Information Systems Frontiers (2024) 26:1–8
https://doi.org/10.1007/s10796-023-10413-6

Social Robotics Business and Computing

Editorial for Special Issue of Information Systems Frontiers

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Published online: 17 July 2023

1 Introduction

Our society is moving towards a world with social robots, where humanoid and anthropomorphic machines can use their artificial intelligence capabilities to engage in complex social interactions and provide valuable services to humans. Unlike traditional robots, social robots are robotic technologies designed to focus on assisting humans through social interactions, rather than just physical tasks (Feil-Seifer and Matarić, 2005). Designed to provide support and assistance, social robots can meet the specific needs of individuals in their social environments and interaction contexts. Social robots may serve myriad applications, leading to a variety of specific names such as companion robots, service robots, education robots, and therapeutic robots, and so on, each tailored to specific purposes and contexts of use. Following the examples of de Araujo et al. (2022), social robots can be employed, e.g., as service robots to support communication for isolated patients in hospitals (Arce et al., 2022), as companion robots for vulnerable people as lonely older adults (Lewis, 2014), as therapeutic robots for children with autism spectrum disorder (Cabibihan et al., 2013), and as educational robots for special teaching-learning approaches (Kim et al., 2015).

Social robots are innovative autonomous systems that feature a physical robot component, typically designed with a humanoid or anthropomorphic form (Sandini, 2019). They are connected to online services through a network infrastructure, which allows them to go beyond traditional robotic functionality (de Araujo et al., 2022). Equipped with devices such as cameras, microphones, and sensors, they can capture a user's physical activity state (e.g., walking, standing, running, etc.), store personalized information (e.g., face, voice, location, activity pattern, etc.), and interact with humans through communication and service delivery (Wirtz et al., 2018). Empowered with characteristics such as speech, gestures, and eye-gaze, which can be customized to a particular user or social context, social robots can behave like natural partners engaging humans in social interactions (Robert, et al., 2020). Thus, social robots use body language that corresponds to the information being expressed verbally, simulating human behavior and attitude. They can be programmed to interact with humans by performing tasks that adhere to specific social cues and rules. Examples of social robots are SoftBank Robotics' Pepper, Romeo and NAO, ASUS's Zenbo, Misty Robotics' Misty II, Blue Frog Robotics' Buddy, Human Robotics' Robios, and Ubtech Robotics' Lynx.

Social robots often come equipped with Artificial Intelligence (AI) capabilities that enable features such as human facial, voice, and emotion recognition, providing for more immersive and interactive experiences (Sandini, et al., 2018; Wu, 2015; Chen, 2021). Along with AI, these robots rely on network data transmission protocols and cloud data storage to function optimally. They also often feature human-like personalities and characteristics to enhance human-machine communication (Wykowska et al., 2015; Sorrentino et al., 2021). The range of activities that social robots can perform

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depends on both the functionalities developed specifically for them and on the creativity embedded in their human-robot interaction design. Providing a fully functional social robot often requires the use of disruptive technologies, spanning both hardware and software aspects. While these disruptive technologies can bring significant benefits to society, they can also raise concerns related to privacy and confidentiality, discrimination and prejudice, freedom of expression and choice, among other issues (Denning et al., 2009; Lutz et al., 2019; Howard et al., 2018).

Unfortunately, advances in social robotics have far outpaced our understanding of the social implications of their use (You et al., 2018, 2022). Human-Robot Interaction (HRI) is a research area whose purpose is to address the large and important questions at the heart of designing and evaluating robots for use by or with humans. This special issue aims to address relevant issues of social robotics, from both a business and computing perspective, i.e., treating this area from a socio-technical perspective.

2 The Special Issue

This special issue consists of nine articles to set the baseline for understanding how HRI will influence and change our business practices and lifestyle.

First, Song et al. (2024) presented a decision-making approach containing robotic assistance of power systems operation based on a scenario-based ambiguity set of distributionally robust unit commitment. The approach is also demonstrated by a series of experiments on two IEEE test systems. Ihamäki et al. (2024) studied the benefits of using a commercial robot dog in a research intervention with 10 participants of ages 65-80+ years. The results found out that the robot dog could activate the social and emotional experiences of elderly, and illustrated the role of building a relationship with a robotic pet. Next, Ni et al. (2024) discussed a pipeline solution for the Text2GQL task to serve the medical Human-Robot Interactions (HRI) based on the adapter pre-trained by the linking of Graph Query Language (GQL) schemes and the corresponding utterances as an external knowledge introduction plug-in.

