Workshop on

Algorithms & Theories for the Analysis of Event Data (ATAED’2017)

Zaragoza, Spain, June 26-27, 2017

Satellite event of the conferences

17th International Conference on Application of Concurrency to System Design (ACSD 2017)

38th International Conference on Application and Theory of Petri Nets and Concurrency (PN 2017)

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Preface

Ehrenfeucht and Rozenberg defined regions about 25 years ago as sets of nodes of a finite transition system. Every region relates to potential conditions that enable or disable transition occurrences in an associated elementary net system. Later, similar concepts were used to define regions for Petri nets from languages as well. Both state-based and language-based approaches aim to constrain a Petri net by adding places deduced from the set of regions. By now, many variations have been proposed, e.g., approaches dealing with multiple tokens in a place, region definitions for Petri nets with inhibitor arcs, extensions to partial languages, regions for infinite languages, etc.

Initially, region theory focused on synthesis. We require the input and the behavior of the resulting Petri net to be equivalent. Recently, region-based research started to focus on process mining as well where the goal is not to create an equivalent model but to infer new knowledge from the input. Process mining examines observed behavior rather than assuming a complete description in terms of a transition system or prefix-closed language. For this reason, one needs to deal with new problems such as noise and incompleteness. Equivalence notions are replaced by trade-offs between fitness, simplicity, precision, and generalization. A model with good fitness allows for most of the behavior seen in the event log. A model that does not generalize is “overfitting”. Overfitting is the problem that a very specific model is generated whereas it is obvious that the log only holds example behavior. A model that allows for “too much behavior” lacks precision. Simplicity is related to Occam’s Razor which states that “one should not increase, beyond what is necessary, the number of entities required to explain anything”. Following this principle, we look for the simplest process model that can explain what was observed in the event log. Process discovery from event logs is very challenging because of these and many other trade-offs. Clearly, there are many theoretical process-mining challenges with a high practical relevance that need to be addressed urgently.

All these challenges and opportunities are the motivation for organizing the Algorithms & Theories for the Analysis of Event Data (ATAED) workshop. The workshop first took place in Brussels in 2015 as a succession of the Applications of Region Theory (ART) workshop series. The second workshop took place in Toruń in 2016. After the success of both workshops, it is only natural to bring together researchers working on region-based synthesis and process mining again.

The ATAED’2017 workshop took place in Zaragoza on June 26-27, 2017 and was a satellite event of both the 38th International Conference on Application and Theory of Petri Nets and Concurrency (Petri Nets 2017) and the 17th International Conference on Application of Concurrency to System Design (ACSD 2017). Papers related to process mining, region theory and other synthesis techniques were presented at ATAED’2017. These techniques have in common that “lower level” behavioral descriptions (event logs, partial languages, transition systems, etc.) are used to create “higher level” process models (e.g., various classes of Petri nets, BPMN, or UML activity diagrams). In fact, all techniques that aim at learning or checking concurrent behavior from transition systems, runs,
or event logs were welcomed. The workshop was supported by the IEEE Task Force on Process Mining (www.win.tue.nl/ieeetfpm/).

After a careful reviewing process, twelve papers were accepted for the workshop. Overall, the quality of the submitted papers was good and most submissions matched the workshop goals very well. We thank the reviewers for providing the authors with valuable and constructive feedback. Moreover, we were honored that Thomas Hildebrandt was willing to give an invited talk on “Modelling & Mining Event-based Concurrent Declarative Processes as Dynamic Condition Response Graphs”. We thank Thomas, the authors, and the presenters for their wonderful contributions.

Enjoy reading the proceedings!

Wil van der Aalst, Robin Bergenthum, and Josep Carmona
June 2017

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## Table of Contents

Sebastiaan J. van Zelst, Alfredo Bolt, Boudewijn F. van Dongen  
*Tuning Alignment Computation: An Experimental Evaluation*  
6 - 20

Robert Lorenz, Johannes Metzger, Lev Sorokin  
*Synthesis of bounded Petri Nets from Prime Event Structures with Cutting Context using Wrong Continuations*  
21 - 38

Evgeny Erofeev, Harro Wimmel  
*Reachability Graphs of Two-Transition Petri Nets*  
39 - 54

Krysztof Łęcki, Jerzy Tyszkiewicz, Jacek Sroka  
*Structural Induction as a Method to Distribute the Generation of a Trace Language Representation for Complex Systems*  
55 - 70

Robin Bergenthum, Benjamin Meis  
*Mining with Eve – Process Discovery and Event Structures*  
71 - 75

Ryszard Janicki, Jetty Kleijn, Maciej Koutny, Łukasz Mikulski  
*On Synthesising Step Alphabets for Acyclic Invariant Structures*  
76 - 88

Luca Bernardinello, Carlo Ferigato, Lucia Pomello, and Adrián Puerto Aubel  
*On Stability of Regional Orthomodular Posets*  
89 - 105

Benjamin Dalmas, Niek Tax, Sylvie Norre  
*Heuristics for High-Utility Local Process Model Mining*  
106 - 121

Uli Schlachter, Valentin Spreckels  
*Synthesis of Labelled Transition Systems into Equal-Conflict Petri Nets*  
122 - 130

Ernesto López-Mellado, Tonatiuh Flores-Tapia  
*Refining Discovered Petri Nets by Sequencing Repetitive Components*  
131 - 138

Markus Huber, Matthias Wolff  
*Segmenting Sequences Semantically. Using Petri Net Transducers for the Translation from Sequential Data to Non-Sequential Models*  
139 - 157

Sergio Hernández, Pedro Álvarez, Javier Fabra, Joaquín Ezpeleta  
*Using Model Checking to Identify Customers’ Purchasing Behaviour in an E-Commerce*  
158 - 164