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Scalable Uncertainty Management

14th International Conference, SUM 2020 Bozen-Bolzano, Italy, September 23–25, 2020 Proceedings

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Preface

This volume contains papers from the 14th International Conference on Scalable Uncertainty Management (SUM 2020). Established in 2007, the SUM conferences are annual events which aim to gather researchers with a common interest in managing and analyzing imperfect information from a wide range of fields, such as Artificial Intelligence and Machine Learning, Databases, Information Retrieval and Data Mining, the Semantic Web, and Risk Analysis. It aims to foster collaboration and cross-fertilization of ideas from these different communities.

SUM 2020 was initially planned to be held in Bolzano, Italy, during September 23–25, 2020. Moreover, it was supposed to take place in the context of the Bolzano Summer of Knowledge, which aimed to bring together researchers from multiple different disciplines such as Philosophy, Knowledge Representation, Logic, Conceptual Modeling and Ontology Engineering, Biology, Medicine, Cognitive Science, and Neuroscience. The idea was to have several weeks of conferences, workshops, and summer schools related to these areas, all with an emphasis on exploring themes around knowledge. Unfortunately, the COVID-19 pandemic forced the postponement of this event. Therefore, SUM 2020 was changed to a fully virtual conference.

Prior to the conference, SUM 2020 solicited three types of paper submissions. Long papers could report on original research, or provide a survey that synthesizes some current research trends. Short papers could be about promising work in progress, system descriptions, or position papers on controversial issues. Finally, extended abstracts could report on recently published work in a relevant journal or top-tier conference. A special feature of SUM 2020 was the addition of a PhD track for papers where the first author was a PhD student. We received 30 submissions, all of which were reviewed by at least three members of the Technical Program Committee. On the basis of these reviews, 12 submissions were accepted as long papers and 9 as short papers.

The conference also included two invited talks. The first invited speaker was Gabriella Pasi from the University of Milano-Bicocca, Italy. She gave a talk on "Assessing Information Credibility in the Social Web." The second invited speaker was V. S. Subrahmanian from Dartmouth College, USA, and his talk was on "Deception, Deterrence and Security."

Additionally, there were five invited tutorials. Vaishak Belle from the University of Edinburgh and the Alan Turing Institute, UK, gave a tutorial entitled "Symbolic Logic meets Machine Learning: A Brief Survey in Infinite Domains." Leopoldo Bertossi from Adolfo Ibáñez University, Chile, gave a tutorial entitled "Score-Based Explanations in Data Management and Machine Learning." Davide Ciucci from the University of Milano-Bicocca, Italy, gave a tutorial on "Rough sets." Frédéric Pichon from Artois University, France, spoke about "Information fusion using belief functions: source quality and conflict." Finally, Steven Schockaert from Cardiff University, UK, spoke about "Representing Knowledge using Vector Space Embeddings." The tutorial

authors also had a chance to submit a 14-pages paper, that was reviewed by the Program Committee co-chairs, to be included in these proceedings. Vaishak Belle and Leopoldo Bertossi have such a paper.

There are a number of people we would like to thank for their support in preparing this conference. Our appreciation is particularly warranted this year, due to the additional stresses, uncertainties, and complications posed by the worldwide COVID-19 pandemic. Firstly, we would like to thank Rafael Peñaloza who was initially in charge of local arrangements and maintaining the conference's web presence. He then pivoted towards helping coordinate the online component of the conference. Secondly, we would like to thank the SUM Steering Committee, which was chaired by Henri Prade. They provided invaluable advice along the way by proposing potential tutorial speakers and helping us navigate the transition from a physical to virtual conference. Thirdly, we would like to thank the members of the Technical Program Committee for providing high-quality and timely reviews. We would like also to thank all authors who submitted papers to the conference. Finally, we are very grateful to Springer for sponsoring the Best Student Paper Award as well as for the ongoing support of its staff in publishing this volume.

July 2020

Jesse Davis
Karim Tabia

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Abstracts of Invited Talks

Assessing Information Credibility in the Social Web

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Abstract. In the context of the Social Web, where a large amount of User Generated Content is diffused through Social Media without any form of trusted external control, the risk of running into misinformation is not negligible. For this reason, the issue of assessing the credibility of "potential" information is of increasing interest and importance. In the last few years several approaches have been proposed to automatically assess the credibility of UCG in Social Media. Most are data-driven approaches, based on machine learning techniques, but recently model-driven approaches are also being investigated, in particular, approaches relying on the Multi Criteria Decision Making paradigm. In this talk an overview of the approaches aimed at tackling this problem are addressed, with particular emphasis on model driven approaches; their application to specific problems will also be addressed.

Deception, Deterrence and Security

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Abstract. Deception is at the heart of many security issues. For instance, phishing and spear-phishing attacks use deception. So do man in the middle attacks in which, for instance, a fake cell tower deceives individual mobile devices to connect to them. However, deception can also be used for "good" in order to inject uncertainty and inflict costs on a malicious adversary. In this talk, I will go over 2 major case studies involving deception for good which have a deterrent effect on a malicious adversary. In the first, I will discuss how selective disclosure of probabilistic logic-based behavioral models can help shape the actions of terrorist groups, making their behavior more predictable (for us) and hence more defendable. In a second application, this time in cybersecurity, I will show methods and a prototype system to inflict costs on an adversary who steals valuable intellectual property by populating a network with automatically generated fake documents that masquerade as intellectual property.

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