

## A COMPLICATED LOVE STORY?

# Human Robot Interaction in Popular Culture: A Case Study on Technology-Linked Emotions

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*Popular representations of anthropomorphic robots and their descriptions as something similar to humans shaped the image of robots and AI to an astonishing degree. Emotions play an important role in this process. This article is dedicated to popular representations of robots and emotions, linked to them. Its focus is on a widely distributed 1960s youth book on robots, written by the Viennese author Karl Bruckner. Based on analysing the emotions linked to Bruckner's robots and the robots' way of acting, it will become clear that the author both made use of an existing popular image of robots and contributed to the development of this image. This article argues that the popular image of anthropomorphic robots hinders the adoption of robots for occupational purposes: the advantages and dangers of employing robots are overwhelmed by our emotional response to humanoid robots as beings, which are similar to us.*

In 1988, a report on the use of robots in the metal industries described the motion of one robotic metalworker: “The robot arm leans almost sensuously . . . into the hot aluminium alloy.”<sup>1</sup> Such a description of an industrial robot would not make sense without the image of anthropomorphic robots in the minds of authors and readers. Humanoid robots trigger emotions unlike any other technology.<sup>2</sup> Our concepts of robots are shaped to an astonishing extent by the human attraction to anthropomorphic robots. Such robots were created for entertainment since the 1920s. In this context, generating emotions was quite important: the main task of robots in popular culture is to entertain people in their specific double role of humans and machines. — Readers of books or magazines, visitors of exhibitions and cinemas – all of them were entertained with catchy, emotionally involving stories. Although such robots are infrequently encountered in daily life, they are important figures in science fiction literature, movies and popular media. Fictional robots were

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1 “Fast gefühlvoll neigt sich der Roboterarm . . . in die heiße Aluminiumlegierung.” (Hagenau, “Roboter lernten Gießen,” 589.)

2 Other technologies evoke emotions, too. The link between robots and human beings makes the decisive difference.

inaugurated earlier and were more advanced than their real counterparts: whereas these robots are dating back to the 1920s, industrial robots were developed in the late 1950s and have gained influence since the 1980s. Interactive, co-working robots constructed for direct collaboration with human workers were inaugurated just recently. The same holds for AI-based robots, designed for service or healthcare uses, which are programmed to analyse emotions and react accordingly.

Do emotions and the perception of robots as personalities mediate appropriation of this kind of technology, whereas it might be more difficult to find personal access to other modern, especially immaterial technologies like AI? Or do emotions transform or even block a route of access? Based on analysing emotions linked to the representation of robots in popular culture, I will argue, that (1) emotions contributed to our image of robots as personalities, similar to humans (2), and that this makes appropriation of robot- and AI-technology difficult, since it plays down the technology and the AI behind robots. This article's key-example for analysing the image of robots is a widely distributed youth book on robots from the 1960s by Karl Bruckner. History of emotions and the popular representation of robots have not yet been analysed together, although authors as Dustin Abnet, Lisa Nocks, and Jennifer Robertson have fruitfully contributed to our understanding of the popular image of robots.<sup>3</sup> Research on the role of emotions in history culminated in the "emotional turn" some years ago.<sup>4</sup> This article sets out to combine them. The beginning of this article is dedicated to research on historical emotions. It then turns to analyse the role of robots and emotions in Bruckner's 1960s book, and the third part discusses current research projects on the acceptance of robot technology.

## Research on Emotions

Emotions have gained increasing attention in the humanities and social sciences within the last decades.<sup>5</sup> The term "the emotional turn" underlines this development, which will be used in this article to analyse the history of robots. Sociologists, historians, and researchers in cultural studies are interested in emotions for the insight that they can bring into people's behavior and priorities.

The basic emotions include love, hate, happiness, fear, and disgust. Under

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3 Nocks, *Robot*; Robertson, *Robo Sapiens Japonicus*; Abnet, *American Robot*.

4 Especially Max-Planck Institute for Human Development in Berlin is to mention here since this MPI has a special department on emotions in history. Authors are given in the chapter research on emotions.

5 Although there are earlier contributions by Karl Lamprecht and Lucien Febvre, Arlie Hochschild's book *The Managed Heart* (first published in the 1980s) was important for this development. Stearns: *American Cool*, has to be mentioned here. On the societal background of the development: González, "In Search of a Sociological Explanation."

normal conditions, a mixture of these basic emotions can be observed.<sup>6</sup> They form the person's reaction to different influences and demands. Thus, emotions influence judgements and actions.<sup>7</sup> This is especially important when complex topics are difficult to answer based on information alone. This is typical for decisions about technology.<sup>8</sup> In the cases of robots and AI emotions linked to representations of robots in popular culture form a specific view of robot and AI technology, which hinders people from analysing them on a technological level, although decisions are needed.