Park et al. (2024) examined the effects of multiple dimensions of service robots' attractiveness on customers' emotions using a text mining approach by collecting 50,629 online reviews on 59 hotels and restaurants using service robots in China. Chen et al. (2024) presented a deep Q learning network (DQN)-based exploration model for robots to navigate the unexplored area in an unknown environment to solve the local minimum problem generated by the robot during the exploration. Chien et al. (2024) conducted an empirical study of trust in Social Humanoid Robots (SHR) communication approaches from different levels of social manner (proactive vs. reactive) and types of expressive behavior (intimate vs. impassive) with 273 participants by two online surveys.

Gittens (2024) explored an exploratory experiment of Remote-HRI (R-HRI) research in a setting where physical separation was the most reliable way of preventing disease transmission. The results demonstrated that R-HRI studies could be an alternative to traditional face-to-face HRI studies. Wang et al. (2024) presented a research model which includes extrinsic and intrinsic determinants that influence Pokémon GO robot users' behavioral intention to patronize hospitality firms and draw visitors with Pokémons. They also conducted a survey with the collection of 261 questionnaires. Finally, Chatterjee et al. (2024) studied users' intention to use robots for household purposes and focused on their perceptions of security, privacy, and legal issues. They also conducted a literature review and related theories to develop the conceptual model.

3 Future Research

In addition to the topics addressed in this special issue, there are many open problems that still need to be tackled, including those highlighted below. Most of these issues are interrelated, so many researchers are dealing with more than one at a time.

The ethical, social, and legal implications of social robots are a multifaceted topic that requires further investigation to address a range of open questions. Bendel (2018) examined the moral implications that arise from the existence of various service robots and emphasize the importance of patient declarations to address conflicts between personal and institutional interests. Esteban et al. (2018) discussed the incorporation of autonomy in social robots for therapy, addressing ethical challenges in working with vulnerable populations. Abate et al. (2020) explored the potential for social robots to be exploited for social engineering purposes, emphasizing the need to address issues related to information gathering and emotion recognition. Allouch and Velsen (2020) focused on social robots in elderly care, discussing the implications of medical device and privacy legislation. Störzinger et al. (2020) suggested a framework for categorizing social robots based on ethical, legal, and social dimensions, encouraging practitioners to consider paradigmatic challenges when designing social robots. Dipaola et al. (2022) raised concerns about advertising to children through social robots, highlighting the design and legal policy considerations involved. Eyssel (2022) explored the social aspects of robots and the psychological factors influencing user perceptions, emphasizing the importance of user attitudes and strategies for promoting technology acceptance. Fracasso et al. (2022) conducted a cross-national study on social robot acceptance

in assisted living, highlighting cultural acceptance, desired functionalities, purchase preferences, and the importance of integrating robots into official databases. Finally, Massa et al. (2022) presented a theoretical framework for understanding the psychological implications of companion robots, with a focus on sexual robotics as a case study, discussing collusive and confirmative dynamics, degradation of relational abilities, and proposing an experimental setup to examine the impact of collusive interactions. Future research in the field should address these open questions and continue to explore the multifaceted ethical, social, and legal implications of social robots.

