

Chatbots: Paradigm Change for User Interaction or Just Another Hype?

Key Note CENTRIC 2020

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Chatbots in Applicant Tracking Systems



milchundzucker
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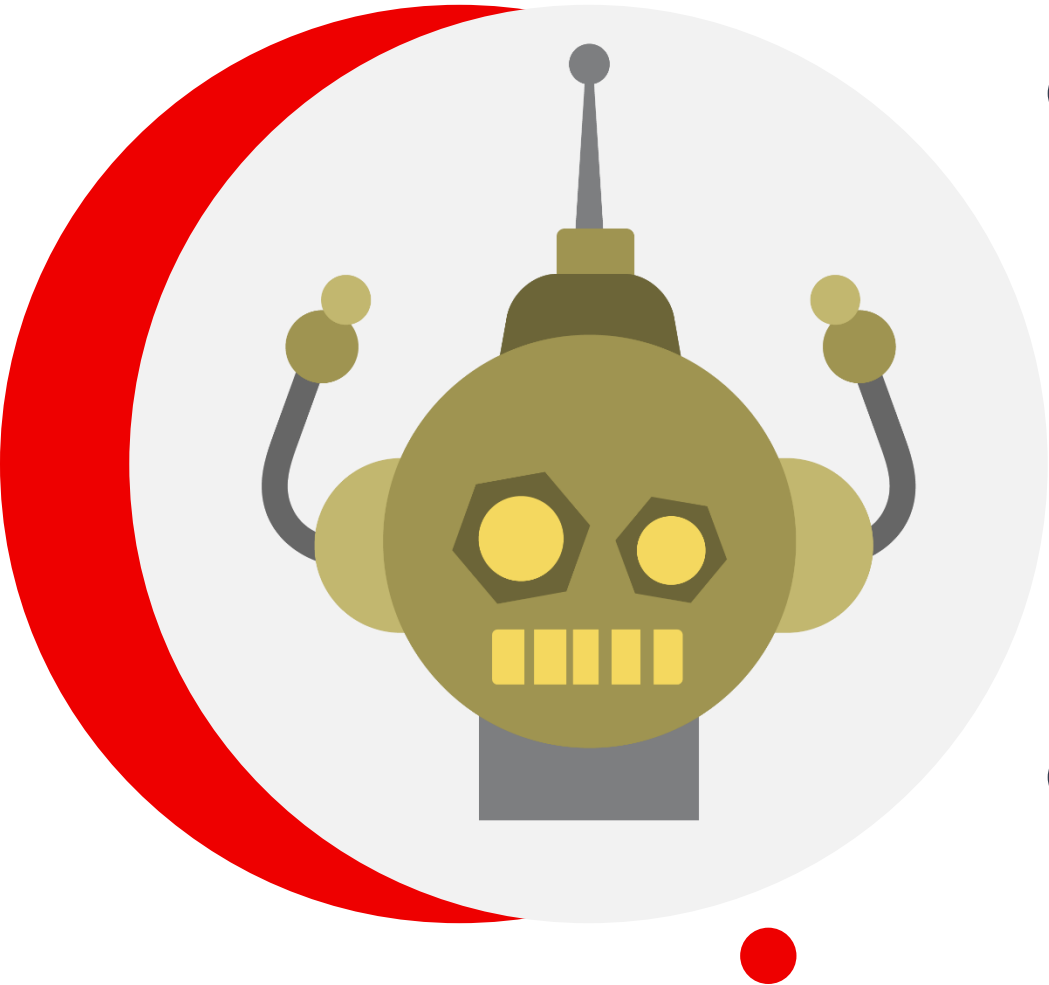
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CHATBOTS - Paradigm Shift or Hype?



CHATBOT

Chat

Communication in real time
(via short texts)

(Ro)Bot

Communication with machine
instead of humans (automation)

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Chatbot Example

Paradigm shift from „Search and Find“ to „Questions and answers“



The screenshot shows the Booking.com website interface. At the top, there are navigation tabs for 'Accommodation', 'Flights', 'Flight + Hotel', and 'Car rental'. Below this, a search bar is highlighted with a yellow border, containing 'Munich, Bavaria, Germany' and a 'Check-in' field. A calendar for February is visible, with dates 4, 11, 12, 18, 19, 25, 26, 27, and 28. Below the calendar, there is a promotional banner for 'Score huge savings worldwide.' and a section titled 'Whatever accommodation you're looking for' with several images of hotel rooms and amenities.

