

Faculty of Engineering

Summer Research Program 2023-2024

Project Title: Inferring Human Task Representations from Behavioural Data

Supervisor(s): Elizabeth Zavitz, Pamela Carreno, Michael Burke

Department: ECSE

Email: elizabeth.zavitz@monash.edu, pamela.carreno@monash.edu,
michael.g.burke@monash.edu

Website profile of project supervisor:

<https://research.monash.edu/en/persons/elizabeth-zavitz>,
<https://research.monash.edu/en/persons/pamela-carreno-medrano>,
<https://research.monash.edu/en/persons/michael-burke-2>

Objective

Implement and evaluate approaches to measure and model the task representations that humans use in collaborative tasks so as to improve human-robot interactions.

Project Details

To create robots that are effective collaborators, they need some understanding of the mental model their human collaborator operates under. Using *Overcooked-AI*, a simplified version of *Overcooked* – the game where players must collaborate to run a busy restaurant kitchen, this project aims at testing different methods for measuring and modelling the representations players use when completing the game (e.g., important objects, geometrical relationships, etc.). As the next step, if time allows it, we will train a robot that uses the same representation while collaborating with a human player and evaluate the human-robot team performance.

To complete this project, you will learn how to design and run human behavioural studies and learn some basic computational modelling strategies that you will use to capture the results.

Prerequisites

Applicants in Year 3 or later are preferred. Applicants must also be competent in at least one programming language (Python is preferred). Experience planning and conducting user experiments is desirable.

Additional Information

Applicants may be required to attend an interview.

The following resources will be relevant:

- Carroll, M., Shah, R., Ho, M. K., Griffiths, T., Seshia, S., Abbeel, P., & Dragan, A. (2019). On the utility of learning about humans for human-ai coordination. *Advances in neural information processing systems*, 32. [<https://arxiv.org/abs/1910.05789>]
- https://github.com/HumanCompatibleAI/overcooked_ai