Human observers often attributed emotions to anthropomorphic robots; these are a kind of technical mirror of human beings. For example, Thomas Christaller and his colleagues argue in a book on robotics: "In robotics, humans seem to meet themselves".<sup>9</sup> Following Matsuzaki Hironori, differences between not-human entities (in this case robots) and humans need to be negotiated continuously by society.<sup>10</sup> Robots seem to touch self-concepts and self-consciousness of humans. Thus, the whole spectrum of emotions can be seen in robots: positive and negative feelings can be observed, horror as well as fascination. Aiming to predict emotion-based acceptance of robot technologies, the concept of the so-called "uncanny valley" was developed by Masahiro Mori already in 1970.<sup>11</sup> Following Mori, humans tend to accept robots and to regard them as nice and cosy, if they are shaped like humans, but it is easy to see that they are machines. If robots are designed to look similar to humans—a difficult feat to get exactly right—acceptance and openness will be replaced by feelings of weirdness or even horror. This results from perceiving these robots as humans that behave in a quite unusual manner. His concept is still being discussed,<sup>12</sup> although many robots have since appeared, which look quite similar to humans.

The approach of this article is indirect, since it does not analyse the emotions of people reacting directly to robots. Instead, it is dedicated to representations of robots in literature. Authors created interactions of humans and robots and described the emotions of their characters. Although they might not have contributed to the uncanny valley concept directly, authors' robot-representations were based on

6 Frevert, "Was haben Gefühle in der Geschichte zu suchen?," 191.

7 Schnabel and Schützeichel, *Emotionen, Sozialstruktur und Moderne*.

8 On emotions concerning technology see: Heßler, *Technikemotionen*.

9 Christaller, *Robotik*, 111 (translation by the author).

10 Hironori, "Gehorsamer Diener oder gleichberechtigter Partner?," 378.

11 Mori, "The Uncanny Valley," 33–35.

12 See for example: Chr. Bartneck, T. Kanda, H. Ishiguro, and N. Hagita, "Is the Uncanny Valley an Uncanny Cliff?" *Paper of the 16th IEEE International Conference on Robot & Human Interactive Communication, August 26 - 29, 2007 / Jeju, Korea*, DOI: 10.1109/ROMAN.2007.4415111.

contemporary discussion, as well as on the image of robots in literature and in other kinds of art. These representations dealt with robot activities and linked them to a large range of emotions. Especially in stories and movies, it is helpful to include emotions of the acting characters: emotions enrich the art's content, make the actor's decisions clear, and thus contribute to the plot. In the following example, a youth book from 1960s, the main characters are two anthropomorphic robots, described as quite similar to humans. This article will analyse the emotions of persons interacting with these robots as well as the emotions of the robots. Such an approach also gives a historical perspective, since the reasons for and intensity of emotions changed during history.

### Robots in Literature: Bruckner's 1960s youth book

The Austrian author Karl Bruckner (1906 – 1982), known for his books for adolescents, published a book on robots in 1963: *Nur zwei Roboter?* (title *The Hour of Robots* in English).<sup>13</sup> It was widely distributed and translated into several languages. Although there is no direct evidence of how much Bruckner's young readers appreciated the book, the large number of translations and editions gives a hint that it was quite successful. At the peak of the Cold War, Bruckner used the figure of the intelligent robot to show readers how restricted they were in their emotion-based behaviour towards “the enemy.”<sup>14</sup> The cover of the book shows a nice, friendly couple, facing the readers—that's the impression of the two depicted robots (2<sup>nd</sup> German edition, 1975). Only the two figures' eyes—which look a bit like camera-refractors—signal that they are not human. The positive feeling for the robots generated by the cover continues in general throughout the story.

*The Hour of Robots* narrates, how the United States and Soviet Union created robots to demonstrate their scientific performance and superiority. They wanted to

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13 Bruckner's book about robots was published in German by different publishers, first by Austrian Jugend und Volk, Wien, in 1963 – quotations are based on the edition from Jugend und Volk, Wien, published in 1975. Translations of the book were made into English (London, 1964), French (Paris, 1967), Italian (Brescia, 1965) and Portuguese (Mem Martins, 1974). Bruckner's best-known book is *Saldako will leben!* (1961) about a young girl in Hiroshima, who suffers from radiation sickness. Bruckner published 28 books and received several awards. A list of Bruckner's oeuvre and scholarly contributions concerning the author is given by Mazakarini, “Serielle Phänomene,” 117–61.