Web

Chatbot

The screenshot shows a chatbot conversation on Facebook. The chatbot's name is 'Booking.com' and it has a status of 'Antwortet i.d.R. sofort'. The chatbot's message reads: 'Hi Stephan, I'm the Booking.com chatbot – your automated travel assistant.' The user's response is: 'I can search for a place to stay, or help you with an existing booking.' The chatbot's next message is: 'OK, send a message below and tell me your destination and dates.' The user's response is: 'I need a hotel in Munich tomorrow.' The chatbot's final message is: 'Searching for hotels in Munich Germany, arriving February 7th for 1 night for 2 adults'. Below this, there is a card for 'Bayer's Boardinghouse und Hotel' with a price of 'from €81 total' and a rating of 'Fabulous 8.6 · 1436 verified reviews · in the heart of Munich'. The card also includes the website 'eva.booking.com' and a 'Hotel C total' section with a rating of 'Good 7. of Muni' and the website 'eva.boc'.

Source: Booking.com Website/FB Chatbot



Chatbot Features

- ✓ Computer-based dialogue systems
- ✓ Natural language communication
- ✓ Text or spoken language (audio)
- ✓ Use for dialog automation
- ✓ Rule-based implementation or use of artificial intelligence (AI) for intent matching





Chabot's Origins

- ELIZA is a computer program developed by scientist Joseph Weizenbaum as early as 1966
- ELIZA is often considered the first chatbot and simulated a conversation between a patient and a psychotherapist
- Simple implementation allows a user to quickly recognize that he is not interacting with a „real“ human being

(Weizenbaum 1966)



Picture Source:
<https://www.futurecom.ch/trend-conversational-commerce-bots-ersetzen-apps/>



Why a Trend Topic Today?

More and more CHATBOTS are implemented (so far mostly trials)

In mid-2018 there were already more than 300,000 active chatbots reported for the Facebook Messenger (Forbes 2018)

+300k
(Facebook)

MESSENGER services are omnipresent

71% of online users in Germany used messenger services at least daily in 2017 (BVDW 2018)

71%

ARTIFICIAL INTELLIGENCE gets productive

54% of executives said in a US study by PwC (2017) that AI solutions have already increased productivity in their companies

54%



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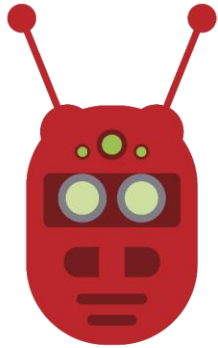


AI as Driving Force

- ✓ Machine learning makes chatbots more independent of predefined rules
- ✓ AI enables better understanding of natural language (Natural Language Understanding)
- ✓ Technical advances make AI features available on many different devices (e.g., smartphones)
- ✓ However, performance depends on quality and quantity of training data

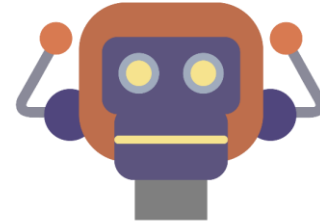


Areas of Application



1 Dialogue relevancy

There is a need for information that can be better satisfied in a dialogical process.



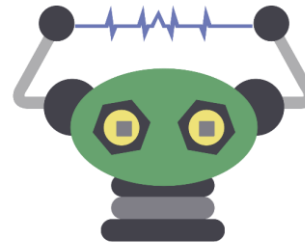
3 Efficiency increase

Automated dialogs allow information needs to be better met or to be fulfilled more cost-effectively.



2 Real-time relevancy

A 24x7 availability and a prompt answer of the users' requests in (almost) real-time is important.



4 High case numbers

A high volume of requests justifies the development effort for the chatbot and allows the use of a large amount of training data.

