

Preface

The present volume features a selection of the papers presented at the 9th International Conference on Formal Concept Analysis (ICFCA 2011). Over the years, the ICFCA conference series has grown into the premier forum for dissemination of research on topics from formal concept analysis (FCA) theory and applications, as well as from the related fields of lattices and partially ordered structures.

FCA is a multi-disciplinary field with strong roots in the mathematical theory of partial orders and lattices, with tools originating in computer science and artificial intelligence. FCA emerged in the early 1980s from efforts to restructure lattice theory to promote better communication between lattice theorists and potential users of lattice-based methods for data management. Initially, the central theme was the mathematical formalization of concept and conceptual hierarchy. Since then, the field has developed into a constantly growing research area in its own right with a thriving theoretical community and an increasing number of applications in data and knowledge processing including disciplines such as data visualization, information retrieval, machine learning, software engineering, data analysis, data mining, social networks analysis, etc.

ICFCA 2011 was held from May 2 to May 6, 2011, in Nicosia, Cyprus. The program committee received 49 high-quality submissions that were subjected to a highly competitive selection process. Each paper was reviewed by three referees (exceptionally two or four). After a first round, some papers got a definitive acceptance status, while others got accepted conditionally to improvements in their content. The latter got to a second round of reviewing. The overall outcome was the acceptance of 16 papers as regular ones for presentation at the conference and publication in this volume. Another seven papers have still been assessed as valuable for discussion at the conference and were therefore collected in the supplementary proceedings. The regular papers presented hereafter cover advances on a wide range of subjects from FCA and related fields.

A first group of papers tackled mathematical problems within the FCA field. A subset thereof focused on factor identification within the incidence relation or its lattice representation (papers by Glodeanu and by Krupka). The remainder of the group proposed characterizations of particular classes of ordered structures (papers by Doerfel and by Meschke *et al.*). A second group of papers addressed algorithmic problems from FCA and related fields. Two papers approached their problems from an algorithmic complexity viewpoint (papers by Distel and by Babin and Kuznetsov) while the final paper in this group addressed algorithmic problems for general lattices, i. e., not represented as formal contexts, with an FCA-based approach (work by Balcázar and Tîrnăucă). A third group studied alternative approaches for extending the expressive power of the core FCA, e. g., by generalizing the standard one-valued attributes to attributes valued in algebraic rings (work by González Calabozo *et al.*), by introducing pointer-like attributes, a. k. a. links (paper by Kötters), or by substituting set-shaped concept intents with modal logic expressions (paper by Soldano and Ventos). A fourth group focused on data mining-oriented aspects of FCA: agreement lattices in structured

data mining (paper by Nedjar *et al.*), triadic association rule mining (work by Missaoui and Kwuida) and bi-clustering of numerical data (Kaytoue *et al.*). An additional paper shed some initial light on a key aspect of FCA-based data analysis and mining, i. e., the filtering of interesting concepts (paper by Belohlavek and Macko). Finally, a set of exciting applications of both basic and enhanced FCA frameworks to practical problems have been described: in analysis of gene expression data (the already mentioned work by González Calabozo *et al.*), in web services composition (paper by Azmeh *et al.*) and in browsing and retrieval of structured data (work by Wray and Eklund). This volume also contains three keynote papers submitted by the invited speakers of the conference.

All these contributions constitute a volume of high quality which is the result of the hard work done by the authors, the invited speakers and the reviewers. We therefore wish to thank the members of the Program Committee and of the Editorial Board whose steady involvement and professionalism helped a lot. We would also like to acknowledge the participation of all the external reviewers who sent many valuable comments. Kudos also go to EasyChair for having made the reviewing/editing process a real pleasure. Special thanks go to the Cyprus Tourism Organisation for sponsoring the conference and to the University of Nicosia for hosting it. Finally we wish to thank the Conference Chair Florent Domenach and his colleagues from the Organization Committee for the mountains of energy they put behind the conference organization process right from the beginning in order to make it a total success. We would also like to express our gratitude towards Dr. Peristianis, President of the University of Nicosia, for his personal support.

May 2011

Petko Valtchev
Robert Jäschke

Conference Organization

The International Conference on Formal Concept Analysis is the annual conference and principal research forum in the theory and practice of Formal Concept Analysis. The inaugural International Conference on Formal Concept Analysis was held at the Technische Universität Darmstadt, Germany in 2003. Subsequent ICFCA conferences were held at the University of New South Wales in Sydney, Australia 2004, Université d'Artois, Lens, France 2005, Institut für Algebra, Technische Universität Dresden, Germany 2006, Université de Clermont-Ferrand, France 2007, Université du Québec à Montréal, Canada 2008, Darmstadt University of Applied Sciences, Darmstadt, Germany 2009, Agadir, Morocco 2010. ICFCA 2011 took place at the University of Nicosia, Cyprus. Its committees are listed below.

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