IPS-RCRA-SPIRIT 2023: Italian Workshop on Planning and Scheduling, RCRA Workshop on Experimental evaluation of algorithms for solving problems with combinatorial explosion, and SPIRIT Workshop on Strategies, Prediction, Interaction, and **Reasoning in Italy.**

Riccardo De Benedictis, Matteo Castiglioni, Diodato Ferraioli, Vadim Malvone, Marco Maratea, Enrico Scala, Luciano Serafini, Ivan Serina, Elisa Tosello, Alessandro Umbrico and Mauro Vallati

Rome, November 7-9th, 2023.

CEUR Workshop Proceedings (CEUR-WS.org)

Italian Workshop on Planning and Scheduling, RCRA Workshop on Experimental evaluation of algorithms for solving problems with combinatorial explosion, and SPIRIT Workshop on Strategies, Prediction, Interaction, and Reasoning in Italy (IPS-RCRA-SPIRIT 2023), Rome – Italy. © 2022 Copyright for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

Copyright for these papers by their authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

Editors' address:

Riccardo De Benedictis

Institute for Cognitive Science and Technologies (ISTC), National Research Council (CNR), Italy. riccardo.debenedictis@istc.cnr.it

Matteo Castiglioni

Dipartimento di Elettronica. Informazione e Bioingegneria, Politecnico di Milano, Italy. matteo.castiglioni@polimi.it

Diodato Ferraioli

Dipartimento di Ingegneria dell'Informazione ed Elettrica e Matematica applicata (DIEM), Univeristà degli Studi di Salerno, Italy. dferraioli@unisa.it

Vadim Malvone

Computer Science and Networks department (INFRES), Institut Polytechnique de Paris, France. vadim.malvone@telecom-paris.fr

Marco Maratea

Dipartimento di Matematica ed Informatica, Università della Calabria, Italy. marco.maratea@unical.it

Enrico Scala

Department of Information Engineering, Univeristà degli Studi di Brescia, Italy. enrico.scala@unibs.it

Luciano Serafini

Fondazione Bruno Kessler, Trento, Italy. serafini@fbk.eu

Ivan Serina

Department of Information Engineering, University of Brescia, Italy.

ivan.serina@unibs.it

Elisa Tosello

Embedded Systems (ES) Department, Bruno Kessler Foundation, Trento, Italy. etosello@fbk.eu

Alessandro Umbrico

Institute for Cognitive Science and Technologies (ISTC), National Research Council (CNR), Italy. alessandro.umbrico@istc.cnr.it

Mauro Vallati

University of Huddersfield, UK. m.vallati@hud.ac.uk

Organizing Committees

IPS 2023 Programme Chairs

National Research Council (CNR), Italy.
University of Brescia, Italy.
University of Brescia, Italy.
Bruno Kessler Foundation, Italy.
National Research Council (CNR), Italy.

RCRA 2023 Programme Chairs

Marco Maratea	Università della Calabria, Italy.
Luciano Serafini	Fondazione Bruno Kessler, Italy.
Mauro Vallati	University of Huddersfield, UK.

SPIRIT 2023 Programme Chairs

Matteo Castiglioni	Politecnico di Milano, Italy
Diodato Ferraioli	Univeristà degli Studi di Salerno, Italy
Vadim Malvone	Institut Polytechnique de Paris, France.

Contents

Organizing Committees	i
Preface	vi
IPS 2023 Regular Papers	1
Planning Safe Collaborative Behaviors through Risk-Aware Heuristic Search Alex Bonini, Marta Cialdea Mayer, Amedeo Cesta, Andrea Orlandini, Alessandro Umbrico	1
Tabular Model Learning in Monte Carlo Tree Search Alberto Castellini, Davide Bragantini, Davide Rossignolo, Federico Segala, Alessandro Farinelli	8
Goal Recognition with Deep Learning and Embedded Representation of State Traces Mattia Chiari, Alfonso Emilio Gerevini, Luca Putelli, Ivan Serina	19
Investigating Domain-oriented Approaches to Optimization in Timeline-Based Planning Riccardo De Benedictis, Gloria Beraldo, Gabriella Cortellessa, Amedeo Cesta	30
Heuristic Planning for Hybrid Dynamical Systems with Constraint Logic Pro- gramming Mikhail Soutchanski, Shaun Mathew	40
RCRA 2023 Regular Papers	65
Characterizing Nexus of Similarity between Entities Giuseppe Agresta, Giovanni Amendola, Pietro Cofone, Marco Manna, Aldo Ricioppo	65
Forward LTLf Synthesis: DPLL At Work Marco Favorito	80
A simple proof-theoretic characterization of Stable Models Enrico Giunchiglia, Marco Maratea, Marco Mochi	96
Experimenting an approach to Neuro-Symbolic RL Andrea Rafanelli, Stefania Costantini, Giovanni De Gasperis	109