Trust, user acceptance, and perception of social robots are also important considerations for the future of this technology. de Graaf et al. (2019) presented a model of social robot acceptance, emphasizing the importance of normative beliefs in shaping the anticipated acceptance of social robots for domestic purposes. The study suggests involving future users' opinions in the early stages of social robot development to align designs with user preferences and foster societal acceptance. Naneva et al. (2020) estimated people's attitudes toward, trust in, anxiety associated with, and acceptance of social robots, as well as factors that are associated with these beliefs, and concluded that people generally have positive attitudes towards social robots and are willing to interact with them. Maggi et al. (2021) investigated the impact of social robots' interaction styles on users' cognitive performance, acceptance, and non-compliant behavior, finding that the authoritarian style enhances cognitive performance and influences users' trust and acceptance. Fracasso et al. (2022) explored the market potential of social robots in assisted living for older adults, highlighting the importance of dimensions like perceived enjoyment, sociability, usefulness, trustworthiness, and technology acceptance in shaping attitudes towards social robots. Huang (2022) examined the factors influencing the use of hotel service robots and elderly customers' acceptance, revealing the importance of empathy, perceived value, perceived usefulness, perceived ease of use, and perceived trust in shaping their intention to use robots. Chi et al. (2023) addressed the role of trust in customers' acceptance of AI robots and the influence of culture on robot acceptance. The study reveals that trust significantly influences the intention to use AI robots and that cultural dimensions play moderating roles. Li et al. (2023) investigated customers' acceptance of service robots in different service settings, finding that customers in experience service settings exhibit more positive attitudes and a greater intention to use service robots. The study identifies variations in antecedents and customer perceptions as key factors contributing to differences in robot acceptance across different contexts. These articles highlight the open questions and considerations related to trust, user acceptance, and perception of social robots, encompassing autonomy, privacy, ethical behavior, normative beliefs, interaction styles, market potential, cultural influences, and contextual variations in acceptance. Future research should continue exploring these aspects to shape the development and deployment of social robots effectively.

User experience (UX), design, usability, and creativity for social robots are important areas of research that present several open questions to be addressed in future studies. Baillie, et al. (2019) addressed the challenges of working on social robots that collaborate with people, emphasizing the need for collaboration between the Human-Computer Interaction (HCI) and Human-Robot Interaction (HRI) communities to advance research in socially collaborative robotics. Maggi et al. (2021) investigated the impact of social robots' interaction styles on cognitive performance, acceptance, and non-compliant behavior, highlighting the influence of the robot's interaction style on user compliance. Ali et al. (2022) examined the impact of a social robot's embodiment and creativity scaffolding on children's creative problem-solving abilities, exploring the potential of designing social robots to enhance creative problem-solving skills. Huang (2022) investigated the factors influencing elderly customers' acceptance and use of hotel service robots, providing insights for the development and marketing of service robots in the hospitality industry. Kaur et al. (2022) addressed the need for simulation frameworks to test path planning algorithms for mobile robots in dynamic human environments, emphasizing the importance of developing realistic simulators with flexible robot and sensor models. Li et al. (2023) examined customer acceptance of service robots in different service settings, identifying variations in attitudes and intentions to use service robots and emphasizing the importance of context-specific factors and customer perceptions. Overall, future research in the field of user experience, design, usability, and creativity for social robots should address these articles' main aspects, including autonomy and ethical challenges, collaboration between HCI and HRI communities, user preferences, interaction styles, creative problem-solving, acceptance and use in different contexts, simulation frameworks, economic potential, and organizational implications.

Artificial intelligence (AI) and machine learning for social robots is a rapidly evolving field with several open questions that require further investigation. Righetti and Carradore (2019) analyzed the representation of robots and AI in Italian online news media, tracking the trends and thematic shifts in news coverage and highlighting the cultural significance of robots in society and that more recent topics have been describing functions that reproduce social behavior in robots. Bankins and Formosa (2020) explored the concept of a psychological contract between human employees and social robots, emphasizing the need to understand the implications of this evolving relationship in the workplace, particularly through the advent of sociable AI. Chew (2020) blended

findings from the deployment of service robots with her own contribution to the AI Select Committee's publications at the UK Parliament, leading to the practical recommendation to the government and policymakers for a national policy implication. Banjanović-Mehmedović (2021) presented a comprehensive survey of AI techniques and their impact on service robots, discussing applications in various industries and the integration of AI, soft robotics, and virtual reality. Karabegovic and Banjanovic-Mehmedovic (2021) covered the design and applications of service robots in various fields, including public relations, education, agriculture, and more, including advancements in AI and collaborative service robots. Vouloutsi et al. (2023) discussed the progress and future challenges in tactile sensing, grasping, and social robotics, emphasizing the creation of artificial systems that can robustly interact with the environment. Chi et al. (2023) investigated customers' acceptance of AI robots in hospitality services, emphasizing the role of trust and cultural influences on intentions to use, contributing to HRI frameworks and promoting AI robot applications in diverse cultures. Despite the progress made, several open questions remain in the field of AI and machine learning for social robots, including the development of explainable intelligence, the enactment of reciprocity in human-robot psychological contracts, the influence of culture on robot acceptance, and the design of psychologically plausible agents for social interaction. Future research should address these questions to further advance the field and unlock the full potential of AI and machine learning in social robotics.

