Volume 39 Part 6

ROBOTICA



cambridge.org/rob



An IFAC-Affiliated Journal, and an Official Journal of the IFR.

International Journal of Information, Education and Research in Robotics and Artificial Intelligence

Professor Jian S. Dai, Centre for Robotics Research, King's College London, United Kingdom

E-mail: jian.dai@kcl.ac.uk

Professor Giuseppe Carbone, Department of Mechanical, Energy and Management Engineering, University of Calabria, Rende, Italy

E-mail: giuseppe.carbone@unical.it

FOUNDING EDITOR

Professor J. Rose, (UK)

EDITORIAL BOARD

Professor Srinivas Akella, University of North Carolina at Charlotte, USA Dr G.K. Ananthasuresh, The Indian Institute of Science, Bangalore, India

Dr Panos Artemiadis, University of Delaware, USA

Professor Nikos A. Aspragathos, University of Patras, Patras, Greece

Professor Xilun Ding, Beihang University, China

Professor Eduardo Jose Bayro-Corrochano, CINVESTAV; Campus Guadalajara, Jalsico, Mexico

Professor Thomas Bock, Technical University of Munich, Germany Associate Professor Mehmet İsmet Can Dede, Izmir Institute of Technology, Turkey

Professor Angelo Cangelosi, University of Manchester, UK

Professor I-Ming Chen, Nanyang Technological University, Singapore

Professor Howie Choset, Carnegie Mellon University, Pittsburgh, USA

Assistant Professor Dongming Gan, Purdue University, USA

Professor Feng Gao, Shanghai Jiao Tong University, China

Professor Victor A. Glazunov, Mechanical Engineering Research Institute of the Russian Academy of Sciences (IMASH RAN), Russia

Professor Clément Gosselin, Laval University, Canada

Professor Alessandro Gasparetto, University of Udine, Italy

Dr Ambarish Goswami, Honda Research Institute, USA

Dr Quang Ha, UTS, Australia

Associate Professor Kenji Hashimoto, Meiji University, Japan Professor S. Hirose, Tokyo Institute of Technology, Japan

Professor Tamas Kalmar-Nagy, Mitsubishi Electric Research Lab. USA Dr M. Kassler, Michael Kassler & Associates, Pty, NSW, Australia Professor Emin Faruk Kececi, Abdullah Gul University, Turkey Associate Professor Hung La, University of Nevada Reno, USA

Professor G. Liu, Ryerson University, Canada

Professor Daniel Martins, Federal University of Santa Catarina (UFSC), Brazil

Professor Todd D. Murphey, Northwestern University, Evanston, Illinois,

Professor Carl A. Nelson, University of Nebraska-Lincoln, USA Professor Frank Chongwoo Park, Seoul National University, Seoul 151-742, Korea

Professor Georg Rauter, University of Basel, Switzerland

Professor Lotfi Romdhane, American University of Sharjah, UAE

Professor Roberto Sabatini, RMIT University, Australia

Professor Andrey V. Savkin, University of New South Wales, Australia

Professor B. Siciliano, University of Naples, Italy

Professor Nabil Simaan, Vanderbilt University Nashville, TN, USA

Professor Tao Sun, Tianjin University, China

Professor Daniela Tarnita, University of Craiova, Romania

Professor Jeff Trinkle, Rensselaer Polytechnic Institute, USA

Professor Qining Wang, Peking University, China

Dr Gouwu Wei, University of Salford, UK

Professor Mark Yim, University of Pennsylvania Philadelphia, USA

Professor Yu Zhou, SUNY Stony Brook, USA

Robotica aims to be an outlet for publication of original papers of the highest quality in the field of Robotics and closely related areas. This includes: novel robotic mechanism and actuator design; robot kinematics, dynamics and control; computer vision; sensor fusion; teleoperation and haptic interfaces; robot motion planning; and artificial intelligence. In addition, papers that apply techniques from Robotics to other fields are also welcome. Examples include dynamics and control models applied to biological systems, the description of implementations of robots in factories, service and agricultural settings, and general mechatronic design. Works may be theoretical, computational or experimental, or some combination. Both short papers (rapid communications), and longer archival papers are welcome. Proposals for special issues on topics of current interest are welcome, and can be submitted via email to the editor.

This journal issue has been printed on FSC-certified paper and cover board. FSC is an independent, non-governmental, not-for-profit organization established to promote the responsible management of the world's forests. Please see www.fsc.org for information.

© Cambridge University Press 2021

SUBSCRIPTIONS

Robotica (ISSN 0263-5747) is published as twelve issues per Volume in January, February, March, April, May, June, July, August, September, October, November and December. The electronic-only price for Volume 39, 2021 available to institutional subscribers is £1420 (US \$2507 in USA, Canada and Mexico). EU subscribers (outside the UK) who are not registered for VAT should add VAT at their country's rate. VAT registered subscribers should provide their VAT registration number. Orders, which

must be accompanied by payment, may be sent to a bookseller, subscription agent or direct to the publishers: Cambridge University Press, University Printing House, Shaftesbury Road, Cambridge CB2 8RU, UK. Orders from the USA, Canada and Mexico should be sent to Cambridge University Press, Journals Fulfillment Department, 1 Liberty Plaza, Floor 20, New York, NY 10006, USA. Japanese prices for institutions are available from Kinokuniya Company Ltd, P.O. Box 55, Chitose, Tokyo 156, Japan. Prices include delivery by air.

Periodicals postage paid at New York, NY and additional mailing offices. POSTMASTER: send address changes in USA, Canada and Mexico to Robotica, Cambridge University Press, 1 Liberty Plaza, Floor 20, New York, NY 10006, USA.

COPYING

This journal is registered with the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923. Organizations in the USA who are also registered with CCC may therefore copy material (beyond the limits permitted by sections 107 and 108 of US copyright law) subject to payment to CCC of the per-copy fee of \$16.00. This consent does not extend to multiple copying for promotional or commercial purposes. Code 0263-5747/2021/\$16.00.

ISI Tear Sheet Service, 3501 Market Street, Philadelphia, Pennsylvania 19104, USA, is authorised to supply single copies of separate articles for private use only.

Organizations authorized by the Copyright Licensing Agency may also copy material subject to the usual conditions.

For all other use, permission should be sought from Cambridge or the American Branch of Cambridge University Press

Information on Robotica and all other Cambridge journals can be accessed via cambridge.org/core.

Cover Image: Motion Control and Trajectory Planning for Obstacle Avoidance of the Mobile Parallel Robot Driven by Three Tracked Vehicles, https://doi.org/vo.Shuzhan.Shentu.Fugui Xie.Xin-Jun Liu and Zhao Gongs Figure 16 'The prototype of VicRoB.'