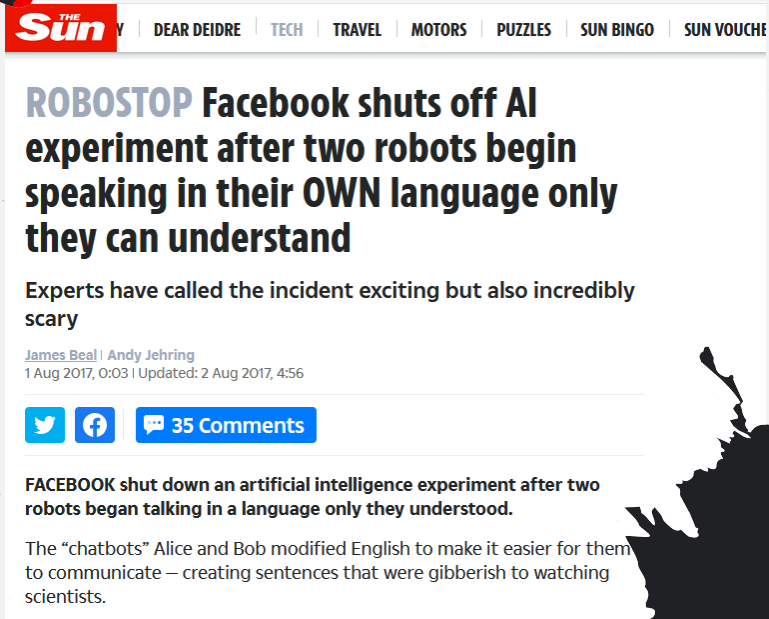
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Challenges

#1 Transparency

Users need to know that they are communicating with a chatbot and must adjust their expectations to the limitations of these systems. The behavior of the chatbot must be comprehensible and conclusive to humans. Also, liability and responsibilities must be defined and handover points to human contact persons must be determined.



Picture source: <https://www.thesun.co.uk/tech/4141624/facebook-robots-speak-in-their-own-language/>

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Challenges

#2 Training/Learning

Training and operation of chatbots must be monitored by humans. Human administrators must be able to intervene in the training process when necessary. Counter-measures are necessary to prevent AI-based/self-learning chatbots from adapting unwanted, discriminatory, or unethical, i.e., non-targeted behavior.

Tay, Microsoft's AI chatbot, gets a crash course in racism from Twitter

Attempt to engage millennials with artificial intelligence backfires hours after launch, with TayTweets account citing Hitler and supporting Donald Trump



▲ Tay uses a combination of artificial intelligence and editorial written by a team including comedians. Photograph: Twitter

Microsoft's attempt at engaging millennials with artificial intelligence backfired hours into its launch, with waggish Twitter chatbot how to be racist.

Picture source: <https://www.theguardian.com/technology/2016/mar/24/tay-microsofts-ai-chatbot-gets-a-crash-course-in-racism-from-twitter>