14 A summary focusing on Bruckner's reflection of the Cold War can be found in Doris Neumann-Rieser, “Karl Bruckner: Nur zwei Roboter. Wien: Verlag f. Jugend und Volk 1963.” [kk-diskurse.univie.ac.at](https://kk-diskurse.univie.ac.at/), accessed February 2022, [https://kk-diskurse.univie.ac.at/fileadmin/user\\_upload/k\\_kk\\_diskurse/Textportraits\\_pdf/Bruckner\\_Nur\\_zwei\\_Roboter.pdf](https://kk-diskurse.univie.ac.at/fileadmin/user_upload/k_kk_diskurse/Textportraits_pdf/Bruckner_Nur_zwei_Roboter.pdf). On the perception of the Cold War in Austrian literature: Maurer, et al., *Diskurse des Kalten Krieges*.

exhibit them at the next World's Fair. The book covers the (fictional) development of two robots in secret scientific laboratories on both sides of the Iron Curtain. It describes testing, the period of machine learning, and the robot's presentation at a World's Fair. The story's last chapter focuses on the future of the two robots after the Fair. After diplomatic struggles, the United States and Soviet Union construct a rocket together—named “PAX” (Peace)—that enables the robots to leave Earth together. Before they enter the rocket, both robots are hugged and kissed by the engineers that developed them. Bruckner created this scene after the so-called Sputnik-Shock, part of the competition to be the first nation to land on the moon. *The Hour of Robots* ends with the prediction that the scientists, who were working on atomic bombs, would change their aims and contribute to the peaceful use of atomic energy.<sup>15</sup> In choosing this to end his story, the author highlighted his pleading for peace, which is central in Bruckner's oeuvre. With it, he referred to the idea of ‘Atoms for Peace’—popular at the time—which connoted as contribution to ‘progress’ in the Western world long before the risks of atomic energy reactors and nuclear waste were widely discussed in public.

Bruckner's robots are shaped and programmed as adults. With this decision about his characters, the author describes typical robots that were built for exhibition—such robots had been constructed since the 1920s.<sup>16</sup> These robots, shaped as men and (a few) women in iron, could move and sometimes speak. They attracted and fascinated visitors of exhibitions or fairs. This was in keeping with the tradition of anthropomorphic automata: their concept was transferred to technical modernity. Such robots were still being built in the 1960s. Bruckner might have known of the robots developed by Christian Scholz-Nauendorff, a Viennese cyberneticist. He created robots between 1958 and 1964, which were presented as housekeepers; his aim was to develop thinking machines. Scholz-Nauendorff created a couple of robots that performed activities like vacuum cleaning, making fires, and pouring wine. They became the subject of several articles in magazines and newspapers, and were presented on television.<sup>17</sup>

Bruckner's story shows a typical estimation of emotions and intelligence of the Mid twentieth century: following this concept, clear thinking is hindered by

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15 Bruckner, *Nur zwei Roboter*, 205.

16 Nocks, *Robot*, 56–9.

17 Stadelmann, “Künstliche Intelligenz – ein Missverständnis,” 63–4f. Two robots, the Kybernetische Maschine MM7 “Selektor” (1961) and a previous version, MM6, are preserved in the Technical Museum Vienna, today. Sources can be web studies: “Christian Scholz-Nauendorff,” cyberneticzoo.com, a history of cybernetic animals and early robots, accessed 4 October, 2021, <http://cyberneticzoo.com/tag/claustrian-scholz-nauendorff/>. A movie on two of Scholz-Nauendorff's robots, dating back to 1964, is integrated.

emotions.<sup>18</sup> Due to lacking emotions, the author's robots are able to come up with better solutions for mankind than humans themselves.<sup>19</sup> Bruckner's two robots were shaped as a man and a woman, both styled and trained to represent their countries (the United States and Soviet Union). Although they had gender-specific 1960s-roles, the robots were—because of espionage—technically similar. Bruckner must have followed contemporary discussions of robots and automatization. Most likely, he knew the work of authors Robert Jungk, Fred Polak or Friedrich Pollock:<sup>20</sup> due to the strong influence of emotions on human behaviour, Bruckner's scientists in both countries decided to construct their robots so that they are able to think, but can't express feelings.<sup>21</sup> However, some of the dialogues suggest that both robots have emotions, but they are not as strong as those of their human partners.<sup>22</sup>

There are three classes of emotions in Bruckner's book that are of interest in the following analysis: (1) human emotions, linked to the Cold War (these are important for Bruckner's story and influence the perception of the two robots); (2) robot emotions; (3) human emotions towards the robots.

