Robotics in society

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Published in:
Technology in Society

DOI:
10.1016/j.techsoc.2022.102174

Published: 01/02/2023

Document Version
Publisher's final version

Technology in Society 72 (2023) 102174

Contents lists available at ScienceDirect

Technology in Society

journal homepage: www.elsevier.com/locate/techsoc

Robotics in society: Technology in Society Briefing

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1. Topic summary

Robotics has been a topic of papers in Technology in Society since the 1980s. Early papers were concerned more with possible future scenarios than with studies of actual implementations. By contrast, papers published since 2010 have focused more on issues associated with robotics coming into widespread use. These recent papers fall into the following categories: robotics fundamentals, industrial robotics, service robotics, and social robotics. Papers concerned with fundamental issues have addressed human values, needs, and expectations in relation to robotics. In terms of industrial robotics, some papers addressed particular industries in specific countries. Other papers addressed broader issues in industrial robotics such as the interrelationships between employment, productivity, safety and sustainability. Papers exploring service robotics focused mainly on the hospitality sector including hotels and restaurants in different countries. Papers concerned with social robotics primarily addressed ethics and policy, with some research exploring implementations in particular settings such as disaster locations and hospital buildings.

2. List of papers

- **Early papers**

R.U. Ayres, S.M. Miller, **Robotics and conservation of human resources**, Technology in Society 4 (3) (1982) 181–197. https://doi.org/10.1016/0160-791X(82)90017-3

D. Idier, **Science fiction and technology scenarios: comparing Asimov's robots and Gibson's cyberspace**, Technology in Society 22 (2) (2000) 255–272. https://doi.org/10.1016/S0160-791X(00)00004-X

R.D. Launius, H.E. McCurdy, **Robots and humans in space flight: Technology, evolution, and interplanetary travel**, Technology in Society 29 (3) (2007) 271–282. https://doi.org/10.1016/j.techsoc.2007.04.007

- **Fundamentals**

P. Cockshott, K. Renaud, **Humans, robots and values**, Technology in Society 45 (2016) 19–28. https://doi.org/10.1016/j.techsoc.2016.01.002

S. Brondi, M. Pivetti, S. Di Battista, M. Sarrica, **What do we expect from robots? Social representations, attitudes and evaluations of robots in daily life**, Technology in Society 66 (2021) 101663. https://doi.org/10.1016/j.techsoc.2021.101663

T. Turja, T. Särkikoski, P. Koistinen, H. Melin, **Basic human needs and robotization: How to make deployment of robots worthwhile for everyone?** Technology in Society, 68 (2022) 101917. https://doi.org/10.1016/j.techsoc.2022.101917

- **Industrial robotics**

K.M. Bayne, R.J. Parker, **The introduction of robotics for New Zealand forestry operations: Forest sector employee perceptions and implications**, Technology in Society 34 (2) (2012) 138–148. https://doi.org/10.1016/j.techsoc.2012.02.004

C.N. Focacci, **Technological unemployment, robotization, and green deal: A story of unstable spillovers in China and South Korea (2008–2018)**, Technology in Society 64 (2021) 101504. https://doi.org/10.1016/j.techsoc.2020.101504

L. Du, W. Lin, **Does the application of industrial robots overcome the Solow paradox? Evidence from China**, Technology in Society 68 (2022) 101932. https://doi.org/10.1016/j.techsoc.2022.101932

S. Yang, F. Liu, J. Lu, X. He, **Does occupational injury promote industrial robot applications?** Technology in Society 70 (2022) 101998. https://doi.org/10.1016/j.techsoc.2022.101998

Y. Li, Y. Zhang, A. Pan, M. Han, E. Veglianti, **Carbon emission reduction effects of industrial robot applications: Heterogeneity characteristics and influencing mechanisms**, Technology in Society 70 (2022) 102034. https://doi.org/10.1016/j.techsoc.2022.102034

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https://doi.org/10.1016/j.techsoc.2022.102174
Received 29 October 2022; Accepted 15 November 2022
Available online 22 November 2022

- **Service robotics**

Y. Liu, X. Wang, S. Wang, **Research on service robot adoption under different service scenarios**, Technology in Society 68 (2022) 101810. https://doi.org/10.1016/j.techsoc.2021.101810

