GAMES 2007 (AutoMathA Day), Scientific Report

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Abstract

The GAMES-Conference 2007 - the 6th annual meeting of the Research Training Network - was held in Lausanne, on September 10-13, 2007. It was co-located with the international conference Computer Science Logic 2007; a joint program took place on September 11th. And Thursday stood as the AutoMathA day, where the papers that were the closer to automata theory were presented. As in previous years, GAMES 2007 was a meeting without proceedings, allowing the participants to present their best "games" paper of the year. The program consisted of five invited tutorials[1] (90 min), contributed talks (30 min) and short presentations (15 min). Contributed talks and short presentations were selected by the Program Committee[2] on the basis of submitted extended abstracts. The second day program was designed in agreement with the Program Committee of CSL 2007, and apart from the two invited speakers' tutorials, the papers presented were the ones accepted to CSL'07 - therefore published in the proceedings - that were the most closely related to the game theoretical setting.

The whole conference was organized by the Western Swiss Center for Logic, History and Philosophy of Science, and the Information Systems Institute at the Faculty of Business and Economics at the University of Lausanne. Each day started with a one and a half hour tutorial by an invited speaker, followed by thirty to fifteen minute long presentations of the selected papers. These presentations were of very high standard, exemplifying the new trend of games as a theoretical tool in computer science. Participants came from various well established universities from all over Europe, Northern America, India, or China.

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[1] Luca de Alfaro *(Santa Cruz*: The Symbolic Approach to Repeated Games, Anuj Dawar *(Cambridge*: Model-checking first-order logic: automata and locality, Javier Esparza *(Stuttgart*: O(f(t)) is not enough: Beyond Big-Oh runtime analysis in automata theory, Hendrik Jan Hoogeboom *(Leiden*: Tree Transducers, Sylvain Sorin *(Paris)*: Zero-sum repeated games: basic results and new advances

[2] Mikolaj Bojanczyk (*Warsaw*), Jacques Duparc (*Lausanne*), Erich Grädel (*Aachen*), Anca Muscholl (*Bordeaux*)

It should be noticed that while the kind of games that people were in the past interested in in this research network were two person complete information games, more and more scientific progress has been made towards classical game theory, in particular stochastic games and computations of equilibria. This was particularly significant, as for the first time in this series of conference, the keynote speaker was one of the founder of modern economic theory: Kenneth Binmore (*London*). Together with Sylvain Sorin *(Paris)*, a mathematical expert on repeated games with incomplete information, Kenneth Binmore shed a new light on these meetings, unveiling new horizons, addressing new challenges.

The second day of the conference was particularly dense, opening at 9:00 with welcoming speeches by the Rector of the University of Lausanne, Dominique Arlettaz, and the Dean of the Faculty of Business and Economics, Suzanne de Trevile, and ending at 22:00 with the EACSL Annual General Meeting. This day was a joint event with Computer Science Logic 2007, where over a hundred fifty participants met together.

Ninety two persons registered to GAMES'07, and all in all - including the organizers - roughly a hundred persons participated in the event. Everyone was stunned by the location, which the wonderful weather we had last september helped very much to improve. At noon, the participants met at various restaurants on campus, usually ending up having lunch in the open air, facing the lake. The sunshine made it particularly pleasant for participants to form little groups that would talk about games, logic and automata in improvised locations, outside the building on campus.

On Wednesday evening took place the conference banquet, as many participants put it into words: "a memorable night". The travel by bus was a little excursion to the Lavaux area with scenic view over the of Geneva. Followed by a gentle walk through the vineyard hills, in order to reach the winemaker manor where we had an exceptional diner. For almost everyone, that was the most extraordinary conference diner they ever had, even the several researchers from Bordeaux found out that the wine was very nice.

On Thursday, the AutoMathA day concentrated presentations at the crossroads of Automata Theory and Game Theory. This day contributed to elaborating the general mathematical framework where new theoretical insights and applications of Automata Theory touch meet the growing interest for a game theoretical approach in Computer Science.

