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Anticipatory Behavior in Adaptive Learning Systems

From Psychological Theories to Artificial Cognitive Systems

Springer

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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 Articial 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

Computational Modelling of Psychological Processes in the Individual and Social Domains

Behavioral and Cognitive Capabilities Based on Anticipation

Computational Frameworks and Algorithms for Anticipation, and Their Evaluation