**ACAI 2021**
*The advanced course on AI on Human Centered AI*

# Tutorial Outline

***Interactive Robot Learning***

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Abstract:
This tutorial focuses on the main methods and models enabling humans to teach social agents, and in particular social robots, using natural interaction. Humans guide the learning process if such agents by providing various teaching signals, which could take the form of instructions, advice, demonstrations or either feedback. The tutorial will introduce human teaching policies and strategies, which are currently studied through lens ranging from low-level signals to Markov Decision Processes. We will particularly show how Bayesian models of human teaching are currently employed to account for the natural pedagogy of humans. This will include main concepts of social learning such signaling and curriculum teaching. Adequate interactive learning approaches will be detailed such as learning from demonstrations and from evaluative feedback. We will then present research opportunities and challenges in interactive robot learning.

Details:

Part 1: Introduction
- Interactive Machine Learning vs. Machine Learning
- Human social learning
- Humans teaching robots

Part 2: Human Teaching Strategies
- Generative models
- Modeling human rationality and irrationality
- Ostensive communication and teaching

Part 3: Learning from humans
- Learning from evaluative feedback
- Learning from demonstrations
- Evaluation of interactive robot learning models

Part 4: Opportunities and challenges
- Learning and teaching
- Explainable Embodied Agents
- Autotelic agents

Readings:

Amershi, S., Cakmak, M., Knox, W. B., & Kulesza, T. (2014). Power to the People: The Role of Humans in Interactive Machine Learning. AI Magazine, 35(4), 105-120.

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Chernova, S., & Thomaz, A. (2014). Robot Learning from Human Teachers. *Robot Learning from Human Teachers*.

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Wallkötter, S., Tulli, S., Castellano, G., Paiva, A. and Chetouani, M. 2021. Explainable Embodied Agents Through Social Cues: A Review. J. Hum.-Robot Interact. 10, 3, Article 27 (July 2021), 24 pages. DOI:https://doi.org/10.1145/3457188