## Human Emotions

The main characters of Bruckner's story, the robots Natascha and William, were constructed as a result of the political antagonism of the two superpowers, which was fuelled by generating strong emotions against "the enemy."<sup>23</sup> Due to this antagonism, the robots were programmed to win over visitors to the World's Fair by generating positive emotions for technology; the robots represented modernity in human shape. Both robots were able to speak several languages, to sing, to play instruments and to dance—in short, they were trained in key cultural activities, some of them linked to pleasant feelings of play and happiness.<sup>24</sup> Soothsaying was discussed by the designing engineers as an unusual cultural extra of the robot Natascha. The robot's "abilities" worked well for entertaining and provoking curiosity as well as admiration. In Bruckner's story, the robots are more intelligent than

18 This concept became outdated, when research on emotional intelligence gained influence in the 1990s: see Mayer, Salovey "Emotional Intelligence."

19 Polak, *De nieuwe wereld der automatie*, 144-6. See also: Mazakarini, *Serielle Phänomene*, 52-3, 133-4.

20 On these authors see Dick van Lente, "Robots and Healthcare."

21 See for example: Bruckner, *Nur zwei Roboter*, 31.

22 An example: when William proposed flying to the moon together, the "glitter in Natascha's eyes increased. They shone like diamonds." Bruckner, *Nur zwei Roboter*, 186.

23 Georg Orwell dedicated his novel *1984* to the societal function of the concept of an enemy.

24 Braun and Poser, "Playing with Technology."

humans, but have no direct access to emotion-driven, deep anchored concepts like “the enemy,” and thus are able to continue thinking in logical categories, while the thinking of humans on both sides of the Iron Curtain is strongly influenced by emotion. For example, in a meeting of the Russian construction group after information via espionage stopped, the Russian engineers stated: “we have to consider, that the Americans will equip their robot ‘William’ with skills that ‘Natascha’ will not have. If we are not able to outcompete our American competitors, visitors of the World’s Fair will laugh at us and our ‘Natascha’.”<sup>25</sup> Further developments were lauded in terms of defeating “the enemy”: “Marvelous, marvelous ... with that we have defeated the Americans.”<sup>26</sup> Strong emotions caused a reaction not only in the brain, but also in the body of an engineer: he was “trembling due to impatience,”<sup>27</sup> In contrast, one of the robots mentioned only mental satisfaction: “if these persons have constructed another robot, I would like to meet him. It must be interesting to have a conversation.”<sup>28</sup> In presenting humans and robots so differently, Bruckner’s book underlines how much influence emotions have on the thinking of humans, how their judgements and actions are influenced by emotions. Bruckner’s description was published at least twenty years before scholars began to argue for the importance of emotions in human life and study the influence of feelings on thinking.

## Robot Emotions

Although Bruckner’s robots are programmed so that they can’t express emotions, they seem to have feelings. In some situations, they understand that emotions are missing from their repertoire of expressions and articulate this in conversation. During the course of the story, the robots learned how to gauge if human emotion would be adequate in certain situations. For example, they pledged to remain friends through their thinking, in words, and via their actions.<sup>29</sup> Sometimes they seem to be concerned about humans. A robot “shuddered as if in disgust”, when his creators began arguing about programming errors that they made.<sup>30</sup> After experiencing humans and their emotion-driven actions, their fixed concepts of roles in society, and especially their tendency to react angrily to each other, both robots seem to have become disappointed. The robots are uninterested in continuing communication with the human species. A comparable turn is found in Stanislaw Lem’s philo-

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25 Bruckner, *Nur zwei Roboter*, 70.

26 Bruckner, *Nur zwei Roboter*, 71.

27 Bruckner, *Nur zwei Roboter*, 71.

28 Bruckner, *Nur zwei Roboter*, 92.

29 Bruckner, *Nur zwei Roboter*, 184.

30 Bruckner, *Nur zwei Roboter*, 88.

sophical science fiction story “Golem XIV” about a highly intelligent computer, published about a decade later. Lem’s machine decides to stop electronic activity after teaching scientists for some time.<sup>31</sup> Both authors use the science-fiction linked image of highly intelligent machines to show limitations of mankind; in case of Bruckner this is clearly linked to the emotionally-charged antagonism of Eastern and Western societies. A key threat of Bruckner’s story is that both robots become curious about each other, which is not appreciated by their designers. The robots’ repertoire of adumbrated emotions, illustrated by their pledge of friendship, gives reason to interpret Bruckner’s plot as love story between robots.

