Master thesis Project: An Ontology for Communication in Human-AI Co-Learning

Make humans and AI agents better team partners by helping them communicate about their interactions!

Watch a teaser video about the research project you will be part of:
https://ii.tudelft.nl/video/HRI_pioneers_2021.mp4

Background

Humans and AI agents are increasingly required to work together as team partners. Whenever a team is formed, team members are usually not successful right away in collaboratively solving their task. When humans collaborate in teams, all team members take some time to get to know each other, explore how they can best work together, and eventually adapt to each other and learn to make their collaboration as fluent as possible. Their interactions play an important role in this process. It is an important research challenge to enable AI agents to participate in this dynamic process, which we call co-learning.

This thesis project is about developing and testing an ontology that allows humans and AI agents to communicate about their adaptive interactions, to enable them to reason about these interactions in future instances of task execution and consequently co-learn to improve team performance.

In previous experiments, we have identified several interaction patterns that contribute to human-AI co-learning. These interaction patterns and the atomic actions they are made off will serve as the building blocks for the ontology. Important to note is that the ontology should be extendable with new interaction patterns when these emerge from adaptive interactions. The human's ability to recognize such patterns can be used by allowing the human to communicate about them to an agent team partner. **The key challenge is therefore to develop an ontology that enables a dynamic and flexible representation of human-agent interaction patterns, that facilitates partners' communication about these patterns.**

Master thesis

This thesis project will be conducted as part of a collaboration between Delft University of Technology and the Netherlands Organization of Applied Scientific Research (TNO).

Within this project, you will:

- Do a review of ontology literature, specifically focused on ontologies used in human-computer interaction and multi-agent collaboration;
- Design an ontology for human-AI adaptive interactions, intended to facilitate communication between human and AI agent team partners;
- Conduct a pilot study with human participants to evaluate and improve the ontology;
- Document your work in a thesis.

The aim of these activities is to investigate what minimal model of the task and interactions is necessary to enable the envisioned communication between human and AI agent team partners.

What are we looking for in a student?

- Interest in human-AI interaction and collaboration
- Affinity with ontology engineering and conversational agents
- Interest in experimental evaluation of designs

Interested?

For more information, you can contact Emma van Zoelen: emma.vanzoelen@tno.nl