Security, privacy, and safety concerns in social robots have become prominent topics of research, with several open questions remaining to be addressed. Dudek and Szynkiewicz (2019) discussed the cyber-security challenges specific to mobile service robots, emphasizing the need to detect and mitigate cybernetic attacks that can impact cyber-physical systems. Lutz et al. (2019) investigated the privacy implications of social robots, identifying the unique challenges they pose to users' informational, physical, psychological, and social privacy. The study suggests studying these challenges from varied theoretical perspectives and highlights the importance of technological privacy solutions. Abate et al. (2020) explored the potential for social robots to be exploited for social engineering purposes, discussing mainly information gathering and emotion recognition techniques, which can have impact on privacy. Allouch and Velsen (2020) explored the implications of medical device and privacy legislation for social robots in elderly care. These articles collectively shed light on the various dimensions of security, privacy, and safety concerns in social robots and provide valuable insights into the open questions that require further research in this field.

The use of social robots for healthcare and elderly care, as well as other types of care, has gained significant attention in recent years. Korchut et al. (2017) identified through surveys the requirements and needs during home tasks in everyday life of older people suffering from Alzheimer disease and early dementia stages with relation to robotic assistants. Examples of priority requirements are related to reacting in emergency situations (calling for help, detecting/removing obstacles) and to reminding about medication intake, about boiling water, turning off the gas and lights. Esteban et al. (2018) focused on incorporating autonomy into therapeutic interventions, highlighting the limitations of the Wizard-of-Oz technique and proposing the exploration of different levels of robot autonomy to enhance diagnostic tasks while addressing ethical challenges. Allouch and Velsen (2020) explored promising use cases and business models for social robots in elderly care, identifying three areas: the robot as a ubiquitous aid, helper in the room, and guide. Cormons et al. (2020) designed a social assistive robot capable of performing a memory evaluation test to help diagnose neurocognitive disorders in the elderly, but some interviews and videos analysis showed their robot is not yet well accepted. Pino et al. (2020) investigated the use of social robots in cognitive stimulation sessions for elders with cognitive impairment and dementia and found that seniors responded positively, actively participating and showing attentiveness, suggesting that social robots can be a valuable tool for supporting therapists in cognitive interventions, highlighting the importance of multidisciplinary approaches that integrate behavioral assessment and robotics. Huang (2022) investigated the factors influencing elderly customers' acceptance and use of hotel service robots, revealing the influence of empathy, perceived value, perceived usefulness, perceived ease of use, and perceived trust. Korn and Zallio (2022) examined the evolving acceptance and economic potential of social robots in healthcare, finding an increase in acceptance for health-related activities but highlighting the lack of necessary functionality in current social robots. Maranesi et al. (2022) examined the acceptance of recent technological solutions in IoT and social robotics for the elderly, considering design and clinical outcomes, revealing various robots designed to offer companionship, support health and lifestyle activities, monitor vital signs, and provide entertainment for older adults. These articles collectively shed light on various aspects related to the use of social robots for healthcare and elderly care, such as autonomy, ethical challenges, privacy implications, interaction styles, market potential, acceptance, user behaviors, and managerial perspectives, providing valuable insights and raising important open questions for future research in this field.

The market potential and characteristics, as well as organizational and managerial perspectives and challenges for social robots, remain crucial areas for future research. Tulli et al. (2019) explored the paradox between successful research outcomes and the failure of social robotics initia-

