Lecture Notes in Artificial Intelligence   4850

Subseries of Lecture Notes in Computer Science

Max Lungarella   Fumiya Iida
Josh Bongard   Rolf Pfeifer (Eds.)

50 Years
of Artificial
Intelligence

Essays Dedicated to the 50th Anniversary
of Artificial Intelligence

Max Lungarella
Rolf Pfeifer
University of Zurich
Artificial Intelligence Laboratory
Andreasstrasse 15, 8050 Zurich, Switzerland
E-mail: {lunga,pfeifer}@ifi.uzh.ch

Fumiya Iida
Massachusetts Institute of Technology
Robot Locomotion Group Computer Science
and Artificial Intelligence Laboratory
32 Vassar Street, Cambridge, MA 02139, USA
E-mail: iida@csail.mit.edu

Josh Bongard
University of Vermont
Department of Computer Science
329 Votey Hall, Burlington, VT 05405, USA
E-mail: j.bongard@uvm.edu

Preface

Half a century ago, at the now famous 1956 Dartmouth Conference, the "fathers" of Artificial Intelligence (AI) – among them John McCarthy, Marvin Minsky, Allen Newell, Claude Shannon, Herbert Simon, Oliver Selfridge, and Ray Solomonoff – convened under the premise "that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it." Fifty years have passed, and AI has turned into an important field whose influence on our daily lives can hardly be overestimated. Many specialized AI systems exist that are at work in our cars, in our laptop computers, and in our personal and commercial technologies. There is no doubt that the impact of AI on our lives in the future will become even more general and ubiquitous.

In this book we provide a representative collection of papers written by the leading researchers in the field of Artificial Intelligence. All of the authors of papers in this volume attended the 50th Anniversary Summit of AI (http://www. ai50.org), held at the Centro Stefano Franscini, Monte Verità, Ascona, Switzerland, July 9–14, 2006. The objective of the summit was fourfold: (1) to celebrate the 50th anniversary of AI as a discipline; (2) to look back and assess the field of AI (what has been done, and where we are); (3) to bring together people with different backgrounds (to enhance interaction between groups and foster future collaborations); and (4) to attract young and talented researchers to generate additional momentum in this exciting field. The AI summit combined discussions from a historical standpoint; scientific exchange on the state of the art; speculations about the future; business, political and educational perspectives; contributions by researchers from different but related areas; presentations of the latest research by top scientists in the field; as well as many informal discussions among the participants and visitors. In this volume, we have tried to maintain the breadth of topics presented and discussed at the summit by including chapters focusing on subjects ranging from the history and prospects of AI, to speech recognition and processing, linguistics, bionics, and consciousness.

We would like to thank all the participants of the summit for helping to make it a successful event, the authors for their contributions to this volume, and the reviewers. We would also like to express our gratitude to the Centro Stefano Franscini, Neuronics AG, Swisscom Innovations, Matek, and Migros Kulturprozent for their support.

September 2007

Max Lungarella
Fumiya Iida
Josh C. Bongard
Rolf Pfeifer

Table of Contents

Historical and Philosphical Issues

Information Theory and Quantification

Morphology and Dynamics

Neurorobotics

Machine Intelligence, Cognition, and Natural Language Processing

Human-Like Intelligence: Motivation, Emotions, and Consciousness

Robot Platforms

Art and AI