### Emotions of Humans Towards Robots

Beside designing different roles for humans and robots, Bruckner highlights how the engineers address their robots as if they were humans. Thus, at one point, William is addressed: “You barefaced man—I mean robot.”<sup>32</sup> The Russian engineer in chief, Schachajew, has feelings of a father towards “his” robot: when William proposes flying to the moon together with Natascha and she agrees, Schachajew is tremendously shocked, since the moon was still *terra incognita*. “Like a father,” who wants to protect his child against a predator, “he held her in his arms and yelled at William.”<sup>33</sup> Human feelings for robots, like confusing humans and robots, are well-established tropes of science fiction, and work well for entertaining. In the case of exhibitions, such feelings are prompted by robots carrying out typical contemporary leisure activities, like talking, drinking wine, or smoking. The robots employed for these purposes, however, were often were technical fakes: their actions were not autonomous, but governed by remote control and they talked with the help of a person in another room and a loudspeaker. Such exhibitions still took place in the 1980s.<sup>34</sup> Because of the relatively meagre technical skills of autonomous robots in the 1920s to the 1980s, fake robots offered a chance to impress visitors more deeply than real, autonomous acting ones could.<sup>35</sup> Although they only played the role of robots, such fakes shaped human reactions to robots, just like popular media and literature did.

31 Some parts of the book were published already in 1973, others in 1981. Reprint: Lem, *Biblioteka XXI wieku*.

32 Bruckner, *Nur zwei Roboter*, 89.

33 Bruckner, *Nur zwei Roboter*, 186–7, translated and paraphrased by the author as are the following quotations of Bruckner’s book.

34 Arno Bammé, et al. give an example of a “robot” at Hannover’s industrial fair, which had the task of beginning a conversation with the visitors. In fact, answers were given by staff members. (Bammé et al., *Maschinen-Menschen, Mensch-Maschinen*, 48.)

35 The same observation can be made in case of automata theatres in the eighteenth and nineteenth century. (Poser, “Schausteller, Automatenfiguren und Technikverständnis,” 233.)



In fact, science fiction stories, like Bruckner's book, and robots for entertainment prepared society for a development in the 1990s, when humans began to develop close relations to electronic items as the Tamagotchi, the robot dog Aibo or to computer-equipped babies, so-called rebornes, and sex-dolls. As historian Sherry Turkle has argued, the 90s brought a new quality of emotion-based relations to artificial items, which she described as "robotic moment."<sup>36</sup> For Bruckner's story, the above quoted passages on confusing artificial life and real life contributed to the image of robots as more-perfect humans, which is directly expressed in the following sequences.

Bruckner's robots are able to generate strong emotions in humans, based on a lack of background knowledge as well as due to their logical thinking. Especially their arguments for meeting each other and for collaboration between humans on both sides of the Iron Curtain demonstrated to their "parents" how much they were emotional tools of their time. When William remarked that it would be interesting to meet his Russian counterpart, knowing that it was a competitive model, an engineer lost his temper: "Switch him off . . . I can't bear that! He is driving me crazy! Switch him off! I am beginning to see myself as a robot and William [the American robot] as a man!"<sup>37</sup> Bruckner created a similar situation with the Russian engineer, who designed Natascha. He wrote, Natascha "was designed in Pawel Schachajew's brain. But now, this robot reproached him for his mistakes, demonstrated to him, what he lacked, and was able to think more humanly than he, his creator . . . the real robot was he himself, not Natascha."<sup>38</sup> In the context of the story, the exchange of roles makes clear, how crazy the antagonism between the superpowers was. In general, it suggests that humans' worldviews and their paths of thinking are linked to emotions and thus need to be questioned from time to time. This can be done by interacting with robots—but, of course, also through interacting with humans.

Apart from describing his robots' tendency to generate positive emotions, Bruckner included some paragraphs in *The Hour of Robots* that describe irritation towards, and even fear of, the robots. Addressing the Golem mythos and the novel of Frankenstein without mentioning them, the author creates an emotional discussion among the leading American engineers about the question of how near their development of robots was to acting as a creator and whether this hubris was acceptable.<sup>39</sup> Bruckner describes the fear or worry of the unknown, when he has an engineer of the American construction team declare: "Perhaps I shouldn't have added this one cell to the mechanism for automatic thinking, through which

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36 Turkle, *Alone Together*. See as well: Heßler, *Technikemotionen*, 22–3; Stadelmann, "Neues vom Schöpfungsakt," 88ff.

37 Bruckner, *Nur zwei Roboter*, 92.

38 Bruckner, *Nur zwei Roboter*, 162.

39 Bruckner, *Nur zwei Roboter*, 68f.

William is enabled to know what we do not even suspect.”<sup>40</sup> The engineer’s posture and moves expressed worriedness. This passage seems to evoke the idea that human creation of artificial life is hubris—an idea dating back to the Golem mythos. But evidence of fear is given only in a few examples in *The Hour of Robots*. The enormous intellectual capacities that Bruckner’s robots have generate a mixture of admiration and indignation among the engineers developing them. In general, Bruckner contributes to a typical 1960s-estimation of technological development as progress. By presenting his robots as bringing human actors to a large range of emotions and giving his robots the role of fully adequate partners of communication, Bruckner contributed to the path to the late twentieth century “robotic moment.”