ii

Planning as Theorem Proving with Heuristics <i>Mikhail Soutchanski, Ryan Young</i>	125
SPIRIT 2023 Regular Papers	147
Learning Augmented Online Learning Algorithms - The Adversarial Bandit with Knapsacks framework Davide Drago, Andrea Celli, Marek Eliáš	147
Optimal Rates for Online Bayesian Persuasion (Extended Abstract) Martino Bernasconi, Matteo Castiglioni, Andrea Celli, Alberto Marchesi, Francesco Trovò, Nicola Gatti	150
Reasoning About Dynamic Game Models Using Obstruction Logic Davide Catta, Jean Leneutre, Vadim Malvone	155
A multi-agent game for sentiment analysis Davide Catta, Aniello Murano, Mimmo Parente, Silvia Stranieri	164
On the Impact of Social Media Recommendations on Consensus of Discrete Opinions (Short Version) Vincenzo Auletta, Antonio Coppola, Diodato Ferraioli	173
The economic agent's Meta-Brain: a biological-economic complex agent-based model Daniela Cialfi	181
Utility-Sharing Games: How to Improve the Efficiency with Limited Subsidies (short paper) Vittorio Bilò, Lucaleonardo Bove, Cosimo Vinci	190
Distance Polymatrix Coordination Games Alessandro Aloisio, Michele Flammini, Bojana Kodric, Cosimo Vinci	199
On approximate strategyproof mechanisms for Hedonic Games and the Group Activity Selection Problem Giovanna Varricchio	206
Verification of Bayesian Mechanisms with Strategy Logic Munyque Mittelmann, Bastien Maubert, Aniello Murano, Laurent Perrussel	215
Towards a Coalition Refinement Approach in the Strategic Verification of Multi- Agent Systems Angelo Ferrando	219

IPS 2023 papers not included here and published elsewhere

Action-Failure Resilient Planning

Diego Aineto, Alessandro Gaudenzi, Alfonso Gerevini, Alberto Rovetta, Enrico Scala, Ivan Serina; in Proceedings of the 26th European Conference on Artificial Intelligence, September 30 - October 4, 2023, Kraków, Poland.

Planning for Temporally Extended Goals in Pure-Past Linear Temporal Logic

Luigi Bonassi, Giuseppe De Giacomo, Marco Favorito, Francesco Fuggitti, Alfonso Emilio Gerevini, Enrico Scala; in Proceedings of the Thirty-Third International Conference on Automated Planning and Scheduling, July 8-13, 2023, Prague, Czech Republic.

Falsification of cyber-physical systems using PDDL+ planning

Diego Aineto, Enrico Scala, Eva Onaindia, Ivan Serina; in Proceedings of the Thirty-Third International Conference on Automated Planning and Scheduling, July 8-13, 2023, Prague, Czech Republic.

Taming Discretised PDDL through Multiple Discretisations

Matteo Cardellini, Marco Maratea, Francesco Percassi, Enrico Scala, Mauro Vallati

Goal Recognition as a Deep Learning Task: The GRNet Approach

Mattia Chiari, Alfonso Emilio Gerevini, Francesco Percassi, Luca Putelli, Ivan Serina, Matteo Olivato; in Proceedings of the Thirty-Third International Conference on Automated Planning and Scheduling, July 8-13, 2023, Prague, Czech Republic.

Learning to Act for Perceiving in Partially Unknown Environments

Leonardo Lamanna, Mohamadreza Faridghasemnia, Alfonso Gerevini, Alessandro Saetti, Alessandro Saffiotti, Luciano Serafini, Paolo Traverso; in Proceedings of the Thirty-Second International Joint Conference on Artificial Intelligence, IJCAI 2023, 19th-25th August 2023, Macao, SAR, China.

RCRA 2023 papers not included here and published elsewhere

Complexity and Scalability of Defeasible Reasoning with Typicality in Many-Valued Weighted Knowledge Bases

Mario Alviano, Laura Giordano, Daniele Theseider Dupré; in Proceedings of the 18th European Conference, JELIA 2023, Dresden, Germany, September 20-22, 2023.

A Neuro-Symbolic Approach for Non-Intrusive Load Monitoring

Gianluca Apriceno, Luca Erculiani, Andrea Passerini; in Proceedings of the 26th European Conference on Artificial Intelligence, September 30 - October 4, 2023, Kraków, Poland.

Geometric reasoning on the Traveling Salesperson Problem: comparing Answer Set Programming and Constraint Logic Programming Approaches Alessandro Bertagnon, Marco Gavanelli; in Proceedings of the International Conference on Logic Programming 2023 – Workshops co-located with the 39th International Conference on Logic Programming (ICLP 2023), London, United Kingdom, July 9th and 10th, 2023.

Deep Symbolic Learning: Discovering Symbols and Rules from Perceptions Alessandro Daniele, Tommaso Campari, Sagar Malhotra, Luciano Serafini; in Proceedings

of the Thirty-Second International Joint Conference on Artificial Intelligence, IJCAI-23.