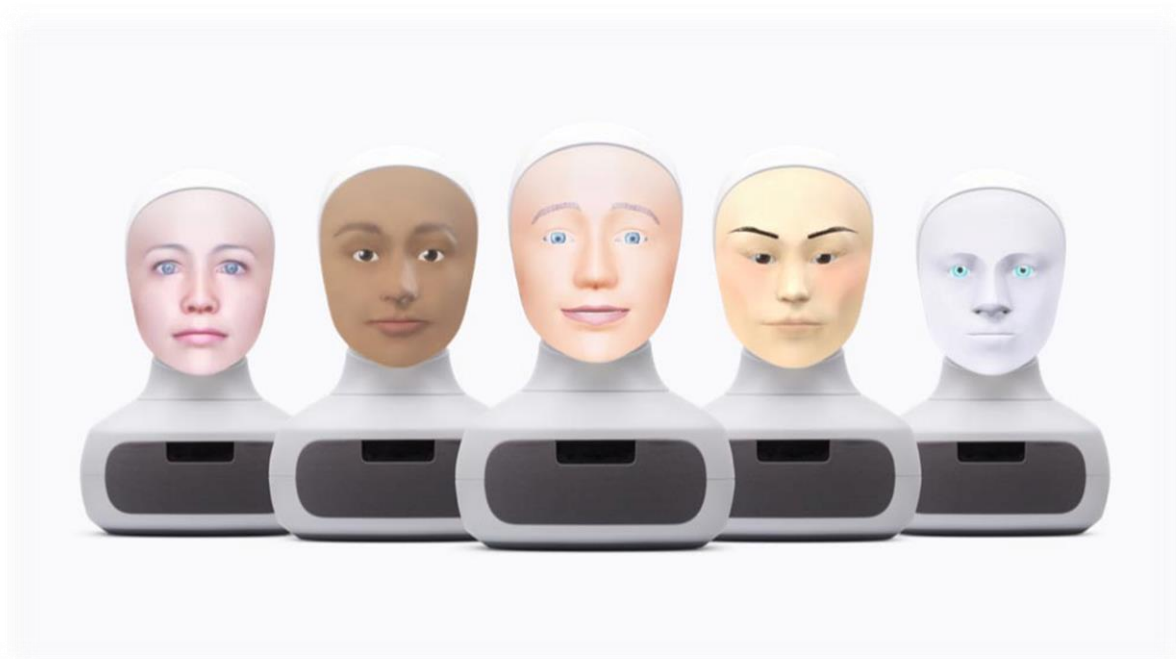SAMKIN PROJECT – FURHAT STUDY

Studying AI with AI in academia

Using AI to understand AI in academia:
Exploring AI practices in and AI experiences of academics with Furhat

Report Furhat-Study

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<u>Introduction</u>

This report presents the results of our Furhat study that took place in June 2023. This research project is part of our SAMKIN research[1] (performed by researchers from the University of Twente and financed by Instituut Gak), in which we study the experiences of knowledge workers in working with Artificial Intelligence (AI) technologies, and how working with AI shapes their work practices. In the Furhat study, specifically, we aimed to further our knowledge of AI technologies in academic practices, and we focused on academics as a prime example of knowledge workers. More specifically, we aimed to gain a more profound understanding of:

(1) The (possible) use of AI in academic practices of research and teaching; and

(2) The AI experiences of academic professionals in using AI in these research and teaching practices.

We focused both on the actual use and possible uses of AI technologies in academic practices. Exploring the possible uses of AI in the academic practices of research and teaching means that we not only pay attention to the possibilities and threats of working with the technology, like its advantages, disadvantages, challenges, and/or improvements but more importantly, to the changes in the research and teaching practices resulting from working with AI technologies. Regarding AI experiences, we were interested in the attitudes and perceptions of academics towards working with AI in academia. To gain this knowledge we used "Mr. Furhat", a social robot, as an AI interview technology. In our research we considered the social robot Furhat as a form of AI because it is designed to interact with humans naturally and engagingly, mimicking human-like communication, and using natural language processing for understanding and generating speech.

In this report, we first account for our methodology, after which we present our findings unfolding from the Furhat-interviews and the reflection sessions with the participants. We continue with a reflection on how we as researchers have experienced working with an AI technology in our academic practices, and we close this report with a conclusion.

