Faculty of Engineering
Summer Research Program 2021-2022

Project Title: Active user model learning vs “Off-line” Reinforcement Learning: What is best during interaction?

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Objective
Develop and conduct a user study in which inference-based (Partially Observable Markov Decision Processes - POMDPs) and simulation-based (e.g, Deep Reinforcement Learning - Deep RL) approaches are evaluated in episodic, interactive tasks between a robot and a human.

Project Details
This project aims at evaluating whether a robot trained using Deep RL algorithms and simulated humans obtained from a parametric, generative model performs the same, better or worse than a robot using standard inference-based methods in which relevant human parameters are simultaneously learned and used for decision making during interaction.

To do so, you will help to design, program and conduct a user study in which a robot and a human collaborate to complete multiple instances of a simple task. During the task, the robot will use either the inference-based or Deep RL-based approaches to decide its next best action. Both subjective and objective metrics will be collected during the study and later used to compare the performance and interaction quality achieved by each decision making approach.

Prerequisites
Good programming skills; experience with Python, Julia, Deep RL and ROS; good communication skills

Additional Information
Applicants may be required to attend an interview