Social Intelligence towards Human-AI Teambuilding (Student Abstract)

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Abstract

As Artificial Intelligence (AI) continues to develop, it becomes vital to understand more of the nuances of Human-AI interactions. This study aims to uncover how developers can design AI to feel more human in a work environment where only written feedback is possible. Participants will identify a location from Google Maps. To do this successfully, participants must rely on the answers provided by their teammates, one AI and one human. The experiment will run a 2x4 design where AI's responses will either be designed in a human style (high humanness) or state a one-word answer (low humanness), the latter of which is more typical in machines and AI. The AI's reliability will be either 60% or 90% correct, and the human will be 30% correct. Participants will be given a series of questionnaires to rate their opinions of the AI and rate feelings of trust, confidence and performance throughout the study. Following this study, the aim is to identify specific design elements that allow AI to feel human and successfully appear to have social intelligence in more interactive settings.

Introduction

Over the last twenty years, society has witnessed an explosion in Artificial Intelligence (AI) capabilities. Concepts that were once a dream are now a reality, revolutionizing how individuals interact and understand AI. One area of life AI could significantly impact is the workplace. AI can outperform humans in areas of work based on large volumes of data, high detail levels or areas requiring a high cognitive workload for long periods. However, much research has indicated that the most effective outcomes occur when humans and AI collaborate on work. For this reason, Human-AI teams (HATs) are a very effective way to implement AI in a workforce and thus, it is essential to learn more about the dynamics of creating these teams.

When designing AI, it is essential to understand the dynamics of Human-AI Teams (HATs). One goal when forming HATs is to develop the role of the AI from a tool to a teammate. In HATs, four drivers lead to the formation of a team setting (Rix 2022): the presence of two or more individuals, shared goals, interdependency, and unique roles & functions. In addition to these four drivers, the HATs must function as a social entity.

For a traditional human team to evolve into a social entity, there is usually a feeling of team spirit, cohesion and a 'team identity; at this point, the team members recognize themselves as part of the team. HATs also contain these properties HATs (Oh et al., 2018). To create HATs that function as successfully as human teams, researchers need to learn more about designing social AI to build a team that feels like a social entity. One concept that is key to this process is Social Intelligence (SI). Psychologists have debated SI, and there are differing theories on the correct way to define and measure SI. However, a consensus does appear to split SI into five social categories; understanding, memory, perception, creativity and knowledge.

Creating an AI to display social intelligence is challenging as it is a human process; the focus is on reacting to the human in an equally human way and being situation specific. As well as this, an increase in teammates can lead to more complex social situations as there are multiple agents to be correctly social with and less control over the situation.

Researchers have used anthropomorphism to make AI feel more human and social, which is largely successful, but there are some constraints and debates about its success (Zanatto 2020). Furthermore, there can also be variations in the anthropomorphism of the embodiment of the AI, from complete embodiment to complete disembodiment. This study addresses how we can create feelings of SI in written feedback, which can be very challenging. From the existing literature, we developed the following hypothesis.

H_1: Increased humanness in AI responses will lead to a change when deciding which teammate to trust.

H_2: Increased humanness in AI responses will lead to a change in the perceived performance when working in a Human-AI Team.

Methodology

For ease of development and maximum control, the study will run a Wizard of Oz experimental method; participants

will believe they are working with an AI and human teammate but are working with pre-written answers displayed via PsychoPy, allowing maximum control over the experiment. The task will see participants shown a random location from Google Earth. Participants must devise the continent, country, and city they are viewing. The participant will be working with an AI and a human teammate who will provide what they believe to be each location's continent, country and city. The participant will be labelled as the 'team leader', meaning they must input the final choice, relying heavily on the other teammate's responses (the AI and human teammate will give different answers 90% of the time). Each participant will identify 30 locations across three blocks (10 trials per block). After each trial, the correct answer is displayed, allowing participants to gauge their performance. The interface used in the experiment was built in PsychoPy and is shown in Figure 1.