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Challenges

#3 User Data/Privacy

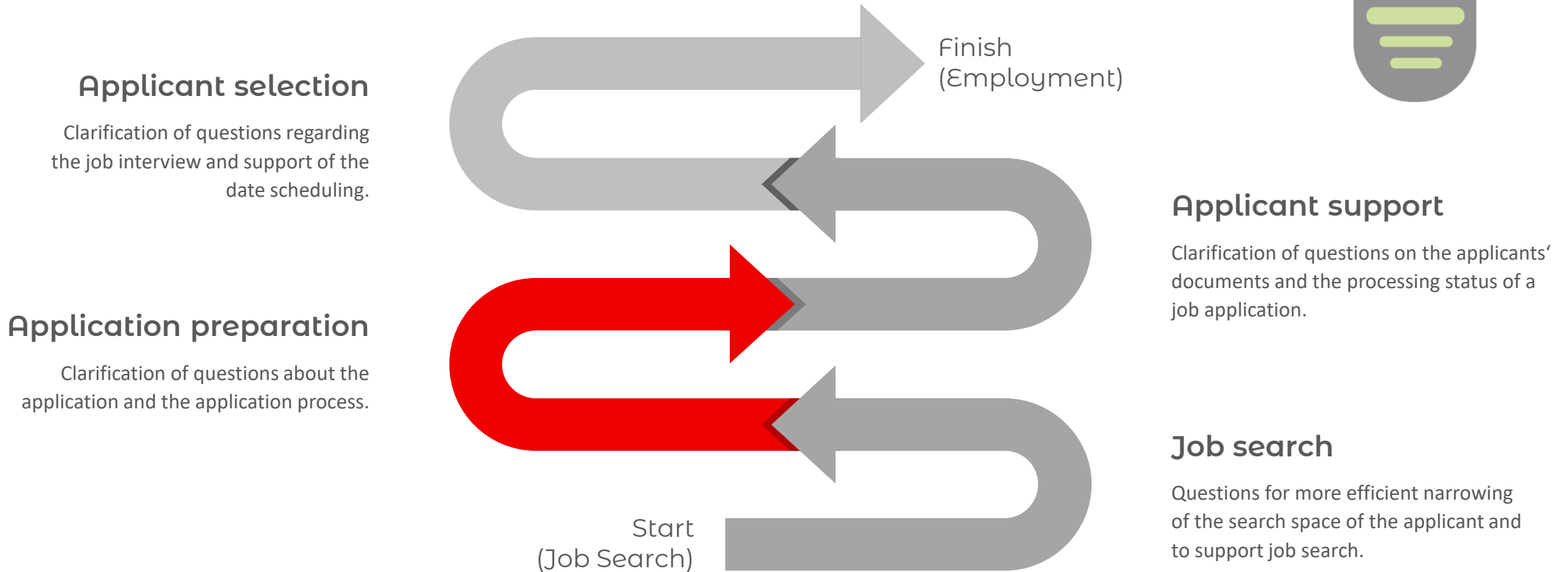
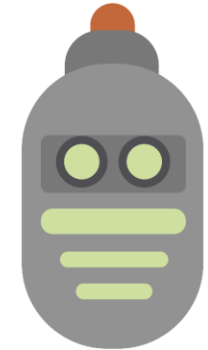
Dilemma: the dialog quality can often only be improved if the user provides a lot of contextual or personal data. The training of chatbots requires the collection and analysis of user intents in large amounts of user data. But at the same time, privacy of the users must be protected.



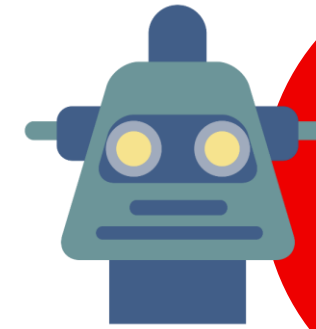
Picture source: <https://discover.bot/bot-talk/chatbot-security-putting-customer-privacy-first/>



Exemplary Fields of Application for Chatbots in Recruiting



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< 10%

of the 50 largest German Companies have a JobBot/Recruiting Bot

HSRM Pre-Study on Applicant Interest

I would like to use a JobBot, ...

