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At the dawn of the new millennium, robotics is undergoing a major transformation in scope and dimension. From a largely dominant industrial focus, robotics is rapidly expanding into the challenges of unstructured environments. Interacting with, assisting, serving, and exploring with humans, the emerging robots will increasingly touch people and their lives.

The goal of this new series of Springer Tracts in Advanced Robotics is to bring, in a timely fashion, the latest advances and developments in robotics on the basis of their significance and quality. It is our hope that the greater dissemination of research developments will stimulate more exchanges and collaborations among the research community and contribute to further advancement of this rapidly growing field.

As one of robotics pioneering symposia, ISRR, the "International Symposium on Robotics Research," has established over the past two decades some of the field’s most fundamental and lasting contributions. With the launching of STAR, this and other thematic symposia devoted to excellence in robotics find an important platform for closer links and extended reach within the research community.

The Tenth edition of "Robotics Research" edited by Raymond Jarvis and Alex Zelinsky offers in its 11-part volume a collection of a broad range of topics in robotics. The content of these contributions provides a wide coverage of the current state of robotics research: the advances and challenges in its theoretical foundation and technology basis, and the developments in its traditional and new areas of applications.

Remarkably, the focus of a sizable portion of this edition is on advances in robotic technologies and applications. The diversity, novelty, and span of the work unfolding in these areas reveal the field’s increased maturity and expanded scope. The Tenth edition of ISRR culminates with this important reference on the current developments and new directions in the field of robotics - a true tribute to its contributors and organizers!

Stanford, January 2003

Oussama Khatib
Preface

The 10th International Symposium on Robotics Research (ISRR 2001) was held from November 9–12 2001, at Lorne, Victoria. The ISRR series of conferences began in 1983, and is sponsored by the International Foundation of Robotics Research (IFRR), an independent organization comprised of top researchers around the world. The goal of the ISRR is to bring together active, leading robotics researchers from academia, government, and industry, to define the state of the art of robotics and its future direction. Papers are generally more reflective and authoritative than those at other conferences, and over the years the ISRR has developed a high reputation. The symposium is typically held in a pleasant setting with a limited number of participants in order to maximize interaction.

This proceedings comprises 40 papers selected for ISRR 2001. The process of paper selection proceeded primarily through an open Call for Papers; these papers were reviewed by the Symposium co-chairs and the IFRR. In addition, the three regional delegations of the IFRR (North America, Europe, and Asia/Australia) invited a total of 18 papers.

IFRR (at the time of paper selection and hence the formal Program Committee for the Symposium)

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Bernie Roth
Tomomasa Sato
Yoshiaki Shirai
Tsuneo Yoshikawa

Papers were presented in a single track during the four day symposium. In addition, there were a number of information presentations by participants, a video session, and evening group discussions. A session on Field Robotics was organised by Chuck Thorpe and Hugh Durrant-Whyte. Alex Zelinsky organised a session on commercialisation of robotics research results. In keeping with the spirit of past ISRR’s, a number of breaks and activities were scheduled to allow for greater participant interaction. These included walks, and a tour of the scenic areas around Lorne.

The topics can be loosely placed into 8 categories: (1) Dynamics and control; (2) Planning and modelling; (3) Sensing technologies; (4) Vision based robotics; (5) Mobile robot localisation and mapping; (6) Humanoid robotics; (7) Human-centred robots; and (8) Applications. They represent progress in traditional areas of robotics, in areas of more recent expansion or emphasis, and in more speculative directions.
for robotics research and development. ISRR 2001 was an opportune time to reflect on the successes of robotics, on the expansion of topics, which are now encompassed by the field, and on the challenges for future commercial, technical, and intellectual success. The papers in this volume provide ample substance for this reflection.

The ISRR 2001 co-chairs/editors would like to thank Sarina Kennedy and Amber McKinley, secretarial staff at Monash University who greatly contributed to the smooth handling of research manuscript collection, transmission to reviewers and final assemblage for pre-print production, and Rosemary Shepherd, Pei Yean Lee and James Ashton of the Australian National University for helping to put the book together.

Canberra, Australia, November 2002

Raymond A. Jarvis
Alex Zelinsky
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