Guest editorial: Social robots, services and applications

Preface

A social (companion) robot, such as Pepper, Buddy, Miko, Lynx, Misty Robotics' Misty II and ASUS's Zenbo, are devices that comprise a physical humanoid robot component that connects through a network infrastructure to online services that enhance traditional robot functionalities. Today's robots can easily capture a user's physical activity state (e.g. walking, standing, and running) and store personalized information (e.g. face, voice, location and activity pattern) through many devices like cameras, microphones and sensor.

Humanoid robots often behave like natural partners that could engage in social interactions with human users, with features such as speech, gestures and eye-gaze, referring to users' personal data and social context. The user behavior of anthropomorphic robot users shows that they are more open to robots. Some prior research shows that it is much easier for a humanoid robot to gain user trust. Social robots can interact with humans by performing tasks that adhere to specific social cues and rules. They offer features such as human facial, voice, and emotion recognition, including adding human-like personality to their artificial intelligence (AI)-based capabilities to achieve better human–machine interaction. Particularly during the COVID-19 pandemic, robotic applications can save human resources and reduce direct contact to avoid virus transmission (Yu *et al.*, 2022; Huang *et al.*, 2021, 2022).

One of the main themes of this special issue is human–robot Interaction (HRI). HRI is a research area whose purpose is to understand, design and evaluate robots for use by or with humans. The foundations of this special issue will set the baseline for understanding how HRI can influence and change business practices and people's lifestyles. This special issue includes 13 articles related to HRI described below.

The first group of four papers focused on user service improvement and enjoyment with robotic applications. Edwards *et al.* (2022) discussed the relationship between self-reported levels of acute stress, perceived social support and interactions with robot animals in an academic library. Fuentes-Moraleda *et al.* (2022) presented an exploratory study of a multidimensional instrument for measuring willingness to accept social robots in museum contexts. Tung and Campos (2022) introduced a social robot app called the Music Buddy that can play situational music based on users' electroencephalogram data. Finally, Hsiao and Chen (2022) studied service quality, trust and satisfaction to predict users' continuance intention to use a food-ordering chatbot through an online questionnaire. Readers may also be interested in reading Guth and Vander Meer (2017) on telepresence robotics in an academic library and Araujo *et al.*'s (2021) review of social robots on depressive symptoms in older adults.

The second group of two papers focused on educational applications. Weng *et al.* (2022) presented the quantitative and qualitative data based on a project on computational thinking in problem-solving skills and programming learning attitudes by LEGO robotics kits. Hsia *et al.* (2022) discussed the issues of robot programming sustainability and the ability to solve problems integrated into curriculum instruction in clubs. Please watch out for our upcoming special issue on "Contemporary learning on mobile devices and social media" and also our call for paper on the journal website for part 2 of this special issue due to overwhelming responses.

The third group of four papers focused on AI applications. Asemi *et al.* (2022a) presented a fully automated usability evaluation method for interactive social robots by a fuzzy inference system based on ISO 9241-210:2019. Asemi *et al.* (2022b) studied the thematic and conceptual

Library Hi Tech
Vol. 40 No. 4, 2022
pp. 873-877

0737-8831
DOI 10.1108/LHT-08-2022-511

relationship in published papers on deep learning and smart manufacturing and its possible implications. Next, Agarwal *et al.* (2022) reviewed the literature on chatbots and virtual assistants, which showed that this area has been increasing in the last few years. Finally, readers may be interested in reading Harisanty *et al.* (2022), exploring leaders, practitioners and scientists' awareness of AI in libraries and another review of AI in libraries (Cox *et al.*, 2019). Please also watch out for our call for paper on the journal website for "AI and Blockchain for Information and Library Sciences – Challenges and Possibilities."

The fourth group of three papers focused on security enhancement applications. Zhang *et al.* (2022) presented a real-time autonomous information communication mechanism to predict the traffic between different social robots. Chen *et al.* (2022) presented a fault-tolerant content list management unit for real-time streaming systems based on intelligent robot claw machines. Basudan (2022) presented an efficient attribute-based data sharing scheme to enforce security and access control over health sensing data on the Internet of Medical Robotic Things (IoMRT). Alamer (2022) discussed tracking mobile robot devices for a secure framework of the Internet of Robotic Things (IoRT) network applications by a secure, anonymous tracing method. Readers may also be interested in reading Yang and Liao (2010) on using robot meta-tags to allow or refuse software robots on websites and express webmasters' online copyright authorization policies.