The whole meeting was a definitive success, specially considering the fact that the participant did not get their travel expenses funded by the European Research Network as it used to be the case in the past. Scientifically, this was very thrilling to help a growing community establish a long foreseen bridge between Theoretical Computer Science and Economics via a deeper implication of modern classical game theory. It was also very stimulating to host many young researchers whose minds were fertilized by the use of games in a theoretical setting.

The Swiss National Science Foundation, the Swiss Academy of Sciences, and the Western Swiss Center for Logic, History and Philosophy of Science, and the European Science Foundation provided financial support for this event. The

European Research Network also participated financially to the great success of this meeting.

Programme

Monday 10 September

- 08:30-09:00 Registration GAMES 07

- 09:00-09:15 Opening Ceremony

- 09:15-10:15 Invited Talk: Kenneth Binmore (London) The Future of Game Theory

- 10:15-10:30 Coffee Break

Session 1

- 10:30-11:00 Signalling in Infinite Games; Dietmar Berwanger (Lausanne)

- 11:00-11:30 Game Relations and Metrics; MariÎlle Stoelinga (Twente)

- 11:30-12:00 Priority Weighted Markov Decision Processes; Hugo Gimbert (Paris)

- 12:00-14:00 Lunch

Session 2

- 14:00-14:30 Minimum Expected Time for Concurrent Reachability Games; Laurent Doyen (Lausanne)

- 14:30-15:00 Probabilistic and Topological Semantics for Timed Automata; Thomas Brihaye (Cachan)

- 15:00-15:30 Assumption based strategies in games of imperfect information; Sunil Simon (Chennai)

Session 3

- 15:30-16:00 A simple P-matrix linear complementarity problem for discounted games; Rahul Savani (Warwick)

- 16:00-16:30 A qualitive study of winning strategies in discrete two player games; David Janin (Bordeaux)

- 16:30-17:00 Coffee Break

Session 4

- 17:00-17:15 Recursive Stochastic Games with Positive Rewards; Dominik Wojtczak (Edinburgh)

- 17:15-17:30 Random Fruit on the Zielonka Tree; Florian Horn (Paris, Aachen)

- 17:30-17:45 Model Checking Games for the Quantitative ?-Calculus; Diana Fischer (Aachen)

- 17:45-18:00 Using infinite words to modelize infinitely repeated games; B. Ouldmohamedlemine (Rouen)

- 18:00-18:15 Average-Price and Reachability-Price Games on Hybrid Systems with Strong Resets; Michal Rutkowski (Warwick)

- 18:15-18:30 Minimum Reachability-price problem for Concave Priced Timed Automata; Ashutosh Trivedi (Warwick)

Tuesday 11 September (joint day with CSL 07)

- 08:30-09:00 Registration CSL 07

- 09:00-09:15 Opening Ceremony

- 09:15-10:45 Invited Tutorial: Anuj Dawar (Cambridge) Model Checking First-Order Logic: Automata and Locality

- 10:45-11:00 Coffee Break

Session 5: Logic and Games

- 11:00-11:30 Omega-Regular Half-positional Winning Conditions; Eryk Kopczynski

- 11:30-12:00 Clique-Width and Parity Games; Jan Obdrzalek

- 12:00-12:30 Logical Refinements of Church?s Problem; Alexander Rabinovich and Wolfgang Thomas

- 12:30-13:00 The Power of Counting Logics on Restricted Classes of Finite Structures; Anuj Dawar and David Richerby

- 13:00-14:30 Lunch

- 14:30-16:00 Invited Tutorial: Luca de Alfaro (Santa Cruz); The Symbolic Approach to Repeated Games

Session 6: Expressiveness

- 16:00-16:30 Comparing the Expressive Power of Well-structured Transition Systems; Giorgio Delzanno, Parosh Aziz Abdulla and Laurent Van Begin

