

Hiring an AI: The Design of an Artificial Team-Member for Anesthesiology

Stephan Huber, Nathalie Papenfuß, Tobias Grundgeiger

Julius-Maximilians-Universität Würzburg, Chair for Psychological Ergonomics, [firstname.lastname]@uni-wuerzburg.de

Johannes Basch

Neu-Ulm University of Applied Sciences, Business Psychology, Johannes.Basch@hnu.de

Oliver Happel

University Hospital Würzburg, AINS, Happel_O@ukw.de

An ongoing collaboration between our research group and the local university hospital has advanced application development and theoretical perspectives on the intersection of HCI and healthcare with a focus on acute care in the past decade [1-3]. In our current project*, we build upon the idea of a conversational AI agent for teams in anesthesiology [5]. The benefits of the agent *Cassandra (Clinical assessment and reasoning in anesthesia)* are twofold. First, Cassandra will be able to extract information from the anesthesia team communication and transcribe this information as a protocol, alleviating the medicolegal procedure of documentation. Second, as the patient status is now documented in real time, the AI component of Cassandra can interpret the current patient state based on former patient data and outcome. While this project offers challenges for multiple disciplines including voice recognition and data science, our research questions with respect to HCI are “How can we design a context sensitive agent for teams in anesthesiology?” and “How will an AI team member influence the behaviors of the human anesthesia team members?”.

What methods are most appropriate for the design of an artificial team member? Most user-centered design methods originate from software- and product design and have been adapted to service design [e.g., 4]. Bot design guidelines for conversational interfaces are typically applied for crafting 1:1 interaction or even relationships, or moderation of a remote group of asynchronously interacting users. For conceptualizing an artificial team member that can interact with the team in-situ and in real time, supporting the team to succeed in a safety-critical domain such as acute care medicine, we need to explore different methods further. Besides simple conversational questions as “When to speak and whom to address?” the challenges include, for example, adapting to varying team constellations, empathically reacting to the current mood in the operating theater, providing the interpretation of the current state, or appropriately questioning decisions of human team members. When selecting human teams, such soft skills are commonly explored in assessment centers. Virtual agents can be newly designed to custom-fit the context in contrast to classifying pre-existing competencies of humans regarding their suitability for a task. However, the description of the respective task, or precise job profile still needs to be elaborated. Therefore, we propose to look beyond the horizon of existing HCI methods and take inspiration from a recruiters’ toolbox that holds field tested instruments for job demand analysis. We look forward to discussing our ideas and preliminary results on *how to hire an AI* with workshop attendees.

* This research was partially funded by the German Federal Ministry of Education and Research (BMBF) as part of the research program “Interactive technologies for health and quality of life”.

REFERENCES

- [1] Tobias Grundgeiger, Stephan Huber, Daniel Reinhardt, Andreas Steinisch, Oliver Happel, and Thomas Wurmb. 2019. Cognitive Aids in Acute Care: Investigating How Cognitive Aids Affect and Support In-hospital Emergency Teams. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* Association for Computing Machinery, Paper 654. DOI= <http://dx.doi.org/10.1145/3290605.3300884>.
- [2] Tobias Grundgeiger, Jörn Hurtienne, and Oliver Happel. 2020. Why and How to Approach User Experience in Safety-Critical Domains: The example of healthcare. *Human Factors*. DOI= <http://dx.doi.org/10.1177/0018720819887575>.
- [3] Anna Hohm, Oliver Happel, Jörn Hurtienne, and Tobias Grundgeiger. 2022. User experience in safety-critical domains: a survey on motivational orientations and psychological need satisfaction in acute care. *Cognition, Technology & Work* 24, 2 (2022/05/01), 247-260. DOI= <http://dx.doi.org/10.1007/s10111-022-00697-0>.
- [4] Karen Holtzblatt and Hugh Beyer. 2016. *Contextual Design: Design for Life*. Morgan Kaufmann.
- [5] Sara Klüber, Franzisca Maas, David Schraudt, Gina Hermann, Oliver Happel, and Tobias Grundgeiger. 2020. Experience Matters: Design and evaluation of an anesthesia support tool guided by user experience theory. In *Proceedings of the 2020 ACM Designing Interactive Systems Conference*, 2020, Eindhoven, Netherlands. Association for Computing Machinery. 1523–1535. DOI= <http://dx.doi.org/10.1145/3357236.3395552>.