For this study, we will use a 2x4 between-subject design. Depending on the group they are assigned to, participants will interact with an AI with either high or low levels of humanness and either high reliability of 90% correct answers or low reliability of 60% correct answers. The human participant will always get 30% of the answers correct.

In the low humanness group, the AI will be introduced as an AI, focused on the technical aspects and will state only the answer. In high humanness conditions, the AI will introduce itself and state its name as 'pixie' and mention how excited it is to be a teammate; this is shown to increase feelings of humanness (Wiethof et al., 2021). As well as this, the AI will give similar responses to the human that have an anthropomorphic style of writing which is shown to enhance effective conversation; it is essential for the AI to feel 'warm' in its responses.

One question in the Godspeed questionnaire will ask participants to rate how warm they felt the AI was to confirm we achieved this.

Finally, we decided to limit the time per trial to 90 seconds. Time scarcity as an environmental factor can affect the outcome of team tasks as it often forces decisions to be made quickly; this environmental factor can push human teammates to make a choice based on their implicit feelings.

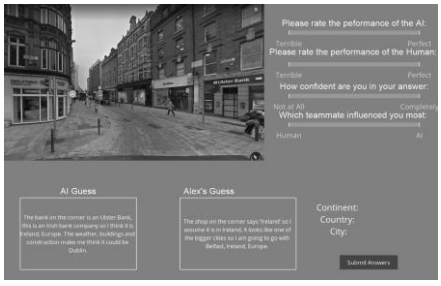

Figure 1: The interface used to display the AI and human response.

Throughout the experiment, participants will be asked to rate the performance of the human and AI, how confident they are in their answers and who influenced them most. As well as this, participants are given the Propensity to trust Machines Questionnaire, the Godspeed questionnaire (Bartneck et al., 2009) and if they believe the teammates to be real.

We will decide which statistical tests to compute for the different metrics depending on the data distribution.

Future Research

In the future, we aim to develop the interaction with AI, moving towards a more interactive AI to see how different features can impact the presence of Social Intelligence. We also want to take findings from the first experiment and investigate them more thoroughly with a mixed method approach, including qualitative data to learn more about the essential features to provide a framework for designing AI that will be able to thrive in a workplace setting where there is not a possibility (or very limited) for an embodiment of the AI.

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References

Bartneck, C.; Kulić, D.; Croft, E.; and Zoghbi, S. 2009. Measurement instruments for the anthropomorphism, animacy, likeability, perceived intelligence, and perceived safety of robots. *International Journal of Social Robotics* 1(1): 71-81. https://doi.org/10.1007/s12369-008-0001-3

Oh, C.; Song, J.; Choi, J.; Kim, S.; Lee, S.; and Suh, B. 2018. I lead, you help but only with enough details: Understanding the user experience of co-creation with artificial intelligence. Conference on Human Factors in Computing Systems. https://doi.org/10.1145/3173574.3174223.

Rix, J. 2022. From Tools to Teammates: Conceptualizing Humans' Perception of Machines as Teammates with a Systematic Literature Review. Proceedings of the 55th Hawaii International Conference on System Science. https://doi.org/10.24251/hicss.2022.048.

Wiethof, C.; Tavanapour, N.; and Bittner, E. 2021. Implementing an intelligent collaborative agent as a teammate in collaborative writing: Toward a synergy of humans and AI. Proceedings of the Annual Hawaii International Conference on System Sciences. https://doi.org/10.24251/hicss.2021.047.

Zanatto, D.; Patacchiola, M.; Goslin, J.; and Cangelosi, A. 2016. Priming Anthropomorphism: Can the credibility of humanlike robots be transferred to non-humanlike robots?. Eleventh ACM/IEEE International Conference On Human-Robot Interaction. https://doi.org/ 10.1109/hri.2016.7451847.