Special Issue

Symmetry/Asymmetry in Autonomous Robotics

Message from the Guest Editors

Symmetry, broadly defined as the invariance of a system under transformations such as rotation, reflection, or, in some cases, translation, is a fundamental concept in both natural and artificial systems. In robotics, symmetry supports efficient design, locomotion, manipulation, and perception by leveraging balanced configurations and predictable dynamics. Conversely, asymmetry opens up opportunities for adaptability, customization, and optimized performance, particularly in unstructured environments. This Special Issue explores the role of symmetry and asymmetry in autonomous robotics, with a focus on their impact on system architecture, control strategies, perception, and interaction. Topics of interest include symmetrical and asymmetrical robotic designs, motion planning and control algorithms, sensor placement optimization, and the influence of symmetrical/asymmetrical features on machine learning models for autonomous decision making. We invite theoretical, experimental, and review contributions that address the interplay of symmetry and asymmetry in robotics to further our understanding and development of autonomous systems.

Guest Editors

Dr. Eduardo Freire

1. Laboratorio de Investigaciones en Neurociencias Y Tecnologías Aplicadas (LINTEC), Departamento de Bioingeniería, Facultad de Ciencias Exactas Y Tecnología, Universidad Nacional de Tucumán, San Miguel de Tucumán, Argentina
2. Instituto Superior de Investigaciones Biológicas (INSIBIO), Consejo Nacional de Investigaciones Científicas Y Técnicas (CONICET), San Miguel de Tucumán, Argentina
3. Department of Electrical Engineering, Federal University of Sergipe, São Cristóvão, Brazil

Dr. Humberto A. Secchi

Instituto de Automática, INAUT, Universidad Nacional de San Juan, San Juan 5400, Av. San Martín Oeste 1109, Argentina

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Symmetry
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
symmetry@mdpi.com

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About the Journal

Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

Editor-in-Chief

Prof. Dr. Sergei Odintsov
1. ICREA, 08010 Barcelona, Spain
2. Institute of Space Sciences (IEEC-CSIC), C. Can Magrans s/n, 08193 Barcelona, Spain

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