- 16:30-17:00 There Exist Some ?-Powers of Any Borel Rank; Olivier Finkel and Dominique Lecomte

- 17:00-17:30 Coffee Break

Session 7: Games and Trees

- 17:30-18:00 Satisfiability of a Spatial Logic with Tree Variables; Emmanuel Filiot, JeanMarc

- Talbot and Sophie Tison

- 10:00-18:30 Forest Expressions; Mikolaj Bojanczyk

- 18:30-19:00 MSO on the Infinite Binary Tree: Choice and Order; Arnaud Carayol and Christof Loeding

Wednesday 12 September

- 09:00-10:30 Invited Tutorial: Hendrik Jan Hoogeboom (Leiden): Tree Transducers

- 10:30-10:45 Coffee Break

Session 8

- 10:45-11:15 On Devising Algorithms for Ehrenfeucht-Frȧ?ssé Games; Nicola Vitacolonna (Universita Udine)

- 11:15-11:45 The Church Problem for Countable Ordinals; Alexander Rabinovich (Tel Aviv U)

- 11:45-12:15 On the topological complexity of weakly recognizable tree languages; Filip Murlak (Warsaw)

- 12:15-14:00 Lunch

- 14:00-15:30 Invited Tutorial: Sylvain Sorin (Paris) Zero-sum repeated games: basic results and new advances

- 15:30-16:00 Coffee Break

Session 9

- 16:00-16:15 The complexity of finding Nash equilibria in infinite games; Michael Ummels

- 16:15-16:30 Memory Reduction for Strategies in Infinite Games; Michael Holtmann (Aachen)

- 16:30-17:00 Games You Cannot Win; Marco Faella (Napoli)

- 17:00-17:30 Non-zero-sum games in verification and synthesis; Tom Henzinger (Lausanne)

- 17:30-18:00 Bus: Lausanne to Lavaux

- 18:00-18:30 Gentle walk through the vineyards

- 18:00-23:00 Gala Diner at Wannaz

- 23:00-23:30 Bus: Lavaux to Lausanne

Thursday 13 September (AutoMathA day)

- 09:00-10:30 Invited Tutorial: Javier Esparza (Munich) O(f(t)) is not Enough: Beyond Big-Oh Runtime Analysis in Automata Theory

- 10:30-10:45 Coffee Break

Session 10

- 10:45-11:15 Analyzing heaps using automata; P. Madhusudan (Illinois U-C)

- 11:15-11:45 Infinite-state Automata and Pushdown Rewriting; Salvatore La Torre (Universita Salerno)

- 11:45-12:15 Recursion Schemes and Collapsible Pushdown Automata; Luke Ong

- 12:15-14:00 Lunch

Session 11

- 14:00-14:30 Semi Identical Twin Plants; Sophie Pinchinat (Canberra)

- 14:30-15:00 Infinite State AMC-Model Checking for Cryptographic Protocols; Ralf Küsters (Zurich)

- 15:00-15:30 Games on strategies: on comparing nondeterministic programs; Andrzej Murawski (Oxford)

- 15:30-16:00 Undirected graphs of entanglement 2; Luigi Santocanale (Marseilles)

- 16:00-16:30 Coffee Break

Session 12

- 16:30-17:00 Parity games over collapsible pushdown graphs; Olivier Serre (LIAFA)

- 17:00-17:15 Saturation Methods for Global Model Checking of Higher-Order Pushdown Systems; Mathew Hague (Oxford)

- 17:15-17:30 Minimization variants of visibly pushdown automata; Patrick Chevret (LaBRI)

- 17:30-17:45 Quantifying in Games; Davi Romero Vasconcelos (Rio de Janeiro)

- 17:45-18:00 Towards an Implementation Theory via a Game Logic Approach; Davi Romero Vasconcelos (Rio de Janeiro)

- 18:00-18:15 Closing Ceremony