Judith Kelner
Centre of Informatics, Federal University of Pernambuco, Recife, Brazil

Pei-Chun Lin
Department of Information Engineering and Computer Science, Feng Chia University, Taichung, Taiwan

Kelvin K.F. Tsoi
Faculty of Medicine, The Jockey Club School of Public Health and Primary, The Chinese University of Hong Kong, Hong Kong, China

Zakaria Maamar
College of Technological Innovation, Zayed University, Dubai, United Arab Emirates

Patrick C.K. Hung
Faculty of Business and IT, Institute of Technology, University of Ontario, Oshawa, Canada

Dickson K.W. Chiu
Faculty of Education, The University of Hong Kong, Pokfulam, Hong Kong, and

Kevin K.W. Ho
Graduate School of Business Sciences, Humanities and Social Sciences, University of Tsukuba, Tokyo, Japan

References

Agarwal, S., Agarwal, B. and Gupta, R. (2022), "Chatbots and virtual assistants: a bibliometric analysis", *Library Hi Tech*, Vol. 40 No. 4, pp. 1013-1030, doi: 10.1108/LHT-09-2021-0330.

Alamer, A. (2022), "A secure anonymous tracing fog-assisted method for the Internet of Robotic Things", *Library Hi Tech*, Vol. 40 No. 4, pp. 1081-1103, doi: 10.1108/LHT-09-2020-0217.

Araujo, B.S.d., Fantinato, M., Marques Peres, S., Melo, R.C.d., Batistoni, S.S.T., Cachioni, M. and Hung, P.C.K. (2021), "Effects of social robots on depressive symptoms in older adults: a scoping review", *Library Hi Tech*, ahead-of-print, doi: 10.1108/LHT-09-2020-0244.

Asemi, A., Asemi, A. and Tahaei, H. (2022a), "Non-empirical ISO 9241-210:2019-based usability evaluation using fuzzy inference analyser: a special issue on interactive social robots", *Library Hi Tech*, Vol. 40 No. 4, pp. 976-993, doi: 10.1108/LHT-02-2022-0091.

Asemi, A., Ko, A. and Asemi, A. (2022b), "Infoecology of the deep learning and smart manufacturing: thematic and concept interactions", *Library Hi Tech*, Vol. 40 No. 4, pp. 994-1012, doi: 10.1108/LHT-08-2021-0252.

Basudan, S. (2022), "A puncturable attribute-based data sharing scheme for the Internet of Medical Robotic Things", *Library Hi Tech*, Vol. 40 No. 4, pp. 1064-1080, doi: 10.1108/LHT-08-2021-0254.

Chen, C.-C., Wang, J.-H., Wang, H.-W. and Zhang, J. (2022), "Fault-tolerant content list management for media servers in the smart robot domain", *Library Hi Tech*, Vol. 40 No. 4, pp. 1049-1063, doi: 10.1108/LHT-07-2020-0179.

Cox, A.M., Pinfield, S. and Rutter, S. (2019), "The intelligent library: Thought leaders' views on the likely impact of artificial intelligence on academic libraries", *Library Hi Tech*, Vol. 37 No. 3, pp. 418-435, doi: 10.1108/LHT-08-2018-0105.

Edwards, A., Edwards, C., Abendschein, B., Espinosa, J., Scherger, J. and Vander Meer, P. (2022), "Using robot animal companions in the academic library to mitigate student stress", *Library Hi Tech*, Vol. 40 No. 4, pp. 878-893, doi: 10.1108/LHT-07-2020-0148.

Fuentes-Moraleda, L., Lafuente-Ibañez, C., Fernandez Alvarez, N. and Villace-Molinero, T. (2022), "Willingness to accept social robots in museums: an exploratory factor analysis according to visitor profile", *Library Hi Tech*, Vol. 40 No. 4, pp. 894-913, doi: 10.1108/LHT-07-2020-0180.

Guth, L. and Vander Meer, P. (2017), "Telepresence robotics in an academic library: A study of exposure and adaptation among patrons and employees", *Library Hi Tech*, Vol. 35 No. 3, pp. 408-420, doi: 10.1108/LHT-03-2017-0059.

Harisanty, D., Anna, N.E.V., Putri, T.E., Firdaus, A.A. and Noor Azizi, N.A. (2022), "Leaders, practitioners and scientists' awareness of artificial intelligence in libraries: a pilot study", *Library Hi Tech*, ahead-of-print, doi: 10.1108/LHT-10-2021-0356.

