TOWARDS THE CONCEPTION OF A VIRTUAL COLLABORATOR

Extended Abstract

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Digitization and an increasingly interconnected world confronts companies with immense challenges and complex problems, that require teamwork and collaboration (Finkbeiner and Morner, 2015; Dulebohn and Hoch, 2017). With the help of information and communication technology (ICT), collaboration can be conducted time- and location-independent, resulting in virtual teamwork. Virtual teamwork is a setting that nowadays is part of the daily business of many knowledge workers, where different team members collaborate by using specific information technology for communication, information exchange and an overall collective value creation (Driskell et al., 2003; Fiol and O'Connor, 2005; Dulebohn and Hoch, 2017). The interdisciplinary endeavour of computer-supported collaborative work (or collaboration technology), examined the different mechanisms that are required to successfully collaborate via information systems (Grudin, 1994; Borghoff and Schlichter, 2000). Guidelines and design principles propose various features, that support interaction and group dynamics in order to decrease negative cognitive or social group effects, like production blocking, evaluation apprehension or social loafing (Diehl and Stroebe, 1987; Voigt and Bergener, 2013). With the rise of artificial intelligence (AI), new forms of collaboration need to be considered, that involve AI as an active partner within a collaboration setting (Seeber et al., 2018). Theories and design guidelines that support collaboration, considering cognitive and social group effects, need to be revised when team members are not solely human any more.

Recent research tries to address this or similar questions by focusing on specific mechanisms and phenomena, like trust, politeness, reciprocity, mindlessness or anthropomorphism (Nass and Moon, 2000; Gnewuch et al., 2017; Saffarizadeh et al., 2017; Elson et al., 2018; Schroeder and Schroeder, 2018). Especially trust and reliance are frequently covered topics, as well as privacy concerns and data security when interacting with intelligent systems (Saffarizadeh et al., 2017). Studies show that trust in intelligent systems is an important aspect that has a major influence on the willingness to share information (Schroeder and Schroeder) and how users rely upon recommendations from intelligent systems (Elson et al., 2018). When interacting with computers, data security additionally impacts privacy concerns and overall trust (Saffarizadeh et al., 2017). In summary, the studies underline the importance of trust in computers and subsequently the necessity to consider trust as a major factor within human-machine collaboration.

Commonly known applications of AI like Apple's Siri or Google Assistant are personal assistants fulfilling everyday tasks for their user (McTear et al., 2016a; Pearl, 2016). They can carry out tasks and give various information concerning topics like weather, traffic, restaurant information or even make appointments at the user's favourite hairdresser (see Google Duplex) (Zhao, 2006; McTear et al., 2016a).

Hence, these systems are already able to understand natural human language and interact with humans in a social way (Zhao, 2006; Skalski and Tamborini, 2007b). According to Maedche et al. (2016), we speak of Advanced User Assistance Systems when amongst other things, the user's context and activities are considered while performing a particular task. They suggest that so-called Anticipating User Assistance Systems are the highest form of user assistance, which include a proactive behavior and self-learning capabilities, adapting to certain contexts and to the user's needs. Maedche et al. (2016) draw attention on this topic and demand future research in this field (Maedche et al., 2016). Seeber et al. (2018) coincide with that and state that technology has the potential to be our smart collaboration partner in the future (Seeber et al., 2018). This assumption includes, that the support by a smart machine is not solely an assistance, but a coequal value creation between humans and AI. Based on these various definitions of AI that support the user, combined with the theoretical background on collaboration, we define the **Virtual Collaborator (VC)**, a coequal virtual teammate in a collaboration setting.

To shed light on the newly established term of a Virtual Collaborator, we conducted an exploratory study for a phenomenon that has not been studied before (Babbie, 2015). In order to understand the conception and in order to identify the influencing factors of team workers towards virtual collaborators, a questionnaire was developed and carried out. A study with 144 participants was carried out to provide valuable information about collaboration principles, conceptual implementations and requirements.

The results reveal that a substantial part of the participants is not using any VAs in their daily life (42%), because of mistrust. Overall, the study reveals a somewhat inconclusive opinion about VCs. Participants can imagine working with a VC, but only when a VC is subject to stricter rules and works on less complex tasks and do agree on the fact that a VC should not work as a team leader. This leads to the conclusion, that participants do perceive a VC as unequal to other team members, don't conceive a collaboration with a VC the same as with solely human partners, do not completely trust in a VC and would not accept instructions from a VC in equal measure as from a human person. Tasks mentioned by the participants that VCs should not take are executive activities, critical decision making, vital tasks or creative tasks. When it comes to completely replacing human-made work with a VC, only 39% of the participants agree and comment that especially easy tasks can be done by VCs, but "there must always be a last means of human control." Participants name tasks like "Organize appointments", "Write summaries of lecture scripts", "Conduct systematic literature reviews", "Help writing mid-term paper", "Write emails and communicate with clients" or "Secretarial duties" that should and can be done by VCs. Some participants did not answer this question, as they could not imagine any relevant tasks a VC can adopt. The participants state that the workload can be reduced significantly and that a VC can be beneficial in the professional environment as well as in the private sphere. Overall, the conception of a VC is unclear and participants are primarily sceptical towards VCs in a coequal manner. Participants expect a VC to comply to rules of collaboration, e.g. a VC should be reciprocal, trustworthy, respectful, have commitment and work benevolently with all team members towards a common goal. This is backed by comments, that a VC should not take tasks involving empathy, personal conflicts or social relationships.

The conception of the participants that VAs and possible VCs still don't work as satisfying as required, should challenge practice to further develop AI and especially consider collaboration features within their services. Current VAs are limited to features that solely assist the user, like chatbots that are implemented in support or voice assistants like Apple's Siri. In summary, it can be said, that the novel research endeavour of AI, actively collaborating with humans and working in teams is still in its infancy. With our study, we provided a foundation for future research that can lead to new collaboration theories, mechanisms, artefacts and guidelines.

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