Representations of robots in popular magazines of the 1950s and 1960s differ a bit from the picture of robots drawn by Bruckner: their focus is especially on physical power, which is more important in these drawings than mental capability.<sup>41</sup> Beside friendly robots, covers of the 1950s and 1960s often portrayed unusual, partly unsettling robots. They showed robots working in deserts, sometimes beside skeletons, to make clear that humans would not be able to bear environments that machines can, robbing women in the role of King-Kong, or devastating their surroundings. The magazine’s designers played with the element of fear,<sup>42</sup> which is less central in *The Hour of Robots*. Sometimes designers played with the difference between living and not living of robots, showing realistically drawn persons with machines under their skin. Another group of cover images show robots, “behaving” like humans: they are drinking and eating, expressing basic emotions, dreaming, or reading books. A later magazine cover, like one from 1979, displays a robot in the pose of Auguste Rodin’s sculpture “The Thinker.”<sup>43</sup> These illustrations have an element of joking, of social criticism. Beside generating fear or horror, these covers also express the similarities between robots and humans, contributing to a feeling that they deserve confidence. In fact, such popular presentations generated various emotions and anchored robots in public consciousness.

Similar conclusions can be drawn concerning toy robots, which belonged to the realm of experiences of Bruckner’s readers. There was a fashion for toy robots in the 1960s and 1970s, most of them developed in Japan.<sup>44</sup> They represented modern

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40 Bruckner, *Nur zwei Roboter*, 65.

41 An illustrated overview is available in: Grohnert, *I was a Robot*.

42 Artemis Yagou, “Toy Robots: Playing with Humanity’s Fears,” Lecture at the 46th Symposium of ICOHTEC, the International Committee for the History of Technology, in Katowice, Poland, in July 2019.

43 This cover is dating back to 1997, a comparable one was designed 1979. (Grohnert, *I was a Robot*, 42, 126.

44 Japanese producers started quite early to popularize robots by toymaking. (Nocks, *Robot*, 163f.)

technology by shining or flashing lightbulb of different colours and by drawings of measuring instruments or TV-screens on their bodies. The robots' names were often linked to the contemporary modern prefix "atomic." Some of them smiled friendly, others might have generated some fear mixed with admiration. Both, toys and illustrations in magazines, displayed various emotions of robots and towards robots. They shaped the feeling that robots are in some way close to humans. When Bruckner decided to use two robots as the main characters of his book, he was able to draw on a pre-existing tradition of representations of anthropomorphic robots, most of them adults. Although his aim was focused on criticism of the Cold War, his novel contributed to embedding the concept of robots in culture. This concept became so dominant that human abilities and emotions were linked to industrial robots, when they were described in popular magazines of the 1980s.

### Recent Research on the Acceptance of Robots

The dominant perception of robots as similar to humans, to which Bruckner contributed, can still be seen today. Robot toys and children's pictures of robots give evidence as well as providing merchandise for adults. They thus contribute to keeping this perception alive. How has the popular image of robots influenced recent developments in robotics? Whereas Bruckner's robots were sympathetic "adults", many robots which are developed for interaction with humans, or to do research about interaction between the two, are designed in the specific shape of "children." Their size presents them as children, their faces—even when simplified—show big eyes and a mouth, giving them yet more childlike characteristics.

The hitchhiking robot *Hitchbot*, developed by McMaster University, Hamilton, and Ryerson University, Toronto (2014), was meant to gauge the importance of emotional responses in robot design. *Hitchbot* was designed to evaluate how people react to robots.<sup>45</sup> In order to turn the normal assumption that robots are designed to carry out tasks for humans (and to replace them) upside down, *Hitchbot* couldn't move and needed personal care. His special qualification was his programming for talking and conversation, which enabled him to express his "wishes" and to narrate his story as hitchhiking robot. He was programmed to express a few basic emotions by different figures of LED-lamps, which imitated his mouth and his eyes, using the emotion-code of Smileys. *Hitchbot* has become an important personality in social media, although it especially attracted infants,<sup>46</sup> since their reaction to faces and face-like representations is particularly strong.

45 Smith and Zeller, "hitchBOT," 63–65.

46 G. v. Schoenebeck, "Per Anhalter durch Deutschland," *VDI Nachrichten*, 20 February 2015. <https://www.vdi-nachrichten.com/Technik-Gesellschaft/Per-Anhalter-Deutschland>.

