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Simulation, Modeling, and Programming for Autonomous Robots

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Preface

The First International Conference on Simulation, Modeling, and Programming for Autonomous Robots (SIMPAR 2008) was held during November 3-6, 2008, in Venice, at Telecom Future Center, with a special session held in Padua, in the Archivio Antico of the university.

The SIMPAR Conference was promoted to offer to a selected number of researchers the possibility to discuss, in a highly stimulating atmosphere, how to identify and solve the key issues necessary to ease the development of robot software, and boost a smooth shifting of results from simulation to real applications.

Novel robotics applications driven by society and industry call for the development of systems of ever-increasing complexity. Systems with sliding autonomy, humanoid robots, distributed robots, and mobile sensor networks are just a few examples of this exciting area. But unfortunately, steady improvements in robot hardware have not been matched by corresponding advancements in robot software. Besides fundamental open problems still waiting for sound answers, the lack of broadly accepted and reusable development tools, libraries, standards, and algorithms is one of the main technological obstacles towards the efficient development of this new generation of robotics applications.

Hence, simulation environments able to replicate a robot's sensing and motion abilities and their interaction with the physical world are playing an essential role in reducing the development time and cost of large-scale autonomous systems. Notwithstanding, their use is still regarded by many as suspicious. Seamless migration of code from general-purpose simulators to real-world systems is still a rare circumstance, due to the complexity of robot, world, sensors, and actuators modeling. The above challenges drive the quest for next-generation development methods in robotics. We are convinced that SIMPAR has succeeded in giving a first answer to this search, and it can be followed by proper scientific and engineering actions in the near future.

This book collects 29 papers that were presented orally in Venice, selected among a total of 42 that were submitted to the main single-track conference. Seven papers address methodologies and environments of robot simulation, 11 refer to methodologies about autonomous robot programming and middleware, and 11 describe applications and case studies. Each submitted paper received at least two reviews by the members of a carefully selected international Program Committee.

In addition, to enlarge the scientific attention towards particularly challenging environments, six workshops were offered: The Universe of RoboCup Simulators; Standards and Common Platforms for Robotics; Omnidirectional Robot Vision; Mini and Micro UAV for Security and Surveillance; Brain–Computer Interface; and Teaching with Robotics. Papers presented at these workshops were collected in a CD-ROM edited separately, by Emanuele Menegatti. A Tutorial

on USARSim/MOAST was kindly offered by Stephen Balakirsky from the National Institute of Standards and Technology. Two invited talks were also given in Venice at the opening, by Herman Bruyninckx and Yoshi Nakamura, while Hiroshi Ishiguro and Giulio Sandini gave invited talks in Padua, at a special session organized on New Perspectives on Humanoids Research.

We want to gratefully thank Telecom Future Center for offering such a beautiful ancient location, in the heart of the city of Venice. We also express our gratitude to the Program Committee members and all other supporters, organizers, and volunteers who contributed in making SIMPAR possible. Without their effort, it would not have been possible to run SIMPAR!

November 2008

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