Table of Contents

Overview and Roadmap

Overview of RoboCup 2003 Competition and Conferences 1
Enrico Pagello, Emanuele Menegatti, Ansgar Bredenfeld, Paulo Costa, Thomas Christaller, Adam Jacoff, Jeffrey Johnson, Martin Riedmiller, Alessandro Saffiotti, and Takashi Tomoichi

RoboCup: Yesterday, Today, and Tomorrow Workshop
of the Executive Committee in Blaubeuren, October 2003 15
Hans-Dieter Burkhard, Minoru Asada, Andrea Bonarini, Adam Jacoff, Daniele Nardi, Martin Riedmiller, Claude Sammut, Elizabeth Sklar, and Manuela Veloso

Invited Papers

Challenges in Robust Situation Recognition
through Information Fusion for Mission Criticial Multi-agent Systems 35
Hiroaki Kitano

On Role Allocation in RoboCup 43
Brian P. Gerkey and Maja J. Matarić

On the Role of Quantitative Descriptions of Behaviour
in Mobile Robotics Research 54
Ulrich Nehmzow

Technical Papers

Complexity Science and Representation in Robot Soccer 67
Jeffrey Johnson and Blaine A. Price

Recognition and Prediction of Motion Situations
Based on a Qualitative Motion Description 77
Andrea Miene, Ubbo Visser, and Otthein Herzog

Evaluating Team Performance at the Edge of Chaos 89
Mikhail Prokopenko and Peter Wang

Hidden Markov Modeling of Team-Play Synchronization 102
Itsuki Noda

Designing Agent Behavior with the Extensible Agent Behavior
Specification Language XABSL 114
Martin Lötzsch, Joscha Bach, Hans-Dieter Burkhard, and Matthias Jüngel

Feature-Based Declarative Opponent-Modelling 125
Timo Steffens

Scenario-Based Teamworking, How to Learn, Create, and Teach Complex Plans? 137
Ali Ajdari Rad, Navid Qaragozlou, and Maryam Zaheri

Specifying Agent Behaviors with UML Statecharts and StatEdit 145
Jan Murray

Echo State Networks for Mobile Robot Modeling and Control 157
Paul G. Plöger, Adriana Arghir, Tobias Günther, and Ramin Hosseiny

Model and Behavior-Based Robotic Goalkeeper 169
Hans Lausen, Jakob Nielsen, Michael Nielsen, and Pedro Lima

Evolving Visual Object Recognition for Legged Robots 181
Juan Cristóbal Zagal, Javier Ruiz-del-Solar, Pablo Guerrero, and Rodrigo Palma

Coaching Advice and Adaptation 192
Patrick Riley and Manuela Veloso

Technical Solutions of TsinghuAeolus for Robotic Soccer 205
Yao Jinyi, Lao Ni, Yang Fan, Cai Yunpeng, and Sun Zengqi

A Real-Time Auto-Adjusting Vision System for Robotic Soccer 214
Matthias Jüngel, Jan Hoffmann, and Martin Lötzsch

Knowledge-Based Autonomous Dynamic Colour Calibration 226
Daniel Cameron and Nick Barnes

Playing Robot Soccer under Natural Light: A Case Study 238
Gerd Mayer, Hans Utz, and Gerhard K. Kraetzschmar

Tracking Regions 250
Felix von Hundelshausen and Raúl Rojas

Fast and Robust Edge-Based Localization in the Sony Four-Legged Robot League 262
Thomas Röfer and Matthias Jüngel

A Symmetry Operator and Its Application to the RoboCup 274
Kai Huebner

RoboCup as an Introduction to CS Research 284
Peter Stone

RoboCup in Higher Education: A Preliminary Report 296
Elizabeth Sklar, Simon Parsons, and Peter Stone

Scaffolding Children's Robot Building and Programming Activities 308
Peta Wyeth, Mark Venz, and Gordon Wyeth

Planning Trajectories in Dynamic Environments
Using a Gradient Method 320
Alessandro Farinelli and Luca Iocchi

Local Multiresolution Path Planning 332
Sven Behnke

A Humanoid Approaches to the Goal –
Reinforcement Learning Based on Rhythmic Walking Parameters 344
Minoru Asada, Yutaka Katoh, Masaki Ogino, and Koh Hosoda

Design of Walking Gaits for Tao-Pie-Pie, a Small Humanoid Robot 355
Jacky Baltes and Patrick Lam

ProRobot – Predicting the Future of Humanoid Robots 366
Ralf Regele, Paul Levi, and Wolfgang Bott

Traction Monitoring for Collision Detection with Legged Robots 374
Michael J. Quinlan, Craig L. Murch, Richard H. Middleton, and Stephan K. Chalup

Multi-robot Control in Highly Dynamic, Competitive Environments 385
David Ball and Gordon Wyeth

Developing Comprehensive State Estimators for Robot Soccer 397
Thorsten Schmitt, Robert Hanek, and Michael Beetz

Cooperative Soccer Play by Real Small-Size Robot 410
Kazuhito Murakami, Shinya Hibino, Yukiharu Kodama, Tomoyuki Iida, Kyosuke Kato, and Tadashi Naruse

On-Board Vision Using Visual-Servoing
for RoboCup F-180 League Mobile Robots 422
Paul Lee, Tim Dean, Andrew Yap, Dariusz Walter, Les Kitchen, and Nick Barnes

A Plugin-Based Architecture for Simulation in the F2000 League 434
Alexander Kleiner and Thorsten Buchheim

Development of a Simulator of Environment and Measurement
for Autonomous Mobile Robots Considering Camera Characteristics 446
Kazunori Asanuma, Kazunori Umeda, Ryuichi Ueda, and Tamio Arai

