

Syllabus Multi-Facets of AI

Course aim (PhD and post-docs)

Upon course completion, the participant should be able to:

- describe the most common AI methods in reasoning, machine learning, and robotics
- analyze key societal and legal aspects of AI applied in various real contexts and domains
- categorize a given real-world problem and choose appropriate AI methods
- getting aware of how to apply relevant law to the development of AI applications
 - AI Act, GDPR - and Japanese side tech regulations
- critical reflections on which key-players play which role in the creation of AI solutions
- discuss ethical, societal, business, and sustainability issues related to AI

Background: during the MIRAI 2.0 R&I week 2022, we had two workshops focusing on Ethical and Legal aspects of AI as well as Society and Industry 5.0. We identified that while collaboration projects between the different disciplines is already a great step, it would be even more impactful, if a new generation of researchers have the knowledge of multiple disciplines in AI, including societal aspects, legal aspects, and technical aspects. Such a group of researchers will even easier communicate across disciplines and initiate collaboration. The inclusion of participants from both countries will increase their creativity.

Contents: The topics covered are on an introductory level:

	Week 1+2	Week 3+4	Week 5+6
society	4th industrial Revolution Sub-areas to look in to (economic, tech, law) 2- nuggets		
economy	Intro motivation, history, Industry,	robot taking over tasks	human-AI interaction (which tasks appear, ..); explainable AI
tech	Intro history, how to address AI problems Swedish angle Japanese angle	How learning machines take over tasks: machine learning and applications Beyond 100 %	How do reasoning machines work? reasoning and applications Explainable AI
law/governance	“Fairness awareness” Governance: Ethics guidelines, (with elements of tech), history	How to deal with machines taking over tasks Instructions for case analysis: Roles + context analyzing Fairness, transparency, accountability. E.g.:	Practical cases - 5 cases with reflection (not too complex, so not in detailed legal)

		Social robots in care; AI-supported mammography; automated welfare support decisions, etc.	
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Realization: Material will be available online for self-study. All content is in English. Regular online meetings will complement the self-study with reflection, group discussions, and challenges. Course assignments in the form of multiple-choice questions, short texts, or code completion will be given after each unit. Before and after the assignments are solved, there will be meetings to present and discuss different solutions. At the end of the course, a workshop will be organized, where methods of design thinking and multi-disciplinary collaboration will be taught, as well as a short multi-disciplinary AI project will be initiated.

- 1 hour Introductory session on October 2, 9:00 Swedish time, 16:00 Japanese time
- virtual sessions (45-60 minutes) during the week 40-44 (Mondays 16:00, Fridays 17:00, Japanese time)
- Full-day Workshop on the 17th of November, physically in Umeå, co-location in Sophia University.

Entry requirements and selection: Participants shall be PhD or Post-docs from MIRAI 2.0 partner universities, fluent in English, and have basic knowledge in either of the areas (society, law, technology).

Selection procedure (ordered by priority):

- Applicants should fulfill the stated requirements (from MIRAI university and fluent in English)
- Background (country, subject) – we strive for diversity
- Latest degree grade average
- In case of a tie situation, the underrepresented gender will be selected

Maximum number of participants: 20

Modules: There will be three modules with 3 ECTS, each (society, law, technology). Participants have to take the two modules which they did not cover in their undergraduate studies. Furthermore, a 1.5 ECTS project will be the final module of the course.

Application via the following link: https://docs.google.com/forms/d/e/1FAIpQLSfHPj-ZQpAA9Qyes0VfZdsk3GjxQdp0TjMFHi51rNXuxPxd0Q/viewform?usp=sf_link