CIAA 2013
PROGRAM
JULY 15 – 19
HALIFAX

18th International Conference on Implementation and Application of Automata
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1. SCHEDULE

MONDAY July 15
- 1800--1930: Wine and cheese reception and registration (in SB 4th floor)

TUESDAY July 16 (all talks in room SB 255)
- 0800: REGISTRATION
- 0900: Welcome message
- 0930: Invited: "Automata for Codes", Helmut Jürgensen
- 1030: COFFEE break
- 1100: "Partial Word Automata", Balkanski, Blanchet-Sadri, Kilgore and Wyatt
  "Approximate Matching between a Context-Free Grammar and a Finite-State Automaton", Yo-Sub Han, Sang-Ki Ko and Kai Salomaa
- 1200: LUNCH (and registration: 1300--1330)
  "Two-Pass Greedy Regular Expression Parsing", Niels Bjørn Bugge Grathwohl, Fritz Henglein, Lasse Nielsen, Ulrik Terp Rasmussen
  "Early Nested Word Automata for XPath Query Answering on XML Streams", Tom Sebastian, Denis Debarbieux, Olivier Gauwin, Joachim Niehren, Mohamed Zergaoui
- 1500: COFFEE break
- 1530: "Comparing Two-Dimensional One-Marker Automata to Sgraffito Automata", Daniel Prusa, Frantisek Mraz and Friedrich Otto
  "Lambda-Confluence is Undecidable for Clearing Restarting Automata", Frantisek Mraz and Friedrich Otto

WEDNESDAY July 17
- 0800: REGISTRATION
- 0900: Invited: "Applications of Symbolic Finite Automata", Margus Veanes
- 1000: COFFEE break
- 1030: "Implementation Concepts in Vaucanson 2", Demaille, Duret-Lutz, Lombardy and Sakarovitch
  "LALBLC a program testing the equivalence of dpda's", Patrick Henry and Géraud Sénizergues
  "Computing Weights", Houda Abbad and Eric Laugerotte
- 1200: LUNCH (and registration: 1300--1330)
- 1330: "Some Decision Problems Concerning NPDAs, Palindromes, and Dyck Languages", Oscar Ibarra and Bala Ravikumar
  "Input-Driven Queue Automata: Finite Turns, Decidability, and Closure Properties", Martin Kutrib, Andreas Malcher, Carlo Mereghetti, Beatrice Palano, Matthias Wendlandt
  "Invertible Transducers, Iteration and Coordinates", Klaus Sutner
- 1500: COFFEE break
- 1530: "Deterministic counter machines and parallel matching computations", Stefano Crespi Reghizzi and Pierluigi San Pietro
"Trimming Visibly Pushdown Automata",
Mathieu Caralp, Pierre-Alain Reynier and Jean-Marc Talbot
"On Palindromic Sequence Automata and Applications",

THURSDAY July 18
- 0800: REGISTRATION
- 0900: Invited: "Cover Languages and Implementation", Cezar Câmpeanu
- 1000: COFFEE break
- 1030: "Universal Witnesses for State Complexity of Basic Operations Combined with Reversal",
  Janusz Brzozowski and David Liu Chair: Andreas Maletti
  "On the Boundary of Regular Languages",
  Jozef Jirasek and Galina Jiraskova
  "More Robust Than Thought---Brzozowski's Minimization Algorithm"
  Markus Holzer and Sebastian Jakobi
- 1200: LUNCH (and registration: 1300—1330)
- 1330: Group Picture
- 1340: **Excursion and Banquet**

FRIDAY July 19
- 0800: REGISTRATION
- 0848: "Enhancing Approximations for Regular Reachability Analysis", Chair: Stavros Konstantinidis
  Aloïs Dreyfus, Pierre-Cyrille Heam and Olga Kouchnarenko
  "Generating small automata and the Cerny conjecture",
  Andrzej Kisielewicz and Marek Szykuła
  "Incomplete Transition Complexity of Basic Operations on Finite Languages",
  Eva Maia, Nelma Moreira and Rogério Reis
- 1000: COFFEE break
- 1030: "Hyper-Optimization for Deterministic Tree Automata", Chair: Rogerio Reis
  Andreas Maletti
  "A Completion Algorithm for Lattice Tree Automata",
  Thomas Genet, Le Gall, Axel Legay and Valérie Murat
  "A Uniformization Theorem for Nested Word to Word Transductions",
  Dmitry Chistikov and Rupak Majumdar
- 1200: LUNCH
- 1330: Business Meeting
- 1430: "On Length of Homing Sequences for Nondeterministic Finite State Machines",
  Chair: Nelma Moreira
  Kushik, Yevtushenko
  "Using RegularGrammars for Event-Based Testing",
  Fevzi Belli and Mutlu Beyazit
- 1530: COFFEE break
- 1600: "Towards Nominal Context-Free Model-Checking" Chair: Stavros Konstantinidis
  Pierpaolo Degano, Gianluigi Ferrari and Gianluca Mezzetti
- 1630-1730: **Software Demo Sessions**
  "Regular languages operations and simulations with Fado"
  Nelma Moreira and Rogério Reis
  "I-LaSer: implementing the maximality problem"
  Stavros Konstantinidis and Casey Meijer
2. PRACTICAL INFORMATION