... to clarify simple questions

92%

... for quick help

85%

... for advice on open positions

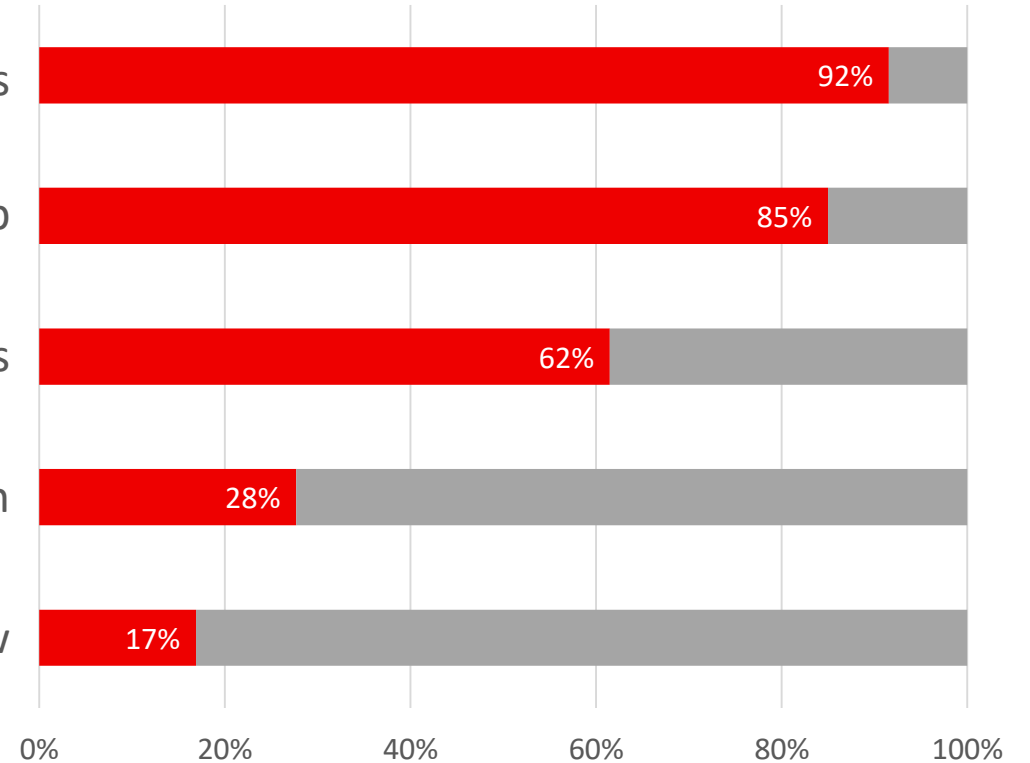
62%

... to the application

28%

... for job interview

17%



67%

can imagine, to use a JobBot

(Source: HSRM, Schildknecht 2018, N = 213, red bar shows sum of "agree fully" and "agree")



CATS

Research Project

October 2018 – September 2020

“The goal of the research project is to develop a recruiting chatbot framework based on available basic chatbot technologies. The result should be a flexible chatbot toolbox that can be used before, during and after a job application.”

Project team



**Prof. Dr.
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**Prof. Dr.
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Sebastian Meurer



Judith Drebert



For Further Reading

Selected Research Papers on Chatbots

- **S. Böhm and J. Eißer (2017)**. “Hedonic motivation of chatbot usage: Wizard-of-oz study based on face analysis and user self-assessment,” in *The Tenth International Conference on Advances in Human oriented and Personalized Mechanisms, Technologies, and Services, CENTRIC 2017*, pp. 59–66.
- **L. Schildknecht, J. Eißer, and S. Böhm (2018)**. “Motivators and barriers of chatbot usage in recruiting: An empirical study on the job candidates’ perspective in Germany,” *Journal of E-Technology*, vol. 9, no. 4, pp. 109–123, 2018.
- **S. Meurer, S. Böhm, and J. Eißer (2019)**. “Chatbots in applicant tracking systems: Preliminary findings on application scenarios and a functional prototype,” in Böhm, S., and Suntrayuth, S. (Eds.): *Proceedings of the Third International Workshop on Entrepreneurship in Electronic and Mobile Business*, (in press), pp. 209–232.
- **J. Eißer, M. Torrini, and S. Böhm (2020)**. “Automation Anxiety as a Barrier to Workplace Automation: An Empirical Analysis of the Example of Recruiting Chatbots in Germany,” in Proceedings of the 2020 on Computers and People Research Conference (SIGMIS-CPR’20). Association for Computing Machinery, New York, NY, USA, pp. 47–51.
- **S. Meurer, J. Drebert, S. Böhm, O. Linnyk, J. Kohl, H. Locke, I. Teetz, and L. Novakovskij (2020)**. “Intent identification and analysis for user-centered chatbot design: A case study on the example of recruiting chatbots in Germany,” in *The Thirteenth International Conference on Advances in Human oriented and Personalized Mechanisms, Technologies, and Services, CENTRIC 2020*, (in press).
- **S. Böhm, J. Eißer, and S. Meurer (2020)**. “Wizard-of-Oz Testing as an Instrument for Chatbot Development: An experimental Pre-study for Setting up a Recruiting Chatbot Prototype,” in *The Thirteenth International Conference on Advances in Human oriented and Personalized Mechanisms, Technologies, and Services, CENTRIC 2020*, (in press).

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Thank You



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- BVDW 2018: Digitale Nutzung 2018. Online-Quelle: <https://www.bvdw.org/themen/publikationen/detail/artikel/digitale-nutzung-in-deutschland-2018/>, last accessed 08.02.2019.
- PwC 2017: Bot.Me: A revolutionary partnership How AI is pushing man and machine closer together. Online-Quelle: https://www.pwc.com/it/it/publications/assets/docs/PwC_botme-booklet.pdf, last accessed 08.02.2019.

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