Hsia, C.-H., Lai, C.-F. and Su, Y.-S. (2022), "Impact of using ARCS model and problem-based leaning on human interaction with robot and motivation", *Library Hi Tech*, Vol. 40 No. 4, pp. 963-975, doi: 10.1108/LHT-07-2020-0182.

Hsiao, K.-L. and Chen, C.-C. (2022), "What drives continuance intention to use a food-ordering chatbot? An examination of trust and satisfaction", *Library Hi Tech*, Vol. 40 No. 4, pp. 929-946, doi: 10.1108/LHT-08-2021-0274.

Huang, P.S., Paulino, Y.C., So, S., Chiu, D.K.W. and Ho, K.K.W. (2021), "Editorial", *Library Hi Tech*, Vol. 39 No. 3, pp. 693-695, doi: 10.1108/LHT-09-2021-324.

Huang, P.S., Paulino, Y.C., So, S., Chiu, D.K.W. and Ho, K.K.W. (2022), "Guest editorial: COVID-19 pandemic and health Informatics Part 2", *Library Hi Tech*, Vol. 40 No. 2, pp. 281-285, doi: 10.1108/LHT-04-2022-447.

Tung, W.-F. and Campos, J.J.S. (2022), "User experience research on social robot application", *Library Hi Tech*, Vol. 40 No. 4, pp. 914-928, doi: 10.1108/LHT-08-2021-0248.

Weng, C., Matere, I.M., Hsia, C.-H., Wang, M.-Y. and Weng, A. (2022), "Effects of LEGO robotic on freshmen students' computational thinking and programming learning attitudes in Taiwan", *Library Hi Tech*, Vol. 40 No. 4, pp. 947-962, doi: 10.1108/LHT-01-2021-0027.

Yang, C. and Liao, H. (2010), "Using the Robots.txt and Robots Meta tags to implement online copyright and a related amendment", *Library Hi Tech*, Vol. 28 No. 1, pp. 94-106, doi: 10.1108/07378831011026715.

Yu, P.Y., Lam, E.T.H. and Chiu, D.K.W. (2022), "Operation management of academic libraries in Hong Kong under COVID-19Library Hi Tech", ahead-of-print, doi: 10.1108/LHT-10-2021-0342.

Zhang, C., Li, Y. and Li, T. (2022), "A road traffic accidents prediction model for traffic service robot", *Library Hi Tech*, Vol. 40 No. 4, pp. 1031-1048, doi: 10.1108/LHT-05-2020-0115.

About the authors

Judith Kelner is a full faculty member of the Center of Informatics in UFPE since 1979. She is the co-founder and research leader of the GRVM team since 1998. Prof. Kelner received her Ph.D. from the Computing Laboratory at the University of Kent at Canterbury, the UK in 1993. She currently teaches multimedia and interactive systems and applications and coordinates numerous research projects in the areas of computer vision, robot interaction, the design of virtual and augmented reality applications and smart communication devices. Recently she received a grant from the Bill & Melinda Gates Foundation in the call for Grand Challenges Explorations: Data Science Approaches to Improve Maternal and Child Health. She has a partnership with Petrobras, Ericsson, Sapura and several other companies.

Pei-Chun Lin is an assistant professor in the Department of Information Engineering and Computer Science, Feng Chia University in Taiwan. She received B.Sc. degree in the department of mathematics from National Kaohsiung Normal University, Kaohsiung, Taiwan and received M.Sc. degree in the department of mathematical sciences from National Chengchi University, Taipei, Taiwan. Moreover, she received a Ph.D. degree from the Graduate School of Information, Production and Systems (IPS), Waseda University, Japan. Dr. Lin also worked as a researcher at IPS of Waseda University after she graduated from Waseda University. Dr. Lin not only has good results in the research field but also serves as the editor and reviewer of many top journals. At the same time, she also serves as the keynote speaker for many international academic exchanges. Her research interests include Soft Computing, Artificial Intelligence Computing, Robotics Computing, Statistical Modeling, Cloud Computing, Big Data Analysis, etc.