tives in the industry, aiming to understand why breakthroughs achieved by the research community are not easily transferable into successful stories in the entrepreneurial landscape. Allouch and Velsen (2020) discussed promising use cases and potential business models for social robotics in elderly care, while highlighting the implications of medical device and privacy legislation. García et al. (2020) provided insights into practices, challenges, and solutions in robotics software engineering, focusing on service robots and aiming to enhance the field. Garcia-Haro et al. (2021) addressed the advance of service robots, mainly how these robots are applied in society based on the market application, highlighting a new category of social robotics – catering robotics. Fracasso et al. (2022) explored the market potential of social robots in assisted living for older adults in Italy and Germany, emphasizing cultural acceptance, desired functionalities, and purchase preferences. Gonzalez-Aguirre et al. (2021) shows how the market of service robots is attractive, remarking the need for formal development in the service robots area, including knowledge transfer and literature reviews. Huang (2022) investigated factors influencing elderly customers' acceptance and use of hotel service robots, providing guidance for the development and marketing of these robots. Korn and Zallio (2022) examined the evolving acceptance and economic potential of social robots in healthcare, highlighting that persons are aware of the influence of cultural, spiritual, or religious beliefs, the functionality gaps and experts' perspectives on leasing or renting social health robots. Ramírez, et al. (2022) conducted a survey of 40 commercial robots that reveals a common design pattern: an egg-shaped, white plastic robot with a rendered face displaying emotions and a speech interface, which dominates the market despite lacking documented literature on its preference and showing variation based on target group and culture. Finally, Meyer et al. (2023) investigated the perceptions of retail managers regarding the use of service robots in brick-and-mortar retailing, highlighting the challenges faced in implementing service robots while balancing customer needs and the impact on front-line employees. Future research should address these open questions to further explore the market potential, organizational dynamics, and managerial challenges associated with social robots.

By addressing these open questions, researchers can contribute to the development and deployment of social robots that effectively meet societal needs while ensuring ethical and responsible implementation. The articles published in this special issue aim to advance research and discussions on these and other open questions in the field of social robotics business and computing.

Acknowledgements We sincerely thank the authors who submitted their manuscripts for consideration for this special issue, as well as the guest reviewers who worked to make this special issue possible.

References

Abate, A.F., Bisogni, C., Cascone, L., Castiglione, A., Costabile, G., & Mercuri, I. (2020) Social Robot Interactions for Social Engineering: Opportunities and Open Issues. In: Proceedings of the Proceedings IEEE 18th International Conference on Dependable, Autonomic and Secure Computing, IEEE 18th International Conference on Pervasive Intelligence and Computing, IEEE 6th International Conference on Cloud and Big Data Computing and IEEE 5th Cyber Science and Technology Congress, p. 539–547

Ali, S., Devasia, N.E., & Breazeal, C. (2022) Escape!Bot: Social Robots as Creative Problem-Solving Partners. In: Proceedings of Creativity and Cognition, p. 275–283

Allouch, S. B., & Velsen, L. V. (2020). Social robots for elderly care: An inventory of promising use cases and business models. *Studies in Health Technology and Informatics, 270*, 1046–1050.

Arce, D., Gibaja, S., Urbina, F., Maura, C., Huanca, D., Paredes, R., & et al. (2022) Design and Preliminary Validation of Social Assistive Humanoid Robot with Gesture Expression Features for Mental Health Treatment of Isolated Patients in Hospitals. In: Proceedings of the 14th International Conference on Social Robotics, p.518–528

Baillie, L., Denman, P., Fischer, K., Breazeal, C., Foster, M.E., & Cauchard, J.R. (2019) The challenges of working on social robots that collaborate with people. In: Proceedings of the Conference on Human Factors in Computing Systems

Banjanović-Mehmedović, L. (2021) Artificial intelligence advancement in Service Robots Applications. In: Karabegović I, Banjanović-Mehmedović L, (Eds.) *Proceedings of the Service Robots: Advances in Research and Applications* (p. 55–75). Robotics Research and Technology

Bankins, S., & Formosa, P. (2020). When AI meets PC: exploring the implications of workplace social robots and a human-robot psychological contract. *European Journal of Work and Organizational Psychology, 29*(2), 215–229.

Bendel, O. (2018). Service robots from the perspectives of information and machine ethics. *Frontiers in Artificial Intelligence and Applications, 311*, 12–18.

Cabibihan, J. J., Javed, H., Ang, M., Jr., & Aljunied, S. M. (2013). Why Robots? A Survey on the Roles and Benefits of Social Robots in the Therapy of Children with Autism. *International Journal of Social Robotics, 5*(4), 593–618.