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[1] SAMKIN stands for (Dutch) "Ervaringen met Samenwerken met Kunstmatige Intelligentie in de praktijk". More information about the project can be found on our website and the project-website of Instituut Gak.

Methodology

Our research methodology is qualitative and experimental in nature. In an experimental setting, a social robot, "Mr. Furhat" (Furhat Robotics, 2021), conducted interviews with academic professionals. Using Mr. Furhat enabled us, as qualitative social science researchers, to explore the possibilities of AI technology as an alternative innovative methodological tool for doing qualitative social science research. We follow previous research in adopting a social robot interviewer to collect data (e.g., Schermer & Hindriks, 2020), whereas at the same time, to our knowledge, this is one of the first studies to use a social robot as a means of qualitative data collection.

Social robot "Mr. Furhat"

Furhat is an embodied head-only social robot that can be programmed to project realistic facial features, nods and shakes its head, utilizes cameras, and employs speakers for verbal communication (see image). Furhat is a blended embodiment consisting of hardware and software. The hardware is the firm mask sitting on top of a white box that contains the processor, speaker and two motors. These motors afford the movement of the head (shake and nod). The human-like animated face is projected from within the head, through which the head can be animated and adopt facial expressions and lip-syncing (Al Moubayed et al., 2012; Paetzel-Prüsmann et al., 2021). Using its eye-tracking camera system, Furhat can, furthermore, track people's heads during a conversation and thereby eye contact is held as precisely as possible.
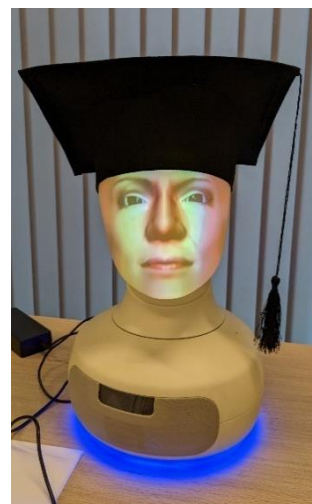
To better understand the experiences of academics in working with AI technologies, we developed an interview protocol (script) with questions about the participants' use of AI in teaching and/or research activities and their experiences. The questionnaire contained open and closed questions about the participants' knowledge of AI, their experiences with AI, advantages, disadvantages, and possibilities. Potential responses were also programmed using the "intent" functionality, through which Furhat records spoken language, translates it into text, and responds. Furthermore, the script also included facial expressions and emotions.

In total, we conducted 13 interviews with academics using Furhat, followed by 13 reflection interviews by ourselves. During the interview between Mr. Furhat and the participant in the experiment room, we – the researchers – watched the interview in another room via video streaming. After the interviews, we organised a reflection session in which we asked open questions to participants to express and explain their robot-interview experiences and emotions. These reflection sessions were rather fruitful in gaining a profound understanding of the participants' experiences with AI in their academic practices and their interactions with Mr. Furhat. We have combined, analysed, and interpreted the data unfolding from the interviews and the reflection sessions. In this report, we present our findings.

Results

The research shows that academics are actively engaging with AI in their work, albeit generally on an experimental basis. They expressed their knowledge and ability to explain the meaning of the concept AI (high AI literacy) and described various (potential) uses of AI in academic practices.

AI in educational activities

Our analysis shows that lecturers are experimenting with AI technologies, and use, for instance, ChatGPT to generate educational content. Lecturers refer to activities as developing exam questions, generating images for presentations, creating group activities, assessing, and providing feedback on students' work, and gaining support in explaining scientific theories.

> *"I'm using ChatGPT with my students to explain theories to each other in a more practical*
>
> *way so they can look for examples, use explanations so that they can easier understand the*
>
> *theory, which sometimes is more from a very academic perspective" (D6)*

Although interviewees explore the possibilities of AI technologies for teaching activities, they also feel uncomfortable about the use of AI by students. They find it difficult to oversee the possible unfolding consequences, both for the students and for their own work and responsibilities. They, for instance, argue that it is difficult to detect whether students have used AI – like ChatGPT – or not when they have submitted a written report or essay since it seems hard to recognize when a text is written by AI. Existing tools are not capable of AI detection, and as such, lecturers need to find different solutions for detecting AI-based texts or may have to change their educational activities, which may potentially lead to extra work.

