

Lecture Notes in Artificial Intelligence 5499

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Anticipatory Behavior in Adaptive Learning Systems

From Psychological Theories
to Artificial Cognitive Systems

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Preface

Anticipatory behavior in adaptive learning systems continues to attract the attention of researchers in many areas, including cognitive systems, neuroscience, psychology, and machine learning. The ABiALS workshop series is now in its fourth edition – and it is very vital.

The 4th Workshop on Anticipatory Behavior in Adaptive Learning Systems (ABiALS 2008) was held in collaboration with the 5th Six-Monthly Meeting of euCognition: “The Role of Anticipation in Cognition” in Munich, June 26–27, 2008.

EuCognition, the European Network for the Advancement of Artificial Cognitive Systems (FP6-26408), funded this stimulating two-day event which saw the participation of six invited speakers (four of whom contributed to this book) and over 50 researchers from several European nations and abroad. Over 20 papers were discussed, either in oral or poster presentations. We are grateful to the euCognition’s Executive Committee, and in particular to David Vernon, for giving us the possibility of holding the fourth ABiALS meeting in collaboration with the euCognition meeting, and for generously sponsoring both events.

We are grateful to our Program Committee members for providing careful reviews of the contributions, and additional comments and suggestions, which have greatly enhanced the quality of this book.

Thanks to the numerous participants – with different backgrounds, but with converging interests – the workshop hosted an extremely stimulating discussion and comparison of ideas which touched numerous topics, including time scales in prediction, how anticipation relates to hierarchies in the control of action, in what sense anticipatory mechanisms of living organisms are related (or the same) across different domains, or what could be the foundations of artificial systems provided with anticipatory capabilities.

The numerous interactions we had during the two-day event testified an extremely vivid interest in basic issues related to prediction and anticipation in many disciplines and from several perspectives. This makes the sharing of a common language extremely important. For this reason, the introductory chapter of this volume revisits the current available terminology on anticipatory behavior and relates it to the available system approaches. In addition, the introductory chapter offers an overview of the contributions in this volume. The contributions have been grouped in six sections: “Anticipation in Psychology: Focus on the Ideomotor View,” “Conceptualizations,” “Anticipation and Dynamical Systems,” “Computational Modeling of Psychological Processes in the Individual and Social Domains,” “Behavioral and Cognitive Capabilities Based on Anticipation,” and “Computational Frameworks and Algorithms for Anticipation, and Their Evaluation.”

One remarkable aspect of this volume is that numerous papers encompass more than one discipline, and in particular study the close relationships between the study of living organisms and the realization of computational modeling of anticipatory mechanisms. This interaction is clearly bidirectional. Some papers start with psychological theories and empirical evidence to inform the study and realization of computational and robotic

models. Others apply insights from computer science or information theory to suggest novel ways to look at empirical phenomena, or to explain empirical data.

In addition to its role in producing scientific advancements and promoting cross-disciplinary discussions, ABiALS continues in its community-building activity, too. A novelty this year was the setting up of a Web portal focused on *anticipatory behavior*, with the intention of further disseminating ideas and fostering discussions and collaborations within and outside the ABiALS community:

<http://www.anticipatorybehavior.org/>

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Organization

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Table of Contents

Introduction

From Sensorimotor to Higher-Level Cognitive Processes: An Introduction to Anticipatory Behavior Systems	1
<i>Giovanni Pezzulo, Martin V. Butz, Olivier Sigaud, and Gianluca Baldassarre</i>	

Anticipation in Psychology: Focus on the Ideomotor View

ABC: A Psychological Theory of Anticipative Behavioral Control	10
<i>Joachim Hoffmann</i>	
Anticipative Control of Voluntary Action: Towards a Computational Model	31
<i>Pascal Haazebroek and Bernhard Hommel</i>	

Theoretical and Review Contributions

Driven by Compression Progress: A Simple Principle Explains Essential Aspects of Subjective Beauty, Novelty, Surprise, Interestingness, Attention, Curiosity, Creativity, Art, Science, Music, Jokes	48
<i>Jürgen Schmidhuber</i>	
Steps to a Cyber-Physical Model of Networked Embodied Anticipatory Behavior	77
<i>Fabio P. Bonsignorio</i>	
Neural Pathways of Embodied Simulation	95
<i>Henrik Svensson, Anthony F. Morse, and Tom Ziemke</i>	

Anticipation and Dynamical Systems

The Autopoietic Nature of the “Inner World”: A Study with Evolved “Blind” Robots	115
<i>Michela Ponticorvo, Domenico Parisi, and Orazio Miglino</i>	
The Cognitive Body: From Dynamic Modulation to Anticipation	132
<i>Alberto Montebelli, Robert Lowe, and Tom Ziemke</i>	

Computational Modelling of Psychological Processes in the Individual and Social Domains

A Neurocomputational Model of Anticipation and Sustained Inattentional Blindness in Hierarchies	152
<i>Anthony F. Morse, Robert Lowe, and Tom Ziemke</i>	
Anticipation of Time Spans: New Data from the Foreperiod Paradigm and the Adaptation of a Computational Model	170
<i>Johannes Lohmann, Oliver Herbort, Annika Wagener, and Andrea Kiesel</i>	
Collision-Avoidance Characteristics of Grasping: Early Signs in Hand and Arm Kinematics	188
<i>Janneke Lommertzen, Eliana Costa e Silva, Raymond H. Cuijpers, and Ruud G.J. Meulenbroek</i>	
The Role of Anticipation on Cooperation and Coordination in Simulated Prisoner's Dilemma Game Playing	209
<i>Maurice Grinberg and Emilian Lalev</i>	

Behavioral and Cognitive Capabilities Based on Anticipation

A Two-Level Model of Anticipation-Based Motor Learning for Whole Body Motion	229
<i>Camille Salaün, Vincent Padois, and Olivier Sigaud</i>	
Space Perception through Visuokinesthetic Prediction	247
<i>Wolfram Schenck</i>	
Anticipatory Driving for a Robot-Car Based on Supervised Learning ...	267
<i>Irene Markelić, Tomas Kulvičius, Minija Tamosiunaite, and Florentin Wörgötter</i>	

Computational Frameworks and Algorithms for Anticipation, and Their Evaluation

Prediction Time in Anticipatory Systems	283
<i>Birger Johansson and Christian Balkenius</i>	
Multiscale Anticipatory Behavior by Hierarchical Reinforcement Learning	301
<i>Matthias Rungger, Hao Ding, and Olaf Stursberg</i>	

Anticipatory Learning Classifier Systems and Factored Reinforcement
Learning 321
 Olivier Sigaud, Martin V. Butz, Olga Kozlova, and Christophe Meyer

Author Index 335