Chatterjee, S., Chaudhuri, R., & Vrontis, D. (2024) Usage intention of social robots for domestic purpose: From security, privacy, and legal perspectives. *Information Systems Frontiers*, *26*(1). https://doi.org/10.1007/s10796-021-10197-7

Chen, L. (2021) Power intelligent customer service robot based on artificial intelligence. In: International Conference on Information Technology and Mechanical Engineering

Chen, S.Y., He, Q.F., & Lai, C.F. (2024) Deep reinforcement learning-based robot exploration for constructing map of unknown environment. *Information Systems Frontiers*, *26*(1). https://doi.org/10.1007/s10796-021-10218-5

Chew, E. (2020) In Love and War with Service Robots: The Passionate Deployment, Challenges and National Policy Implications. In: Proceedings of the 6th International Conference on Robot Intelligence Technology and Applications, p. 361–371

Chi, O,H., Chi, C.G., Gursoy, D., & Nunkoo, R. (2023) Customers' acceptance of artificially intelligent service robots: The influence of trust and culture. *International Journal of Information Management*, *70*

Chien, S.Y., Lin, Y.L., Chang, B.F. (2024) The effects of intimacy and proactivity on trust in human-humanoid robot interaction. *Information Systems Frontiers*, *26*(1). https://doi.org/10.1007/s10796-022-10324-y

Cormons, L., Poulet, C., Pellier, D., Pesty, S., & Fiorino, H. (2020) Testing Social Robot Acceptance: What if You Could Be Assessed for Dementia by a Robot? A Pilot Study. In: Proceedings of the 6th International Conference on Mechatronics and Robotics Engineering, p. 92–98

de Araujo, B. S., Fantinato, M., Peres, S. M., de Melo, R. C., Batistoni, S. S. T., Cachioni, M., & et al. (2022). Effects of social robots on depressive symptoms in older adults: A scoping review. *Library Hi Technology, 40*(5), 1108–1126.

de Graaf, M. M. A., Allouch, S. B., & van Dijk, J. A. G. M. (2019). Why Would I Use This in My Home? A Model of Domestic Social Robot Acceptance. *Human-Computer Interaction, 34*(2), 115–173.

Denning, T., Matuszek, C., Koscher, K., Smith, J.R., & Kohno, T. (2009) A spotlight on security and privacy risks with future household robots: Attacks and lessons. In: Proceedings of the 11th ACM International Conference on Ubiquitous Computing, p.105–114

Dipaola, D., Ostrowski, A. K., Spiegel, R., Darling, K., & Breazeal, C. (2022). Children's Perspectives of Advertising with Social Robots: A Policy Investigation. *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction, 2022*, 570–576.

Dudek, W., & Szynkiewicz, W. (2019). Cyber-security for mobile service robots-Challenges for cyber-physical system safety. *Journal of Telecommunications and Information Technology, 2*, 29–36.

Esteban, P.G., Hernández García, D., Lee, H.R., Chevalier, P., Baxter, P., & Bethel, C. (2018) Social Robots in Therapy: Focusing on Autonomy and Ethical Challenges. In: Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction, p. 391–392

Eyssel, F. (2022) What's Social about Social Robots? A Psychological Perspective. In: Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction. vol. 2022, p. 2

Feil-Seifer, D., & Matarić, M.J. (2005) Defining socially assistive robotics. In: IEEE 9th Int'l Conf. on Rehabilitation Robotics, 465–468

Fracasso, F., Buchweitz, L., Theil, A., Cesta, A., & Korn, O. (2022). Social Robots Acceptance and Marketability in Italy and Germany: A Cross-National Study Focusing on Assisted Living for Older Adults. *International Journal of Social Robotics, 14*(6), 1463–1480.

García, S., Strüber, D., Brugali, D., Berger, T., & Pelliccione, P. (2020) Robotics software engineering: A perspective from the service robotics domain. In: Proceedings of the 28th ACM Joint Meeting European Software Engineering Conference and Symposium on the Foundations of Software Engineering. p. 593–604

Garcia-Haro, J.M., Oña E.D., Hernandez-Vicen, J., Martinez, S., & Balaguer, C. (2021). Service robots in catering applications: A review and future challenges. *Electronics (Switzerland), 10*(1), 1–22.

Gittens, C. (2024) Remote HRI: A methodology for maintaining Covid-19 physical distancing and human interaction requirements in HRI studies. *Information Systems Frontiers*, *26*(1). https://doi.org/10.1007/s10796-021-10162-4

Gonzalez-Aguirre, J.A., Osorio-Oliveros, R., Rodríguez-Hernández, K.L., Lizárraga-Iturralde, J., Menendez, R.M., Ramírez-Mendoza, R.A., & et al. (2021) Service robots: Trends and technology. *Applied Sciences (Switzerland)*, *11*(22)

Howard, A., & Borenstein, J. (2018). The Ugly Truth About Ourselves and Our Robot Creations: The Problem of Bias and Social Inequity. *Science and Engineering Ethics, 24*(5), 1521–1536.