F. Seyitoğlu, S. Ivanov, O, Atsız, İ. Çifçi, **Robots as restaurant employees - A double-barrelled detective story**, Technology in Society, 67 (2021) 101779. https://doi.org/10.1016/j.techsoc.2021.101779

A.Y. Ayyildiz, M. Baykal, E. Koc, **Attitudes of hotel customers towards the use of service robots in hospitality service encounters**, Technology in Society 70 (2022) 101995. https://doi.org/10.1016/j.techsoc.2022.101995

L. Zhong, R. Verma, W. Wei, A.M. Morrsion, L. Yang, **Multi-stakeholder perspectives on the impacts of service robots in urban hotel rooms**, Technology in Society 68 (2022) 101846. https://doi.org/10.1016/j.techsoc.2021.101846

A. Khaliq, A. Waqas, Q.A. Nisar, S. Haider, Z. Asghar, **Application of AI and robotics in hospitality sector: A resource gain and resource loss perspective**, Technology in Society, 68 (2022) 101807. https://doi.org/10.1016/j.techsoc.2021.101807

J. Reis, N. Melão, J. Salvadorinho, B. Soares, A. Rosete, **Service robots in the hospitality industry: The case of Henn-na hotel, Japan**, Technology in Society, 63 (2020) 101423. https://doi.org/10.1016/j.techsoc.2020.101423

- **Social robotics**

H.S. Sætra, **The foundations of a policy for the use of social robots in care**, Technology in Society 63 (2020) 101383. https://doi.org/10.1016/j.techsoc.2020.101383

J.P. Boada, B.R. Maestre, C.T. Genís, **The ethical issues of social assistive robotics: A critical literature review**, Technology in Society 67 (2021) 101726. https://doi.org/10.1016/j.techsoc.2021.101726

G. Wilk-Jakubowski, R. Harabin, S. Ivanov, **Robotics in crisis management: A review**, Technology in Society 68 (2022) 101935. https://doi.org/10.1016/j.techsoc.2022.101935

L. Aymerich-Franch, I. Ferrer, **Liaison, safeguard, and well-being: Analyzing the role of social robots during the COVID-19 pandemic**, Technology in Society, 70 (2022) 101993. https://doi.org/10.1016/j.techsoc.2022.101993

X. Liu, X. He, M. Wang, H. Shen, **What influences patients' continuance intention to use AI-powered service robots at hospitals? The role of individual characteristics**, Technology in Society 70 (2022) 101996. https://doi.org/10.1016/j.techsoc.2022.101996

3. Future research directions

Future submissions concerned with AI should focus on current gaps in the Technology in Society discourse. For example, studies of fundamental issues are needed that compare different societies' values, needs, and expectations in relation to robotics. These can encompass societies ranging from traditional physically situated social groups to new digitally-based open source robotics communities. Papers concerned with industrial robotics could better situate robotics lifecycles within global trade systems. Such papers should consider the implications of increasing robotics for industrialization, deindustrialization and premature deindustrialization in different societies. Service robotics papers should address sectors other than hospitality. Papers addressing issues in social robotics can address issues associated with human-robot interaction, such as cognitive models and theory of mind, but at the level of social groups. These can be established social groups and social groups that emerge as a consequence of becoming producers and/or consumers of social support involving robotics.

4. Practice recommendations

Full automation is possible in few sectors, because the so-called human touch is important in many processes ranging from production work to healthcare. Hence, studies of human-robot interaction (HRI) are important for practitioners. Papers in other journals address HRI at the level of individuals. By contrast, Technology in Society papers address HRI at the level of social groups. This is important as the attitudes of many individuals can have their origins in the collective attitudes of social groups. For example, individuals' anxieties about robots developing dangerous superintelligence and about robots having unfavorable intentions often arise in social groups. Such group attitudes can manifest in organizations' everyday operations. For example, group anxiety about perceived threats can contribute to individuals overestimating their potential consequences. Technology in Society papers provide practitioners with a wide range of insightful studies into group HRI that can inform their own planning and operation of robotics implementations.