

Think beyond tomorrow

AI, our assistant and friend - challenges and implications for human-AI interaction

Executive summary

In cooperation with



Project Group
Business & Information
Systems Engineering



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New medical procedures for cancer diagnostics, autonomous driving and productivity improvements across industries and sectors - artificial intelligence (AI) is gaining ground and permeates virtually all spheres of life. The use of AI will significantly disrupt a vast number of jobs and workflows and generally impact how we interact on a day-to-day basis. We humans see ourselves facing new challenges due to increasing interaction with AI in our daily routines. When designing AI solutions, focus should be not just on technological enhancement, but equally on the interaction between humans and AI. AI can only reach its full potential

if this interaction is useful, appealing and applied in the appropriate context. The challenges and implications of human-AI interaction and the required measures of companies and individuals therefore need to be discussed in depth. This study demonstrates the broad scope of human-AI interaction, its underlying features and various drivers for the success and acceptance of human-AI interaction. We summarize our findings on the future development of human-AI interaction in 10 theses and illustrate the implications, opportunities, challenges and action areas for successful human-AI interaction.

The characteristic interaction types of AI use cases

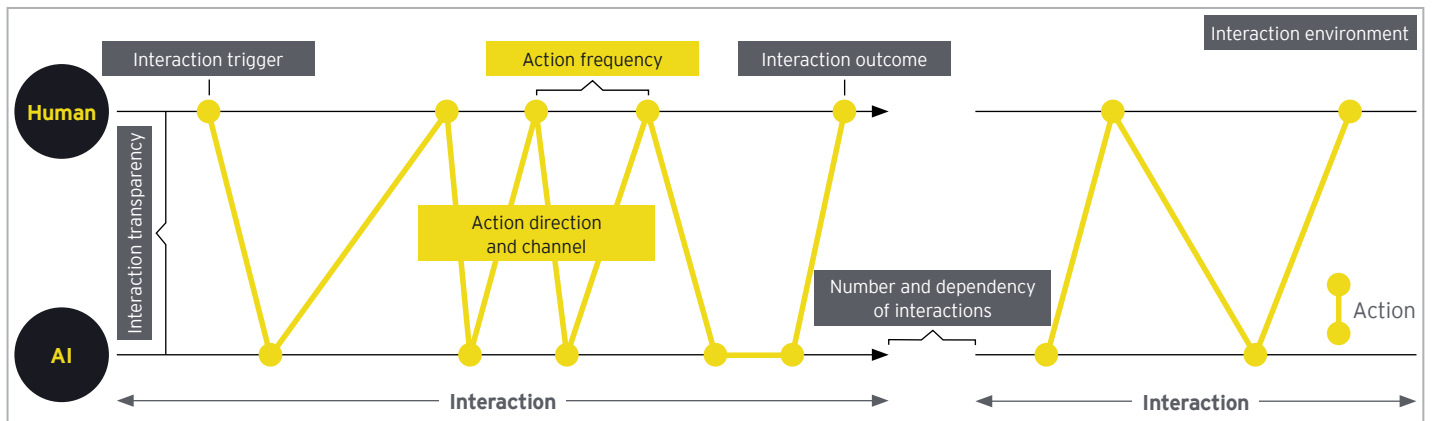
Humans interact in a variety of ways with AI and across a broad range of applications. To describe human-AI interaction, we refer to established communications theories in combination with characteristics and features from other forms of interaction (human-human, human-computer, human-robot). At the same time, AI requires closer analysis; it is technically complex, the different AI capabilities are manifold and the number of use cases correspondingly large. We have identified five specific features of AI and humans' interaction with AI. In sum, they distinguish human-AI interaction from interaction with other technologies:

- ▶ The autonomy of AI agents with their capacity for autonomous learning and ability to make decisions and act on their own
- ▶ The interdependence of the content of human-AI interaction: integrated analysis of the interaction history and context which is taken into account in future interactions
- ▶ The opportunities for a more advanced anthropomorphology due to a human-like appearance or the human-like abilities and behavior of AI agents
- ▶ New and more intuitive interaction channels
- ▶ Emotional and social intelligence as a foundation for some forms of human-AI interaction