Huang, T. (2022). What Affects the Acceptance and Use of Hotel Service Robots by Elderly Customers? *Sustainability (Switzerland), 14*(23), 16102.

Ihamäki, P.J., & Heljakka, K.I. (2024) Robot pets as "serious toys" – activating social and emotional experiences of elderly people. *Information Systems Frontiers*, *26*(1). https://doi.org/10.1007/s10796-021-10175-z

Karabegovic, I., & Banjanovic-Mehmedovic, L. (2021) *Service Robots: Advances in Research and Applications*. Nova Science Publishers, Inc

Kaur, P., Liu, Z., & Shi, W. (2022) Simulators for Mobile Social Robots: State-of-the-Art and Challenges. In: Proceedings of the Proceedings 5th International Conference on Connected and Autonomous Driving, p. 47–56

Kim, C., Kim, D., Yuan, J., Hill, R. B., Doshi, P., & Thai, C. N. (2015). Robotics to promote elementary education pre-service teachers' STEM engagement, learning, and teaching. *Computers and Education, 91*, 14–31.

Korchut, A., Szklener, S., Abdelnour, C., Tantinya, N., Hernández-Farigola, J., Ribes, J.C., & et al. (2017) Challenges for service robots-requirements of elderly adults with cognitive impairments. *Frontiers in Neurology*, *8*

Korn, O., & Zallio, M. (2022) Perspectives on Social Health Robots: How Experts' Views Improved from 2017 to 2021. In: Proceedings of the 15th International Conference on PErvasive Technologies Related to Assistive Environments. p. 125–128

Lewis, L. (2014). Avatars and Robots as Social Companions in Healthcare: Requirements, Engineering, Adoption and Ethics. *International Journal of Enterprise Information Systems, 10*(2), 451–468.

Li, Y., Wang, C., & Song, B. (2023). Customer acceptance of service robots under different service settings. *Journal of Service Theory and Practice, 33*(1), 46–71.

Lutz, C., Schöttler, M., & Hoffmann, C. P. (2019). The privacy implications of social robots: Scoping review and expert interviews. *Mobile Media and Communication, 7*(3), 412–434.

Maggi, G., Dell'Aquila, E., Cucciniello, I., & Rossi, S. (2021). "Don't Get Distracted!": The Role of Social Robots' Interaction Style on Users' Cognitive Performance, Acceptance, and Non-Compliant Behavior. *International Journal of Social Robotics, 13*(8), 2057–2069.

Maranesi, E., Amabili, G., Cucchieri, G., Bolognini, S., Margaritini, A., & Bevilacqua, R. (2022). Understanding the Acceptance of IoT and Social Assistive Robotics for the Healthcare Sector: A Review of the Current User-Centred Applications for the Older Users. *Studies in Computational Intelligence, 1011*, 331–351.

Massa, N., Bisconti, P., & Nardi, D. (2022) The Psychological Implications of Companion Robots: A Theoretical Framework and an Experimental Setup. *International Journal of Social Robotics*

Meyer, P., Roth, A., & Gutknecht, K. (2023) Service robots in organisational frontlines – A retail managers' perspective. *Journal of Retailing and Consumer Services*, *70*

Naneva, S., Sarda Gou, M., Webb, T. L., & Prescott, T. J. (2020). A Systematic Review of Attitudes, Anxiety, Acceptance, and Trust Towards Social Robots. *International Journal of Social Robotics, 12*(6), 1179–1201.

