IJiRA inaugural issue editorial

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Nearly 4 decades ago, the fields of artificial intelligence (AI) and robotics were still in their infancy; most robots were essentially pre-programed arm-like mechanisms and predominantly used in the manufacturing industry, particularly in car assembly plants; robot vision systems were rarely used in the industry, and the few systems available were primarily based on television cameras and analog video signals designed for human perception. Automation, which plays an important role in the global economy and in our daily lives, was the prime motivator during the first wave of robotics in the mid-1980s, driving robotics researchers to find new and useful applications in fields including bio-medical, healthcare, construction, and so on.

A new wave of robotics has recently emerged; autonomous machines with sophisticated, human-like intelligence and sensory and motor capabilities are now being developed for applications to help humans perform dull, dirty, and/or dangerous tasks; explore extreme environments, remote locations, and uncharted worlds; and replace or enhance damaged human anatomical and physiological systems, which would have been unthinkable just a few years ago. Over the 30 years between the two waves of robotics advances, consumer electronics, communication, computing, and control (4C) technologies have undergone several evolutions. Computers were transformed from room-sized to desktop-sized, to handheld size, and most recently to “clouds;” this was accompanied by a major increase in the frequency and transistor density in

embedded processors, the convergence of several consumer electronic products (watches, phones, cameras, PDAs, etc.), and the connectivity of mobile applications to the internet. Digital imaging devices now have exponentially improved capabilities and reduced footprints, and they are widely available at low cost. Against this dramatic backdrop of the major paradigm shift in the 4C technologies along with the rapid advances in AI, neuroscience, human-centered mechatronics, and material engineering, this *International Journal of Intelligent Robotics and Applications* (IJiRA) was launched under the Springer Nature publishing group. IJiRA provides a timely and much needed platform for sharing the latest technological advances, showcasing outstanding contributions in the field of intelligent robotics, and discussing unique opportunities and challenges concerning future robotic applications that evolve in response to changing priorities regarding energy, transport, and mobility; aging populations and healthcare; the environment; productivity; and safety.

International Journal of Intelligent Robotics and Applications publishes original peer-reviewed foundation research on intelligent robotics on all scales from large systems for earth, surface/underwater and space operations, to micro/nano-scale robots. The scope includes scientific methods for autonomous machines; sensing/perception and learning systems; artificial enhancements of humans through functional prosthetic, wearable, and/or implantable devices; intelligent control of human-machine systems; brain-computer interfaces; and advanced materials and bio-inspired designs. Topics include abstractions, algorithms, theories, methodologies, systems, models, and case studies that make a significant contribution to finding insightful and creative solutions to recurrent and emerging problems as well as innovative applications that promote collaboration between

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methodological/theoretical researchers and industry practitioners.

The IJiRA Editorial Manager system is three-tiered, currently consisting of an Editor-in-Chief, two co-Editors and Lead Guest Editors, and 21 Associate Editors and several teams of Guest Editors. Members of the editorial board, who handle the reviews of regular papers, are listed on the inside cover page of this issue. Guest Editors, who are invited specialists, handle reviews of the theme-oriented papers. These absolutely first-rate (associate and guest) editors not only make recommendations on the acceptance or rejection of papers, but also help improve papers' quality by providing a constructive and timely review process for high-quality papers.

This premier issue showcases intelligent robotics for rehabilitation and human assistance. In addition to regular papers, each of the remaining three quarterly issues in the 2017 volume year will include a focused section: advances in soft robotics, intelligent robotics for civil infrastructure, and sensing/perception for autonomous and networked robotics to be published in May, August, and November, respectively. The call for papers for these focused sections can be downloaded from the website (springer.com/41315), where the aims and scope, submission information, and editorial board are posted. If you are in doubt about whether your paper fits within our scope or matches the theme of a focused section, please contact the Editor-in-Chief with your title/abstract. Please submit papers to (<https://www.editorialmanager.com/jira>); instructions for authors are available online at the site. If you encounter any difficulties, please contact the Journal Editorial Office Assistant (Ashi.Asokan@springer.com) or Editor-in-Chief (Kokmeng.Lee@me.gatech.edu).

In closing, we look forward to seeing IJiRA establish itself as the premier venue for publishing original research, state-of-the-art cross-disciplinary surveys, and focused sections on emerging areas of intelligent robotics. Ultimately, the success of IJiRA depends on the network of both established researchers and new talents, who will

subscribe, submit, review, read, and cite the papers as we strive to transform the future of robotics for the benefit of humankind. We look forward to your continued support!

Kok-Meng Lee received the BS degree from the State University of New York, Buffalo, in 1980 and the SM and PhD degrees from the Massachusetts Institute of Technology, Cambridge, in 1982 and 1985, respectively, all in mechanical engineering. He has been with the Georgia Institute of Technology since 1985. He was also honored as Pao Yu-Kong Chair Professor at Zhejiang University. He is also Distinguished Professor with the State Key Laboratory of Digital

Manufacturing Equipment and Technology at Huazhong University of Science and Technology under the National Recruitment Program of Global Experts. As a professor of mechanical engineering, his research interests include system dynamics and control, robotics, automation, mechatronics, machine vision, and field-based actuation, and sensing and perception systems. Dr. Lee received the National Science Foundation (NSF) Presidential Young Investigator Award (1989), Sigma Xi Junior Faculty Award (1989), International Hall of Fame New Technology Award (1992), and Woodruff Faculty Fellow (1994). He holds eight patents in machine vision, three degrees-of-freedom spherical motor and encoder, and live-bird handling systems. He received five best paper awards and was recognized as an advisor for ten Best Student Paper/Thesis Awards. Dr. Lee is a fellow of ASME and IEEE. He was the Editor-in-Chief of *IEEE/ASME Transactions on Mechatronics* for two terms (2008–2013) and an Associate Editor of *IEEE Robotics and Automation Society Magazine* (1994–1996), *IEEE Transactions on Robotics and Automation* (1994–1998), and *IEEE Transactions on Automation Science and Engineering* (2003–2005). He was the founding General Co-chair (1997), General Chair (1999), and Program Chair (2005) of the *IEEE/ASME International Conference on Advanced Intelligent Mechatronics*. He served on the Executive Committee (2012–2017) for the ASME Dynamic Systems and Control Division (Vice Chair, 2014/15; Chair, 2015/16; Past Chair, 2016/17). He is the inaugural Editor-in-Chief of Springer Nature *International Journal of Intelligent Robotics and Applications*.