> *"So mainly that students use it for reports, that they abuse it, and that we need to change*
>
> *the exams and we need to change the evaluation criteria." (D7)*

In contrast, other lecturers aim to proactively help students by teaching them how to use and benefit from AI (e.g., develop AI literacy) or expressed their reluctance to adopt AI in their teaching.

AI in research activities

Several (potential) uses of AI for research activities have been identified. AI is mainly used for activities related to developing and writing proposals, for example, to suggest titles for papers, or to improve an article's text. Furthermore, academics indicated to use AI to generate and develop research ideas, for instance for writing proposals to acquire funding:

> *"I used it to write a proposal, a research proposal for the European Union. […] I was*
>
> *trying to find out what in a proposal GDPR-regulations would be. And I asked ChatGPT to*
>
> *write such." (D4)*

Interviewees described that AI also supported them in retrieving information about specific topics and that its capability of finding and summarizing relevant articles was useful. By doing so, they experienced that working with AI-technologies was saving them time. A final example is that AI also can be useful in supporting data processing and/or statistical analysis – or proposing a specific data analysis - since AI is thought to be fast in processing data and summarizing content, automatically transcribing audio.

> *"Which analyses, for example, can be used to answer which questions, what then are the*
> *conditions of the different analyses… All those things that are written somewhere in the*
> *books and that I also roughly know." (D14)*

The potential of AI

A majority of academics indicated that AI technology changes their job. Generally, academics indicate that AI has the potential to improve the quality of their work-life, whereby AI is seen as an academic assistant that can support the automation of boring tasks and make the work of academics more efficient. Nevertheless, academics also express that they feel that AI developments are going fast and will continue to do so in the future, requiring them to adapt and adjust to the possibilities and use of AI.

AI is thought to be particularly helpful as a tool to automate and support routine and non-core academic tasks, such as aiding text-writing or generating images, which leads interviewees to think that the use of AI will lead to more efficiency and productivity. Also, obtaining inspiration and improving creativity are recognized benefits of AI.

Nevertheless, academics also identified multiple downsides and risks of AI. One of the most prominent ones was the issue of authenticity of written text, meaning that participants were concerned about the originality and integrity of written communication. They were also concerned about the errors, mistakes, and incorrect information (e.g., hallucinations) produced by (generative) AI, the issue of fake data, the lack of transparency of AI applications, and the potential of changing relations with colleagues and students.

Moreover, ethical issues arise when using AI, such that some academics feel that using AI does not feel well or is simply wrong, as the following quote shows:

> *"Perhaps a mild form of shame, thinking you could have done it by yourself as well. So, I*
> *think that it is, indeed, a certain form of shame about why I didn't manage to do it myself."*
>
> *(D23)*

Experiences of the social robot interview

For most participants interacting with a social robot was new, they had not seen Furhat before. Although academics generally had a positive attitude towards the social robot and were interested in the interaction, they also experienced several downsides of such interview.

An important aspect of the robot interview was the fact that Furhat interrupted interviewees quite substantially during the conversation, especially when interviewees did not immediately respond or when they stopped speaking to think. These interruptions made participants feel annoyed or angry, and argued that Mr. Furhat was rude in not creating a fluent and/or genuine two-way conversation. Experiencing these interruptions also made participants adjust their behaviour during the interview, by giving faster and shorter answers and leaving less space for thinking.

> *"I felt not listened to, it felt like I'm trying to give genuine answers to it and even if I make*
> *a small pause, then that's it. In general, I really try to say something as fast as I can and I*
> *don't feel like my answers sometimes were as in-depth as I would have liked them to be,*
> *because I know that if I wait too long, then it will start repeating the question or if I talk*
> *and then I want to think about something else." (D16)*

Participants also described that the robot-interview did not allow for small pauses in the answers to the open questions, which made them feel under pressure to answer as fast as possible thereby leaving less space for providing thoughtful and nuanced answers.

"Well, I think I felt a little bit under pressure knowing that I have to start a sentence quite

soon, especially like, given the questions, because I think those are questions that you

really have to think of for a moment" (D19)

Furhat was used for its natural language processing capacity; to record language and infer the intent of the users. Although this functioned well with closed questions, open questions were found to be more problematic. For instance, Furhat had difficulty with non-English names, as it got more than half of the names wrong, whereby several participants had to repeat their names several times and some even changed their response and adopted a fictional name.