Simulation League: The Next Generation 458
Marco Kögler and Oliver Obst

Posters

Educational Features of Malaysian Robot Contest 470
Amir A. Shafie and Zalinda Baharum

A Hybrid Software Platform for Sony AIBO Robots 478
Dragos Golubovic, Bo Li, and Huosheng Hu

A Rule-Driven Autonomous Robotic System Operating
in a Time-Varying Environment 487
Jia Jianqiang, Chen Weidong, and Xi Yugeng

Trot Gait Design Details for Quadrupeds 495
Vincent Hugel, Pierre Blazevic, Olivier Stasse, and Patrick Bonnin

The High-Level Communication Model for Multi-agent Coordination
in the RoboCupRescue Simulator 503
Stef B.M. Post, Maurits L. Fassaert, and Arnoud Visser

Pseudo-local Vision System Using Ceiling Camera
for Small Multi-robot Platforms 510
*Yasuhiro Masutani, Yukihisa Tanaka, Tomoya Shigeta,
and Fumio Miyazaki*

Using Model-Based Diagnosis to Build Hypotheses
about Spatial Environments. A Response to a Technical Challenge 518
Oliver Obst

Self-localization Method Using Two Landmarks
and Dead Reckoning for Autonomous Mobile Soccer Robots 526
Akira Motomura, Takeshi Matsuoka, and Tsutomu Hasegawa

Speed-Dependent Obstacle Avoidance by Dynamic Active Regions 534
Hans-Ulrich Kobialka and Vlatko Becanovic

Using the Opponent Pass Modeling Method to Improve Defending Ability
of a (Robo)Soccer Simulation Team 543
Jafar Habibi, Hamid Younesy, and Abbas Heydarnoori

Topological Navigation in Configuration Space Applied to Soccer Robots . . 551
Gonçalo Neto, Hugo Costelha, and Pedro Lima

A Fuzzy Reinforcement Learning for a Ball Interception Problem 559
Tomoharu Nakashima, Masayo Udo, and Hisao Ishibuchi

Intelligent Control of Autonomous Mobile Soccer Robot Adapting
to Dynamical Environment 568
*Nobuyuki Kurihara, Ryotaku Hayashi, Hikari Fujii, Daiki Sakai,
and Kazuo Yoshida*

A Hierarchical Multi-module Learning System
Based on Self-interpretation of Instructions by Coach 576
Yasutake Takahashi, Koichi Hikita, and Minoru Asada

Building Aunt Hillary: Creating Artificial Minds with 'Neural Nests' 584
Mike Reddy and Stuart Lewis

Autonomous Robot Controllers Capable of Acquiring Repertoires
of Complex Skills 592
Michael Beetz, Freek Stulp, Alexandra Kirsch, Armin Müller, and Sebastian Buck

A New Odometry System to Reduce Asymmetric Errors
for Omnidirectional Mobile Robots 600
Alireza Fadaei Tehrani, Ali Mohammad Doosthosseini, Hamid Reza Moballegh, Peiman Amini, and Mohammad Mehdi DaneshPanah

Texture-Based Pattern Recognition Algorithms
for the RoboCup Challenge 611
Bo Li and Huosheng Hu

An Open Robot Simulator Environment 621
Toshiyuki Ishimura, Takeshi Kato, Kentaro Oda, and Takeshi Ohashi

Application of Parallel Scenario Description
for RoboCupRescue Civilian Agent 628
Kousuke Shinoda, Itsuki Noda, Masayuki Ohta, and Susumu Kunifuji

RoboCup Advanced 3D Monitor 637
Carla Penedo, João Pavão, Pedro Nunes, and Luis Custódio

RoboCup Rescue Simulation: Methodologies Tools
and Evaluation for Practical Applications 645
Alessandro Farinelli, Giorgio Grisetti, Luca Iocchi, Sergio Lo Cascio, and Daniele Nardi

An Efficient Need-Based Vision System
in Variable Illumination Environment of Middle Size RoboCup 654
Mansour Jamzad and Abolfazal Keighobadi Lamjiri

Filling the Gap among Coordination, Planning, and Reaction
Using a Fuzzy Cognitive Model 662
Andrea Bonarini, Matteo Matteucci, and Marcello Restelli

Toward an Undergraduate League for RoboCup 670
John Anderson, Jacky Baltes, David Livingston, Elizabeth Sklar, and Jonah Tower

A Probabilistic Framework for Weighting Different Sensor Data in MUREA 678
Marcello Restelli, Domenico G. Sorrenti, and Fabio M. Marchese

Plays as Team Plans for Coordination and Adaptation 686
Michael Bowling, Brett Browning, Allen Chang, and Manuela Veloso

Progress in Learning 3 vs. 2 Keepaway 694
Gregory Kuhlmann and Peter Stone

Distributed Control of Gait for a Humanoid Robot 703
Gordon Wyeth and Damien Kee

Predicting Away Robot Control Latency 712
Sven Behnke, Anna Egorova, Alexander Gloye, Raúl Rojas, and Mark Simon

Towards a Probabilistic Asynchronous Linear Control Theory 720
Daniel Polani

Recognizing and Predicting Agent Behavior with Case Based Reasoning .. 729
Jan Wendler and Joscha Bach

Case Based Game Play in the RoboCup Four-Legged League – Part I The Theoretical Model 739
Alankar Karol, Bernhard Nebel, Christopher Stanton, and Mary-Anne Williams

How Contests Can Foster the Research Activities on Robotics in Developing Countries: Chile – A Case Study 748
Javier Ruiz-del-Solar and Juan Cristóbal Zagal

Grounding Robot Sensory and Symbolic Information Using the Semantic Web 757
Christopher Stanton and Mary-Anne Williams

Author Index 765