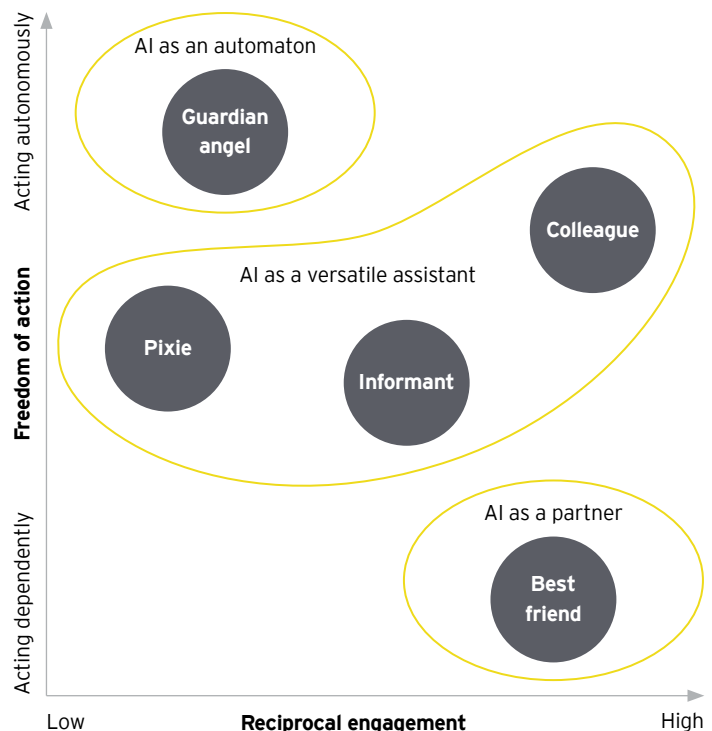
To map the specific patterns of interaction between humans and AI precisely and comprehensively, we distinguish

between nine different interaction dimensions:



An analysis of different AI use cases in everyday life shows that interactions, despite potentially similar features in the nine dimensions, can be classified based on the criteria of freedom of action and reciprocal engagement. For example, interaction often starts with the same trigger and leads to a similar outcome but differs in terms of the degree of freedom of action and reciprocal engagement. In this study, we have identified and classified five characteristic interaction types of current or potential AI use cases using the terms guardian angel, pixie, informant, colleague and best friend. We group these interaction types in three different groups. The first group describes **AI as an automaton** which oversees, protects and if necessary supports the actions of humans

like a guardian angel. The second group, **AI as a versatile assistant**, relates to interactions in which AI supports the work of humans in the background, supplies humans with desired information or helps to produce outcomes in close interaction. Finally, the third group bundles use cases in which **AI as a partner** interacts in the role of best friend due to a high degree of personalization and social elements.



Key factors affecting human-AI interaction

Numerous factors have an impact on human-AI interaction. Understanding and taking human expectations on board is key to instilling acceptance of and trust in AI-powered solutions, and ultimately the success of human-AI interaction. In this context, it is vital to correctly select the form of AI features such as transparency, anthropomorphology and personalization.

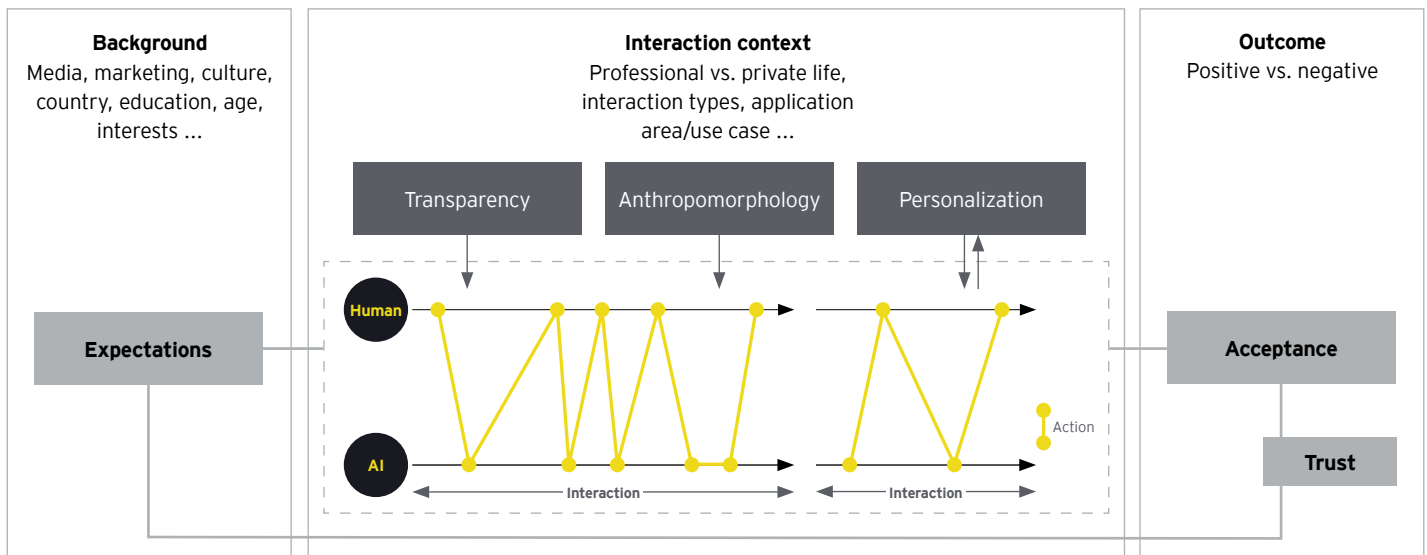
The term transparency describes the extent to which a person is aware that they are interacting with AI and knows the process and its outcomes. Knowledge of what an AI solution can achieve, how it achieves this and the quality of the outcome increases human understanding of and ultimately the success of human-AI interaction. However, the appropriate degree of transparency varies depending on the situation and context of the interaction.