Kelvin K.F. Tsoi is an epidemiologist and a data scientist. He received his bachelor degree in Statistics and Doctoral degree in Medical Sciences at the Chinese University of Hong Kong. He also received clinical research training in the Department of Medicine and Therapeutics and was responsible for the colorectal cancer prevention project. Before his current position, he worked as a research scientist in the statistical department of Hospital Authority (HA). He has led projects covering a wide range of challenging areas on chronic diseases, such as service demand projection for schizophrenia and dementia. His research interests focus on digital innovation in chronic disease management, including mobile and telecare applications for hypertension management, technological implementation and social engagement for cognitive screening and artificial intelligent application on electronic health records. His work includes the traditional epidemiology for evidence-based medicine and population cohort studies. Hypertension and cardiovascular diseases, cognitive impairment and dementia and pharmacological use for cancer prevention are the main areas of his research.

Zakaria Maamar is a professor in the College of Technological Innovation at Zayed University, Dubai, United Arab Emirates. His research interests include Internet-of-Things, social computing and context-aware computing. Currently, he is directing Zayed University's Research Center for Smart Cities and Intelligent Systems. In 2009, Zakaria received an IBM Faculty Award for conducting research on blending social networks with service computing. Zakaria has a Ph.D. in computer science from Laval University, Quebec City, Canada.

Patrick C.K. Hung is a professor and director of International Programs at the Faculty of Business and Information Technology at Ontario Tech University, Canada. Patrick worked with Boeing Research and Technology in Seattle on aviation services-related research with two US patents on mobile network dynamic workflow systems. Before that, he was a research scientist with the Commonwealth Scientific and Industrial Research Organization in Australia. He also worked in the software industry in Toronto. He is a founding member of the IEEE Technical Committee on Services Computing and IEEE Transactions on Services Computing. In addition, he is an editorial board member for the *IEEE Transactions on Engineering Management*, an associate editor for *Electronic Commerce Research and Applications* and a coordinating editor of the *Information Systems Frontiers*. He has a Ph.D. and Master in Computer Science from Hong Kong University of Science and Technology, a Master in Management Sciences from the University of Waterloo, Canada and a Bachelor in Computer Science from the University of New South Wales, Australia. He also chairs the Machine Learning, Robotic and Toy Computing Minitrack and Computing in Companion Robots and Smart Toys Symposium at the Hawaii International Conference on System Sciences (HICSS).

Dickson K.W. Chiu received the B.Sc. (Hons.) degree in Computer Studies from the University of Hong Kong in 1987. He received the M.Sc. (1994) and the Ph.D. (2000) degrees in Computer Science from the Hong Kong University of Science and Technology (HKUST). He started his own computer company while studying part-time. He has also taught at several universities in Hong Kong. His teaching and

research interests are in Information Management, Service Computing, Library Science and E-learning with a cross-disciplinary approach, involving workflows, software engineering, information technologies, agents, information system research and databases. The results have been widely published in over 250 international publications (most of them indexed by SCI, SCI-E, EI and SSCI), including many practical taught master and undergraduate project results. He received a best paper award in the *37th Hawaii International Conference on System Sciences* in 2004. He is the founding editor-in-chief of the *International Journal on Systems and Service-Oriented Engineering* and serves on the editorial boards of several international journals. He is an editor(-in-chief) of Library Hi Tech indexed by SSCI (impact factor 2.325). He co-founded several international workshops and co-edited several journal special issues. He also served as a program committee member for around 300 international conferences and workshops. Dr. Chiu is a *senior member* of both the ACM and the IEEE, and a *life member* of the Hong Kong Computer Society. According to Google Scholar, he has over 5,300 citations, h-index 39, i-10 index 116, ranked worldwide 1st in "LIS," "m-learning," and "e-services."

Kevin K.W. Ho is a professor of Management Information Systems at the University of Tsukuba, Japan. His research interests include electronic service, information systems strategy, social media and fake news and misinformation. He is the co-editor(-in-chief) of *Library Hi Tech*. He received his Ph.D. in Information Systems from the Hong Kong University of Science and Technology (2008). He is a senior member of the IEEE, and member of the Association for Computing Machinery, the Association for Information Systems and the Society of American Military Engineers and a Certified Management & Business Educator. His research has been published in *Behaviour & Information Technology*, *Communications of the Association for Information Systems*, *Computers in Human Behavior*, *Decision Support Systems*, *Government Information Quarterly*, *Health Policy*, *IT Professional*, *Information Systems Frontier*, *Information & Management*, *Internet Research*, *Journal of Retailing and Consumer Sciences*, etc.