Artificial Intelligence-based Assistants

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1. Introduction

Many companies expect to gain a competitive advantage from AI (Ransbotham et al., 2017), and the solutions for AI-enabled processes, products, and business models are continuously becoming more sophisticated (Russell et al., 2010). AI-based assistants, such as virtual personal assistants and chatbots, are an important and particularly innovative field in this development. From a technological point of view, the natural language understanding component makes them one of the most challenging AI-applications in respect of pretraining and the distillation pipeline that are used for intent classification (FitzGerald et al., 2022). From an applied perspective, AI-based assistants like Amazon Alexa and Google Home (Këpuska & Bohouta, 2018) redefine the interaction of human users with applications by replacing standard user interfaces such as mouse, keyboard, and screen with voice.

AI-based assistants are integrated and linked with various forms computer hardware and services. In particular, smart speakers, provided by many big tech companies and have seen a broad diffusion. However, many additional devices have emerged over recent years, such as TV sets or cars. In consequence, the number of digital voice assistants in use is expected to grow from 3.25 billion in 2019 to 8.4 billion in 2024 (*Virtual Assistants*, 2021, p. 4). BMW announced they would use an Alexa-based assistant in their cars (*Next Generation BMW Voice Assistant to Be Based on Amazon Alexa Technology.*, 2022).

Among the value propositions that drive the diffusion and adoption are automated processes, an intensified interaction with the customer, reduced errors when entering data, and speeding up interactions in general. These benefits are reflected in existing research by Bahmani et al. (2022), who show that informational assistant capabilities increase firm value, and Brill et al. (2019), who found that assistants positively impact customer satisfaction.

Following the understanding that information systems are socio-technical in nature, AI-based assistants should be framed as a step toward humanizing technology and working environments. Research by (Schmidt et al., 2021a) shows that AI-based assistants evolve towards digital platforms by creating rich ecosystems with skill providers and device vendors. Direct and indirect network effects within and between these groups may be observed (Schmidt et al., 2022), which opens further strategic venues for applications in practice and research in academia.

The success of assistant platforms may be described by the various offerings from the big tech providers (e.g. Alexa, Cortana, Siri) where the Alexa universe alone comprised 47’000 applications, referred to as “skills” in 2019 (Major et al., 2019). This is also linked to a growth of application fields and interaction modes, which explains why assistant platforms are also recognized as general-purpose technologies (Helpman, 1998). This opens the stage for many research questions that shall be addressed in the minitrack.

2. Goal of Minitrack

Based on the first event in 2021 with 14 submissions (Schmidt et al., 2021b) , a second minitrack was organized in 2022 that received 12 submissions. The goal of these minitracks on “Artificial Intelligence-based Assistants” was to promote the scientific exchange on AI-based assistants for the Digital Economy. The minitrack should enable researchers to present and discuss innovative approaches, methodologies, models, processes, and related aspects. to design, implement, deploy, operate and optimize AI-based assistants for the Digital Economy. The minitrack also addresses broader aspects such as platforms and ecosystems of AI-based platforms. The AI-based assistants minitrack deals with the following topics but was also open to other topics.

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- Applications of AI-based assistants in the digital economy
- Platforms and ecosystems of AI-based assistants
- Methods and models to design, develop, implement, deploy, manage and monitor AI-based assistants
- Methods, tools and approaches to capture user behavior and to derive recommendations for actions
- New business models and processes based on AI-based assistants
- Fundament questions on the use of AI-based assistants
- Research on the transparency of the behavior of AI-based assistants
- Integration of AI-based assistants with services and platforms
- Social and business implications of the use of AI-based assistants

3. Accepted Papers

The minitrack in 2023 was the third in this minitrach series and received seven papers with four papers being accepted after a rigorous review process with two phases.

The first paper was authored by Tom Lewandowski, Mathis Poser, Emir Kučević, Marvin Heuer, Jannis Hellmich, Michael Raykhlin, Stefan Blum, and Tilo Böhmann, who conducted a design science research (DSR) project to derive a validated set of quality criteria for conversational agents. Their project is based both on insights from literature and practice. They provide a blueprint to structure the evaluation of conversational agents and augment knowledge on how to evaluate and improve the quality of CAs throughout their lifecycle. In this way, the conversational agents' potential shall be fully leveraged.

In their paper with the title "Can Chatbots Be Persuasive? How to Boost the Effectiveness of Chatbot Recommendations for Increasing Purchase Intention" Melanie Schwede, Nika Mozafari, Niclas von Schnakenburg, and Maik Hammerschmidt examine how to overcome a lack in persuasiveness of chatbot recommendations and the chatbots themselves. Their results show that two-sided recommendation messages increase the purchase intention if a warm or competent communication style is used. Companies can use their finding to refine the communication style of their chatbots.

The third paper was authored by the minitrack organizers and reviewed outside this minitrack. In this research, Rainer Schmidt, Rainer Alt and Alfred Zimmermann propose two key artefacts based on ecosystem intelligence: First, complementarity graphs represent ecosystems with an ecosystem's functional modules as vertices and complementarities as edges. Second, a process that can collect important information for ecosystem intelligence using proxies and web scraping. This way, data may be obtained that typically is unavailable to platform participants due to competitive reasons. Category-oriented complementarity maps circumvent this restriction and aggregate data from assistant platforms with complementarity graphs to provide decision-making support. Category-oriented complementarity graphs and maps on the Alexa skill ecosystem demonstrate the practical use.

Finally, the fourth paper is titled "Machine Learning in Transaction Monitoring: The Prospect of xAI" and explores how automation and augmentation supported by machine learning affect transaction monitoring and the stakeholders' requirements for building eXplainable Artificial Intelligence (xAI). The authors Julie Gerlings and Ioanna Constantiou show that the requirements of explainable Artificial Intelligence vary on the liable party. Therefore, they suggest a use case-specific method for explainable Artificial Intelligence to promote machine learning adoption in transaction monitoring adequately.

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