Whether or not anthropomorphology - the attribution of human characteristics to AI - should be emphasized depends highly on the end user and context of the interaction. A high degree of anthropomorphology can be a fun factor and have

a positive effect on user experience; however, it should not be used solely as a means to an end or to generate attention.

The more AI is personalized, the more individually it can interact with humans. This means, for example, that users only receive interaction content and outcomes that are relevant to them. In addition, a highly personalized AI solution can reduce the number and frequency of actions, minimizing the time a user spends interacting with AI. In many contexts, personalized AI solutions are therefore potentially better able to meet human expectations.

Consequently, the relevance of the various factors varies overall depending on the type of interaction and interaction context. Interactions that meet expectations foster acceptance and trust in an AI solution over time. In turn, acceptance and trust have an impact on expectations and the form of future interactions. The characteristics and background of a person that shape their individual expectations of AI also play a significant role.



Theses on the future development of human-AI interaction

Based on our understanding of typical human-AI interaction processes, this study formulates 10 theses for its future development. These theses encompass both the successful

design of today's application scenarios as well as adequate preparation for the future potential of human-AI interaction.

Thesis 1

With the ongoing development of AI, personalization, social elements, task diversity and AI's understanding of context in interactions with humans are increasing.

The first thesis relates to a fundamental change in AI and is therefore depicted as an umbrella thesis overarching the other nine theses. These are divided into three segments covering the changes in terms of the roles and

responsibilities of AI (**What**), the process of human-AI interaction (**How**) and the implications for the successful design of future AI applications (**So What**).

What	How	So what
<p>Thesis 2</p> <p>Interactions between humans and AI forms the basis for merging their respective unique capabilities</p>	<p>Thesis 5</p> <p>Human-AI interactions are becoming more direct and therefore largely independent of specific interaction channels</p>	<p>Thesis 8</p> <p>Look and feel of AI no longer need to rely so heavily on looking and functioning like a human</p>
<p>Thesis 3</p> <p>Like humans, AI has scope to act and make decisions to different extents</p>	<p>Thesis 6</p> <p>The user experience with AI develops into an overarching and continuous user journey</p>	<p>Thesis 9</p> <p>Trust in human-AI interaction must be gained through repeated positive outcomes and/or by establishing a social bond</p>
<p>Thesis 4</p> <p>The interaction types are developing toward two extremes: AI as an automaton and AI as a partner</p>	<p>Thesis 7</p> <p>AI adapts to human expectations by providing content- and context-driven services</p>	<p>Thesis 10</p> <p>Ethics and morality are key components of human-AI interaction and require data- and value-driven learning</p>

Action areas and implications for human-AI interaction in companies

AI solutions have a long way to go before they can actually take over the work of humans and pose any immediate risk to their jobs. However, AI will change many professions in the near future. AI offers companies numerous opportunities, but also creates challenges and a need to act. Thus, companies must take steps to be able to use AI in the future and remain

competitive going forward. The opportunities, challenges and action areas identified cover the business activities of companies, technology advancement and the related change in the human work environment. Companies must therefore act wisely when it comes to strategy, technology and organization.