Conference room (July 16—19):
Room SB 255, in the Sobey Building—see map on next page

Wireless access: Those of you with Eduroam access can use it here at SMU, if your institution has already set you up. In any case, there will be wireless access via SMU accounts that will be given to you when you register.

Lunches: The conference fee includes four lunches at the Dockside Cafeteria—located on the main floor of Loyola Residence. Every noon during July 16-19 please go to that cafeteria (simply follow the crowd) and have your registration tag with you in order to receive a lunch ticket from Rose or Jenna who will be at the entrance of the cafeteria.

Excursion and Conference dinner: Thursday July 18 at 1340 outside of the Sobey Building (closest exit from the conference room).

City Buses: Please see the map on the next page for numbers of buses stopping at SMU. See also the page after the map for bus stops from hotels to SMU.

Dinnes and the Halifax Peninsula: The Halifax Peninsula is the location of old Halifax and the downtown, where one can find numerous eating establishments. In particular, you are encouraged to explore the area defined by the following polygon:

Lower Water Street St — South St — South Park St — Sackville St — Brunswick St — Duke St — Lower Water Street St.

Some restaurants: a Mano (Ristorante), Bistro Le Coq (French), Bluenose II, Brussels Restaurant & Brasserie, ChaBaa (Thai), Cheelin Restaurant (Chinese), Curry Village (Indian), Ela (Greek), Estia, Gingerbread Haus Bakery (German and other snacks and sweets), Hamachi House (Japanese), Salty's, Seoul Restaurant (Korean), Talay Thai, The Bicycle Thief, The Economy Shoe Shop, The Five Fishermen, Your Father's Moustache.

Halifax Attractions: The above polygon is an excellent place to explore: Pier 21, Alexander Keith's brewery, Maritime Museum of the Atlantic, Public Gardens.

Contact: Please send me an email message at any time: stavros@cs.smu.ca Most times during the conference I should have access to email via my cell phone.
CIAA talks: room SB255 (enter Sobey Building as shown, and go left a few steps to find the room)

Wine&Cheese: SB 4th floor (enter Sobey Building as shown, go straight to elevator, take elevator to 4th floor, go left around the corner)

All main buildings are wheelchair accessible and most are connected by tunnels or walkways.
**Bus Routes to Saint Mary’s University**

*Radisson Suite Hotel Halifax:* Walk up the hill to Barrington Street. Cross the street and catch the **10** (Dalhousie) or the **14** (Mumford or Leiblin Park) to Saint Mary's.

*The Lord Nelson Hotel:* Walk left from the main entrance of the hotel to the corner of Spring Garden Road and South Park Street. Turn left at this intersection and you will see a bus stop right outside of Public Gardens Dentistry. Catch the **10** (Dalhousie) or the **14** (Mumford or Leiblin Park) to Saint Mary's. OR exit from the Lord Nelson onto Spring Garden Road and the bus stop will be directly in front of you.

*Westin Nova Scotia:* Walk out to Barrington Street. Cross the street and catch the **9** (Barrington to Point Pleasant) to Saint Mary's.

*Commons Inn:* Walk to Robie Street. Cross the street and go left. Continue walking on Robie Street past Tony's. You will see a bus stop ahead. Catch the **17** (Saint Mary's) or the **18** (Universities or Saint Mary's Only) to the university.

*Courtyard by Marriott:* Walk up the hill to Barrington Street. Cross the street and catch the **10** (Dalhousie) or the **14** (Mumford or Leiblin Park) to Saint Mary's.

*Delta Halifax:* Exit the hotel onto Barrington Street. Catch the **10** (Dalhousie) or the **14** (Mumford or Leiblin Park) from the Scotia Square terminal to Saint Mary's.

*Four Points by Sheraton:* Walk up the hill to Barrington Street. Cross the street and catch the **10** (Dalhousie) or the **14** (Mumford or Leiblin Park) to Saint Mary's.

