to predict when the surgery theaters will reach a saturation point, as well as identify which are the main factors behind the length of stay and the procedure duration for non-elective patients in a major Parisian hospital.
- **Lectures given by experts in the field of AI and global health.**
- **Course on Ethical Issues**.

Organization :

- Introduction to the scientific and methodological bases of artificial intelligence in order to understand the main models used in health-related subjects (6 hours of class)
- Workshop on wellness (3h interactive course)
- Lectures on health applications (6 hours)
    - Queue management in emergencies (supply chain)
    - Image processing (oncology field, …)
    - Data classification applied to medicine
    - Optimization of data analysis models (liver disease)
- International conferences given by experts in the field (3h to 6h of lectures)
- Ethics in AI and health (3h of class)

Assessment and examination :
Evaluation by a final test in the form of a quiz associated with the various interventions and a mindmap for collaborative work

Course material :
Slides of the supervisors and experts

Competencies :

- 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