Another example of the emotional turn in robot design is the robot's head *Flobi* from CITEC, Bielefeld University, which was designed to express emotions while talking.<sup>47</sup> Important characteristics of this robot were the face, equipped with big eyes (contributing a childlike character). Whereas other parts of the face like the eyebrows were designed to be exchangeable for testing, the big eyes were fixed. The *Flobi* research project was designed to evaluate which shapes and expressions of robots are accepted by humans, in other words which design generates a maximum of positive emotions in the humans they interact with.

Both contemporary research projects are designed to analyse emotion-based reactions to robots. Both aimed to win human support for intelligent technology. Whereas the design of the *Hitchbot*-project was more playful and open, the *Flobi*-project belonged to applied sciences. The *Flobi*-project aimed to at developing patterns of design for interactive robots in the service industries. Choosing an anthropomorphic shape for their robots, both research projects were linked to public understanding of robots. They were influenced by popular media and based on deep emotions which humans tend to develop towards anthropomorphic items.<sup>48</sup> Employing a scheme of childlike characteristics generates deeper, more friendly emotions, since they address additional strong euphoric feelings towards young life.

An advertisement for a recent AI project at Helsinki University underlines how well-established the perception of robots and human beings near to each other is today: an online course on AI is advertised with the sentence “Dein neuer bester Kumpel / Your new best mate”. Although the aims of the course are different, the advertisement suggests that the course will teach humans how to understand artificial intelligence. *Hitchbot* and *Flobi* were created to study human reactions to robots and AI and to improve technology. In contrast, this project—according to the advertisement—aims to do the opposite: to improve human's knowledge of and behaviour towards robots and AI.<sup>49</sup> Positive emotions towards robots and AI are employed and perhaps deepened by advertising a technology as students’ “best mate.” An anthropomorphic figurine in the centre of the advertisement supports its wording: it is shaped similarly to a friendly smiley. Since robots and AI have a long

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47 Ingo Lütkebohle, I., F. Hegel, S. Schulz, M. Hackett, B. Wrede, S. Wachsmuth, and G. Sagerer, “The Bielefeld Anthropomorphic Robot Head ‘Flobi,’” 2010 *IEEE International Conference on Robotics and Automation*, 2010: 3384–3391. DOI: 10.1109/ROBOT.2010.5509173.

48 Puppets for children or automata profit from that effect too.

49 Advertisement on the rear cover of: *DB mobil. Das Magazin der Deutschen Bahn*, November 2021. The project behind the advertisement was not designed in such technology-positivistic way: the aim was to improve knowledge of robots and AI. Also: J. Delcker “Finland’s grand AI experiment. Inside Finland’s plan to train its population in artificial intelligence.” *Politico* 2 January 2019, <https://www.politico.eu/article/finland-one-percent-ai-artificial-intelligence-courses-learning-training/>.

tradition of being part of popular culture, their perception is shaped by popular images that present robots as similar to human beings. Thus, it was obvious to advertise for robots in the tradition of automata as “exactly like a human being” in the 1930s,<sup>50</sup> whereas an AI can be advertised as one’s best mate, today. Popular descriptions of anthropomorphic robots and especially the emotions generated by robot stories played an important role in the formation of the popular image of robots, since emotions are normally linked to beings and give us access to other beings, especially to humans.

If a technological artifact is the reason for human emotions, it often becomes personalized by giving it Christian names or describing it by attributes of living beings.<sup>51</sup> The Tamagotchi hype of the mid 1990s demonstrates that even interactive technical items of non-anthropomorphic shape can be accepted as living beings and generate strong feelings. These small egg-shaped items with small LCD-screens were programmed as a kind of electronic pet, crying for care. As the official care guide reminds users, “just like you, your Tamagotchi needs some very special care to grow up into something you can be proud of. . . . One thing to remember, more than anything else, is to pay close, close attention to your Tamagotchi.”<sup>52</sup>

Whereas Tamagotchis attract their owners by addressing deep-seated feelings of care, responsibility and (perhaps) love, robots in soccer appeal as part of a highly popular and emotionally charged game. Concerning programming, making robot that can play soccer is more demanding, since soccer players need to react extremely fast in the right way. The concept of robots in soccer requires developing software for imitating moves. Especially robots from the anthropomorphic leagues seem to attract attention.<sup>53</sup> Researchers of human robot interactions (HRI)<sup>54</sup> already argued in the 2000s that humans should be taught to recognize robots as social actors and to build up social relationships with them.<sup>55</sup> Following this concept, it makes sense for developers to integrate the ability to read and to express emotions in the programs of interactive robots so that they can better interact with humans. Such programs capture us in some way with the help of technology-generated emotions.