All participants were asked to express their emotional response to the robot-interview in the follow-up conversation. We adopted the six basic emotions by Ekman as a starting point for discussion, whereby participants could choose one or multiple emotions and could also select their description of their emotions (see Table 1). Participants generally showed a sense of surprise or anger, or a combination of both.

Table 1: overview of experienced emotions during Furhat interview

Basic emotions (Ekman)	Described emotion by participants	#count
Surprise (8)	Surprise	8
Anger (6)	Irritation/annoyance/frustration	4
	Anger	2
Happiness (3)	Happiness	3
Sadness (1)	Resigned	1
Fear (3)	Fear	3
Disgust (2)	Disgust	1
	Discomfort	1

The surprise was mostly linked to the capabilities of the social robot, both in a positive sense that participants were amazed by what was possible, but also in a negative sense that the conversation was not as advanced as expected beforehand.

"So, surprise, but also interesting and I was really looking forward to see what's

happening and what the possibilities are. But in the end, it was more like being reductant.

Why is this social interaction person that I'm having with not really responding to what I'm

saying?" (D17)

The anger was articulated because the robot did not always respond properly and interrupted interviewees, whereas fear was voiced because participants sometimes felt under pressure during the conversation and because they feared long-term consequences of social robots. In contrast, some positive emotions – like happiness – were also shared, especially because participants liked the experience of having a conversation with a social robot.

Reflection of social robot interview

In this research project, we decided to explore and experiment with an AI technology and use Mr. Furhat as an AI-interview tool to learn more about AI in academia. Conducting interviews with Mr. Furhat as an innovative interview technology enabled us to experiment with an AI technology in our research practices. By so doing, we gained a more profound understanding of AI as an alternative innovative methodological tool for doing qualitative research, compared to other interview research methods in social sciences.

Despite the (potential) benefits of deploying a social robot to conduct (qualitative) research, we argue that there are important limitations to using social robots in a study for conducting qualitative scientific interviews. Generally, rendering Furhat operational and functional demanded a significant investment of time, necessitating extensive programming and rigorous testing.

The social robot followed the developed script and asked questions about the pre-determined topics. However, the robot was less capable of sensing whether and what participants had to say. Although it used its natural language processing capabilities to record answers and respond to participants, particularly the open questions were challenging as the social robot did not have a good sense when interviewees were finished answering questions. As indicated, this led to substantial interruptions by the social robot, interviewees quite substantially, especially when interviewees did not immediately respond or when they stopped speaking to think. The consequence of these limitations for our qualitative research was that we did not receive full answers to the questions in Mr. Furhat's script. Also, the fact the interviewees changed their behaviour, felt annoyed, angry, or disappointed distracted them from providing in-depth answers to the questions.

Our strategy to combine robotic interviews with reflection interviews alleviated this limitation. The reflection sessions that took place after the official social robot interview were rather helpful. We could go back to questions and ask for elaboration on their answers and/or additional examples. Furthermore, we learned about their experiences of interacting with a social robot. Hence, in terms of content (experiences of AI in academic work) and process (interacting with an AI robot) we gained valuable insights, which provide groundwork for further research.

Conclusion

This study aimed to explore the experiences of academics in (potentially) utilizing Artificial Intelligence (AI) within their research and teaching practices. The objective was to gain insights into the unique experiences of interacting with a social robot. Our findings reveal that, while the capabilities of AI technologies such as Furhat are generally regarded as impressive, there are notable concerns regarding their conversational limitations and the potential for interruptions. This study has resulted in valuable insights into the experiences of academics as prime examples of knowledge workers in the (potential) use of AI. Academics mainly see AI as a means to perform routine, non-essential tasks, through which timesaving and efficiency are achieved. AI is also used to augment academics in tasks such as generating educational content, writing text, and supporting research execution. Academics, at the same time, also struggle with the downsides of AI usage, particularly with the authenticity of outputs and detection of AI-generated text. In sum, these findings underscore the dual nature of AI in academia: a beneficial tool for augmenting and supporting academic work, yet one that also introduces new challenges in maintaining the integrity and authenticity of scholarly output. As the use of AI continues to evolve, further research is needed to address these challenges and explore how AI technologies shape the nature of academic work.

References and further readings

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