	Strategy	Technology	Organization
Opportunities	<ul style="list-style-type: none"> ▶ Exploit optimization potential in the value chain ▶ Boost productivity ▶ Develop personalized products and services 	<ul style="list-style-type: none"> ▶ Use efficient technology ▶ Exploit rapid innovation cycles ▶ Boost the autonomy of AI 	<ul style="list-style-type: none"> ▶ Assume repetitive and arduous tasks ▶ Free up capacities for creative and complex tasks ▶ Increase job satisfaction
Challenges	<ul style="list-style-type: none"> ▶ Clinging to old business models ▶ No standard solutions ▶ No regulatory framework for AI solutions 	<ul style="list-style-type: none"> ▶ Backward IT landscapes ▶ Lack of user-friendly interfaces ▶ No transparency 	<ul style="list-style-type: none"> ▶ Knowledge gaps in terms of AI capabilities and applications ▶ Rejection of and aversion to AI ▶ Utopian expectations regarding AI capabilities
Action areas	<ul style="list-style-type: none"> ▶ Establish requisite AI expertise in the company ▶ Identify domain-specific optimization potential ▶ Help develop the regulations for the use of AI systems 	<ul style="list-style-type: none"> ▶ Involve all employees in the development of user interfaces ▶ Develop AI solutions with the greatest possible transparency ▶ Collect environmental data to develop use case solutions (data = revenue stream) 	<ul style="list-style-type: none"> ▶ Introduce AI workshops to experiment with AI solutions ▶ Iterative rollouts of AI solutions ▶ Group-specific change management

About the study

The full text of the study is available in German only at www.ey.com/de_de/ai/wie-menschlich-kann-kuenstliche-intelligenz-sein

The study is based on broad-based literature research and interviews conducted by the authors on the current situation at companies. Twenty-five in-depth interviews were conducted with renowned AI experts and users. The interview partners come from different industries and work in technology companies, AI start-ups or research.

We extend our special thanks to our interview partners for their valuable thoughts and opinions. We would also like to thank our colleagues Simon Blöthner, Michael Glahn, Nadine Kaiser, Jens Keuter, Mikail Kibar and Karin Sahr for their support in drafting the study and their comments and suggestions.

About the authors

Shape the future interaction with AI successfully with us and exploit its potential at your company. We have an in-depth understanding of the application possibilities and their impact on business. Experts and experienced practitioners

from the Project Group Business & Information Systems Engineering of the Fraunhofer FIT and EY will work with you to find the right answers for your organization.



Dr. Yilmaz Alan
Partner at EY (Advisory, Munich)
Tel. +49 160 93915751
yilmaz.alan@de.ey.com



Silvana Hinsén
Senior Consultant for Technology Transformation at EY and PhD student at the University of Bayreuth
Tel. +49 160 939 25330
silvana.hinsén@de.ey.com



Patrick Beisel
Consultant for Technology Transformation at EY
Tel. +49 160 93915809
patrick.beisel@de.ey.com



Stephan Blumenthal
Student employee at EY (Technology Transformation) and information systems (M.Sc.) student at the University of Cologne
Tel. +49 221 2779 14743
stephan.blumenthal@de.ey.com



Prof. Dr. Nils Urbach
Professor of Information Systems and Strategic IT Management at the University of Bayreuth and Fraunhofer FIT
Tel. +49 921 55 4712
nils.urbach@fim-rc.de



Jan Jöhnik
Research assistant at Fraunhofer FIT and PhD student at the University of Bayreuth
Tel. +49 921 55 4714
jan.joehnk@fim-rc.de



Malte Weißert
Student assistant at Fraunhofer FIT and business administration (M.Sc.) student at the University of Bayreuth
Tel. +49 921 55 4710
malte.weissert@fim-rc.de



Peter Hofmann
Research assistant at Fraunhofer FIT and PhD student at the University of Bayreuth
Tel. +49 921 55 4716
peter.hofmann@fim-rc.de

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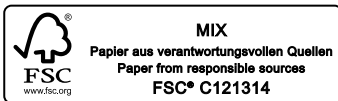
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GSA Agency
BKR 2002-332
ED None



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