Ni, P., Okhrati, R., Guan, S., & Chang, V. (2024) Knowledge graph and deep learning-based text-to-GQL model for intelligent medical consultation chatbot. *Information Systems Frontiers*, *26*(1). https://doi.org/10.1007/s10796-022-10295-0

Park, H., Jiang, S., Lee, O.K.D., & Chang, Y. (2024) Exploring the attractiveness of service robots in the hospitality industry: Analysis of online reviews. *Information Systems Frontiers*, *26*(1). https://doi.org/10.1007/s10796-021-10207-8

Pino, O., Palestra, G., De Carolis, B., Carofiglio, V., & Macchiarulo, N. (2020) Social robots in cognitive interventions. Advances, problems and perspectives. In: Proceedings of the Italian Workshop on Artificial Intelligence for an Ageing Society 2020 co-located with 19th International Conference of the Italian Association for Artificial Intelligence. vol. 2804, p. 113–120

Ramírez, V., Deuff, D., Indurkhya, X., & Venture, G. (2022) Design Space Survey on Social Robotics in the Market. *Journal of Intelligent and Robotic Systems: Theory and Applications*, *105*(2)

Righetti, N., & Carradore, M. (2019) From robots to social robots. Trends, representation and Facebook engagement of robot-related news stories published by Italian online news media. *Italian Sociological Review*, *9*(3), 431–454

Robert, L. P., Alahmad, R., Zhang, Q., Kim, S., Esterwood, C., & You, S. (2020). A review of personality in human robot interactions. *Foundations and Trends in Information Systems, 4*(2), 107–210. https://doi.org/10.1561/2900000018

Sandini, G. (2019) Humane robots – From robots with a humanoid body to robots with an anthropomorphic mind. In: Proceedings of the 5th Italian Workshop on Artificial Intelligence and Robotics

Sandini, G., & Sciutti, A. (2018) Humane Robots-from Robots with a Humanoid Body to Robots with an Anthropomorphic Mind. *ACM Transactions on Human-Robot Interaction*, *7*(1)

Song, X., Wang, B., Lin, P.C., Ge, G., Yuan, R., & Watada, J. (2024) Scenario-based distributionally robust unit commitment optimization involving cooperative interaction with robots. *Information Systems Frontiers*, *26*(1). https://doi.org/10.1007/s10796-022-10335-9

Sorrentino, A., Khalid, O., Coviello, L., Cavallo, F., & Fiorini, L. (2021) Modeling human-like robot personalities as a key to foster socially aware navigation. In: Proceedings of the 30th IEEE International Conference on Robot and Human Interactive Communication, p.95–101

Störzinger, T., Carros, F., Wierling, A., Misselhorn, C., & Wieching, R. (2020). Categorizing Social Robots with Respect to Dimensions Relevant to Ethical. *Social and Legal Implications. i-com, 19*(1), 47–57.

Tulli, S., Ambrossio, D.A., Najjar, A., & Rodríguez Lera, F.J. (2019) Great expectations & Aborted business initiatives: The paradox of social robot between research and industry. In: Proceedings of the 31st Benelux Conference on Artificial Intelligence (BNAIC 2019) and the 28th Belgian Dutch Conference on Machine Learning. vol. 2491

Vouloutsi, V., Cominelli, L., Dogar, M., Lepora, N., & Zito, C. (2023) Martinez-Hernandez U. Towards Living Machines: current and future trends of tactile sensing, grasping, and social robotics. *Bioinspiration and Biomimetics*, *18*(2)

Wang, H.Y., Wang, J.H., Zhang, J., & Tai, H.W. (2024) The collaborative interaction with Pokémon GO robot for increasing the intentions of patronizing hospitality. *Information Systems Frontiers*, *26*(1). https://doi.org/10.1007/s10796-021-10200-1

Wirtz, J., Patterson, P. G., Kunz, W. H., Gruber, T., Lu, V. N., Paluch, S., & et al. (2018). Brave new world: Service robots in the frontline. *Journal of Service Management, 29*(5), 907–931.

Wu, W. (2015). Research progress of humanoid robots for mobile operation and artificial intelligence. *Journal of Harbin Institute of Technology, 47*(7), 1–19.

Wykowska, A., Kajopoulos, J., Ramirez-Amaro, K., & Cheng, G. (2015). Autistic traits and sensitivity to human-like features of robot behavior. *Interaction Studies, 16*(2), 219–248.

You, S., & Robert, L.P. (2018) Emotional attachment, performance, and viability in teams collaborating with embodied physical action (EPA) robots. *Journal of the Association for Information Systems*, *19*(5), 377–407. https://doi.org/10.17705/1jais.00496

You, S., & Robert, L. P. (2022). Subgroup formation in human-robot teams: A multi-study mixed method approach with implications for theory and practice. *Journal of the Association for Information Science and Technology*. https://doi.org/10.1002/asi.24626

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