*Prince George:* Walk down Prince Street to Barrington Street. Catch the **10** (Dalhousie) or the **14** (Mumford or Leiblin Park) to Saint Mary's.
3. ABSTRACTS OF SOFTWARE DEMOS

Regular languages operations and simulations with Fado
Nelma Moreira and Rogério Reis

I-LaSer: implementing the maximality problem
Stavros Konstantinidis and Casey Meijer
Regular languages operations and simulations
with FAdo

http://fado.dcc.fc.up.pt/

Departamento de Ciência de Computadores
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Computational and descriptional complexity of regular languages continues
to be a major topic of research. Computational symbolic manipulation environ-
ments play an important role in assisting this research in several aspects. For
instance:

– Little is known about the practical performance of most classical finite au-
tomata and regular expressions algorithms and experimental results can give
valuable information.
– Random generators are essential for testing combinatorial properties of reg-
ular languages representations and average-case studies.
– Operational descriptional complexity rely heavily on the experimental search
of family languages which provides lower bounds of complexity.
– Prototyping new algorithms benifices from available libraries with common
data structures and standard algorithms.

The FAdo system aims to provide an open source extensible software li-
brary for the symbolic manipulation of regular languages and other formal
languages. FAdo is implemented in Python and currently includes most stan-
dard operations for the manipulation of regular languages through finite au-
tomata (Python classes DFA, NFA, or GFA) and regular expressions (reex). Ele-
mentary regular language operations, such as, union, intersection, complementa-
tion, concatenation, iteration, and reverse are implemented for each class.
Many combined operations for DFA have specialized algorithms. Witness fam-
ilies for several operational complexity lower bounds are defined and a canonical
representation is supported. Several conversions between representations are
implemented: NFA to DFA, NFA to reex, GFA to reex, reex to NFA, etc.. For
DFA, several minimization (and hyperminimization) algorithms are available:
Moore, Hopcroft, Brzozowski, and some incremental algorithms. NFA minimiza-
tion via universal automata is implemented but with the inherent inefficiency.
Some support is provided for computing syntactic semigroups. There are sev-
eral algorithms for language equivalence based on bisimulation-like algorithms.
Finite languages can also be represented, by tries and AFA (acyclic finite au-
tomata). Exact and random generators for some classes of automata and regular
expressions are also available. More detailed information on the models and
the respective operations implemented can be found in the documentation file
In this presentation we will focus in a new implementation of (reduced) regular expressions modulo some algebraic properties: associativity (A), commutativity (C), and idempotence (I) of the disjunction; and associativity of concatenation (AC). This also includes extended regular expressions with intersection and complement. We will present new algorithms for equivalence of extended regular expressions and conversions to finite automata.
I-LaSer: implementing the maximality problem¹
Stavros Konstantinidis and Casey Meijer
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I-LaSer is a software consisting of a web interface [6] and an implementation of
several algorithms written in C++ and Python. These algorithms make extensive
use of the FAdo library for finite state machines [1, 3]. I-LaSer is currently capable
of answering the following decision problem.

– **The satisfaction question:** Given the description of a regular language
and the description of an independence property, decide whether the lan-
guage satisfies the property.

In case the answer to the above question is negative, I-LaSer returns a pair
of words violating the property. Examples of independence properties include
prefix, suffix, bifix, infix, outfix, and solid codes, hypercodes, [5], and error-
detecting languages for various cases of error situations [2].

In this talk we show our progress in an implementation for answering the
following decision problem.

– **The maximality question:** Given the description of a regular language
and the description of an independence property, decide whether the language is
maximal with respect to that property.

In case the answer to the above question is negative, the implementation returns
one or two words, each of which if added to the language (though not necessarily
both), then the resulting language also satisfies the property. At the time of
writing this extended abstract, the implementation of the maximality problem
was not incorporated into I-LaSer, as some interface type programming issues
remained to be resolved.

We note that, in general, the maximality problem is PSPACE-hard, and the
algorithm used to decide it is of exponential time/space complexity in the worst
case. For this reason, if the size of any of the constructed finite state machines
involved in the algorithm exceeds $10^6$ states, then the algorithm interrupts its
execution with an appropriate message to the user.

The web interface allows the user to specify the files containing the descriptions
of the regular language and the desired property. Regular languages can be described via NFAs using the Grail [4] or the FAdo format [3]. The issue of
describing language properties is a central theme in this line of research. More
details will be given in the talk. The reader is also referred to [2] for details.

¹ Research supported by NSERC.
References

4. SPONSORS

- Saint Mary's University
- Microsoft Research
- Atlantic Canada's premier meetings destination
- European Association for Theoretical Computer Science