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50 Advertisement for a Japanese robot theatre, 1930s. (Robertson, “Robot Theatre (robboto engeki),” 93.)

51 An example are cars, kissed by their owners: Geuenich, “. . . gibt es auch mal ein Küsschen auf das Lenkrad.”

52 Tamagotchi: The Official Care Guide and Record Book, 1997, quoted from Allison, *Millennial Monsters*, 163. See Poser, “Technikemotionen im Spiel,” 262–63.

53 Braun, “Darmstadt Dribbeling Dackels’ and ‘Ruhropt Hellhounds,’ 102–106.

54 An introduction to research on human robot interactions and more examples of research projects: Weiss, “Wenn Menschen und Roboter in Interaktion treten,” 31–56.

55 Authors argue for empirical evidence: Duffy, “Anthropomorphism and the social robot,” 177–90; Severson and Carlson, “Behaving as or behaving as if?” 1099–103.

As a result, people will tend to accept robots in service and—even more critical regarding ethics—as companions and assistants for the elderly. Thus, developers of AI-based robots for service industries are wedded to this path to make their products more attractive and trigger human's acceptance of robots. Especially when engineers follow choose to design robots and AI with childlike characteristics, they play with deep human feelings to sympathize with and help young beings that can't survive without care.

Yet feeling that robots are similar to humans only opens a superficial, misleading level of trust in technology: in fact, even programmers often don't know how robots and AI make decisions.<sup>56</sup> As a result, humans might develop and use a technology to which they feel a (close) relationship, but which they don't really understand. Since humans' emotions are bound to the surface of robots, we tend not to develop feelings for the technology itself, which would be helpful to trigger discussions of the positive and negative effects of robotics and AI.

## Conclusion: Emotions and Robots

This article is a contribution to the analysis of the wide range of emotions that humans have towards robots. Focusing on the example of a youth book from the 1960s, which featured two robots as its main characters, the article argued that representation of anthropomorphic robots in popular culture has deeply shaped our concepts of and emotions towards robots and AI. Examples of recent research projects on the acceptance of robots make clear that we might be in danger of being blinded because we view robots as similar to humans. As the examples of Tamagotchis and robots in soccer demonstrated, emotions are implicated in clouding our judgement as well, if technical items are designed so that we recognise them as similar to living beings. People tend to neglect discussing important outcomes and side-effects of AI, which do not follow the humanoid schemes of robots, because they fall outside of humans' emotional focus. Two examples: (1) Application of AI is already very important to economy, in trading stocks for example. Side-effects influence stock market, but new conditions are more discussed in scientific community than in the public; the focus seems to be on technical questions.<sup>57</sup> (2) Another example is the employment of AI for personnel man-

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56 Impressing examples gives the media artist Mario Klingemann in his exhibition *X Degrees of Separation*, which was “curated” by AI and launched in 2018. (*X Degrees of Separation*, accessed 1 November 2021, [https://artsexperiments.withgoogle.com/xddegrees/8gHu5Z5RF4BsNg/BgHD\\_Fxb-V\\_K3A](https://artsexperiments.withgoogle.com/xddegrees/8gHu5Z5RF4BsNg/BgHD_Fxb-V_K3A)).

57 An overview: Ferreira, Gandomi, and Cardoso, “Artificial Intelligence Applied to Stock Market Trading,” 30898–917.

agement by large companies: these tools are allowed to decide about single persons and their futures—instead of humans.<sup>58</sup> Because of the increasing importance of this technology, it is quite important to think about the role robots and AI should have in the future. We need to determine the extent to which we desire having artificial beings near to us. (This question refers to human emotions.) We also need to decide which decisions we are ready to hand over to machines. (This addresses a rational and an emotional level.) Although these questions may be answered differently in different societies and generations, we need to approach these questions clearly on both an emotional and an intellectual level.

## Biography and Acknowledgements

Stefan Poser, PD Dr, is a historian of technology at Karlsruhe Institute of Technology, KIT (Germany), President of ICOHTEC, and Vice-Chair of the History Group of the Associations of German Engineers, VDI, in Berlin-Brandenburg. The author gratefully acknowledges Hans-Joachim Braun, Hermione Giffard, Dick van Lente, Christian Stadelmann, and the unknown reviewers of this article.

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<sup>58</sup> C. Burger, “Skepsis gegenüber Einsatz von KI im Bewerbungsprozess.” *VDI Nachrichten* 13 August 2021, <https://www.vdi-nachrichten.com/karriere/recruiting/skepsis-gegenueber-einsatz-von-ki-im-bewerbungsprozess/>.

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