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Formal Modeling and Analysis of Timed Systems

19th International Conference, FORMATS 2021
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Proceedings

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Preface

This volume contains the papers presented at the 19th International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS 2021), held virtually, and hosted by the Laboratoire d'Algorithmique, Complexité et Logique (LACL), Université Paris-Est Créteil, France, during August 24–26, 2021. The event was part of QONFEST 2021, co-located with CONCUR, FMICS, and QEST.

FORMATS is an annual conference aimed at promoting the study of fundamental and practical aspects of timed systems, and bringing together researchers from different disciplines that share interests in modeling, design, and analysis of timed computational systems. The conference principally aims to attract researchers interested in real-time issues in hardware design, performance analysis, real-time software, scheduling, semantics, and verification of real-timed, hybrid, and probabilistic systems. In response to the call for papers, a total of 19 submissions were received. Each submission was assigned to at least three Program Committee (PC) members, aided by 15 external subreviewers. The PC decided to accept eight papers for inclusion in the scientific program. The selection was made on the basis of novelty, rigour, presentation style, and relevance to the FORMATS community.

The conference also welcomes research works concerning applications of real-time systems on relevant topics in interdisciplinary areas. This year, the conference had a special session on control synthesis and motion planning for cyber-physical and control systems. The papers accepted for this session covered a variety of topics, from model-based and data-driven approaches to analysis and control design for systems with logical and temporal specifications. The selection of papers and coordination for this session was chaired by Morteza Lahijanian (University of Colorado Boulder, USA).

Apart from the contributed talks, the event included invited presentations by Jana Tumova (KTH Royal Institute of Technology, Sweden) and Daniele Magazzeni (J. P. Morgan AI Research, UK). This volume contains all the contributed papers presented at the conference, and the paper and abstract accompanying the two invited talks.

We wish to thank all authors who contributed to FORMATS for their interest in this conference, the Program Committee members for their scholarly effort, and the Organizing Committee for ensuring a lively event despite the difficulties related with organizing it virtually. Finally, we would like to thank the FORMATS Steering Committee for the continuous support, with special thanks to Martin Fränzle, Steering Committee chair.

We were very happy to serve as PC chairs of FORMATS 2021. We hope that you will enjoy and profit from the papers in this volume and that the works herein will inspire further progress and new research directions on timed systems and adjacent areas.

July 2021   Catalin Dima
                                                              Mahsa Shirmohammadi

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Temporal Reasoning for Intelligent Financial Services: Examples and Challenges (Abstract)

Daniele Magazzeni

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Abstract. Temporal reasoning can play a key role in the financial do-main. In this talk, I will present several research directions we are pursuing and discuss how temporal reasoning can help in a variety of problems faced by large financial institutions. Active research activities include efficient resource allocations, time series analysis, behavioural reasoning, fraud detection, and market predictions. I will offer concrete examples of projects, presenting the contributions and highlighting the main challenges. I will then focus on a more specific area that has strong implications for temporal reasoning, namely Explainable AI (XAI). XAI represents an increasingly critical feature of operations undertaken within the financial industry, as brought about by the growing sophistication of AI models and the demand for fairness, safety and interpretability. I will present some novel XAI techniques we developed that leverage temporal reasoning, and future directions. I will conclude highlighting the many challenges and opportunities for temporal reasoning in the financial do-main.

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