Preface

This volume presents the proceedings of the 2nd International Workshop on Algebraic Frames for the Perception and Action Cycle. AFPAC 2000. held in Kiel, Germany, 10–11 September 2000. The presented topics cover new results in the conceptualization, design, and implementation of visual sensor-based robotics and autonomous systems. Special emphasis is placed on the role of algebraic modelling in the relevant disciplines, such as robotics, computer vision, theory of multidimensional signals, and neural computation. The aims of the workshop are twofold: first, discussion of the impact of algebraic embedding of the task at hand on the emergence of new qualities of modelling and second, facing the strong relations between dominant geometric problems and algebraic modelling.

The first workshop in this series, AFPAC'97. inspired several groups to initiate new research programs, or to intensify ongoing research work in this field, and the range of relevant topics was consequently broadened, The approach adopted by this workshop does not necessarily fit the mainstream of worldwide research-granting policy. However, its search for fundamental problems in our field may very well lead to new results in the relevant disciplines and contribute to their integration in studies of the perception–action cycle.

The background of the workshop is the design of autonomous artificial systems following the paradigm of behavior-based system architectures. The perception–action cycle constitutes the framework in which the designer has to make sure that robust, stable, and adaptive system behavior will result. The mathematical language used to shape this frame is crucial for getting system features such as the ones mentioned above or, in addition, semantic completeness and in some cases linearity. By semantic completeness we mean a representation property which is purpose-oriented in its nature rather then the traditional mathematical meaning of the term of completeness. While linearity is, without any restriction, a useful system property, most of the problems we have to handle turn out to be nonlinear. We learn from the approach of this workshop that this is not a matter of fate which traditionally results in non-complete, approximating linearizations. Instead, various problems can be algebraically transformed into linear and, thus, complete ones. The reader can identify this approach in several contributions related to multidimensional signal processing, neural computing, robotics, and computer vision.

This volume includes 7 invited papers and 20 regular papers. The invited papers are contributed by members of the program committee. Regretably, not all of them were able to present a talk or to contribute a paper to the proceedings. We wish, however, to thank all of them for their careful reviewing of the contributed papers. All authors of papers presented in this volume contributed to important aspects relevant to the main theme of the workshop. Our thanks go to all the authors of the invited and contributed papers for the high quality of their contributions and *for* their cooperation.

We thank the Christian-Albrechts-Universitt Kiel for hosting the workshop and the industrial sponsors for their financial support. Special thanks to the Deutsche Forschungsgemeinschaft (DFG) which, by awarding grant no. 4851/223/00, made it possible to invite selected speakers. Last but not least the workshop could not have taken place without the extraordinary commitment of the local organizing committee.

Kiel and Haifa, June 2000 Gerald Sommer and Yehoshua Y. Zeevi

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http://www.springer.com/978-3-540-41013-3

Algebraic Frames for the Perception-Action Cycle
Second International Workshop, AFPAC 2000, Kiel, Germany, September 10-11, 2000 Proceedings
Sommer, G.; Zeevi, Y.Y. (Eds.)

2000, X, 349 p., Softcover
ISBN: 978-3-540-41013-3