The 33rd Annual ACM Symposium on Applied Computing

Pau, France
April 9-13, 2018

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Tuesday Keynote Title: Non-standard supervised classification problems

Dr. Jose A. Lozano
University of the Basque Country UPV/EHU
Spain

Abstract: The literature around machine learning has recently seen many problems that depart from the standard supervised classification problem. In these problems the common structure of a supervised dataset where there is a label associated to each instance is broken: an instance can have several labels, a label is assigned to a subset of instances, etc. These problems present different degrees of uncertainty in learning but also in prediction. In this talk we will provide a taxonomy of non-standard machine learning problems illustrating each of them with case examples. We will also elaborate on how to learn classifiers in these scenarios, how to evaluate them and finally we will point out to some results on PAC learning on these problems.

BIO: Jose A. Lozano received the PhD in computer science in 1998 and currently is full professor in the Department of Computer Science and Artificial Intelligence at the University of the Basque Country UPV/EHU (Spain) where he leads since 2005 the Intelligent Systems Group. His research interests ranged over several areas of computer science, particularly metaheuristic optimization, probabilistic graphical models and machine learning and their application to problems in biomedicine, bioinformatics, ecology and risk analysis, to name a few. Prof. Lozano has published more than 100 ISI journal papers receiving his works more than 9100 citations in google scholar. He is currently associate editor of IEEE Trans. on Neural Networks and Learning Systems and IEEE Trans. Evolutionary Computation and member of the editorial board of Evolutionary Computation journal, memetic computing and several other journals on computational intelligence.

Thursday Keynote Title: From Smart Data Systems to Smart Industrial-Purpose Applications

Prof. Michael P. Papazoglouholds
Tilburg University
Netherlands

Abstract: Smart data systems and applications support the processing and integration of data into a unified view from disparate big data sources, sensors and devices in the Internet of Things, social platforms, and databases, whether on-premises or cloud, and software-as-a- service applications to enable more effective decision making. The decisive criterion here is not necessarily the amount of data available, but smart content techniques that promote not only the collection and accumulation of related data, but also its context, and understanding. This requires discovering associations between the data, prioritizing results, finding useful insights, discovering patterns and trends within the data to reveal a wider picture that is more relevant to the problem in hand and react to them. The mechanisms that convert stale data to smart data focus on knowledge-based meta-data representation techniques that structure and associate the data sets and content, annotate them, link them with associated processes and software services, and deliver or syndicate information to recipients.
Smart Industrial-Purpose Applications are a new generation of software applications that combine the benefits of smart data and advanced analytics to help organizations manage their resources (including humans), data, sensors, processes and systems more efficiently. They promise to bring greater speed and efficiency to industries as diverse as smart agriculture, smart cities, smart manufacturing, and smart healthcare delivery where they can provide meaningful insights to decision makers and help them solve complex problems.

This talk will focus on the role, characteristics, potential of smart data and applications for diverse domains, and their enabling technologies. To illustrate the potential of smart data and applications, the talk will draw on examples that highlight the interplay of medical and technical aspects of smart healthcare applications. Smart healthcare involves deploying computing, information, service, sensor and visualization technologies to aid in preventing disease, improving the quality of care and lowering overall cost. The talk will also examine the design and deployment requirements, particularly for point -of-care medical applications, which emerge from the interplay of the actual clinical situation and the novelty of the smart healthcare application.

BIO: Prof. Michael (Mike) Papazoglou is a highly acclaimed academic with noteworthy experience in areas of education, research and leadership pertaining to computer science, information systems, service-engineering, cloud computing, and digital manufacturing. He holds the Chair of Computer Science and is the executive director of European Research Institute in Service Science (ERISS) at Tilburg University. He is noted as one of the original promulgators of ‘service-oriented computing’ and was the scientific director of the acclaimed EU Network of Excellence in Software Systems and Services (S-CUBE). He is renowned for establishing local ‘pockets of research excellence’ in service science and engineering in several European countries, China, Australia and the Middle East. Papazoglou is an author of the most highly cited

papers in the area of service engineering and Web services worldwide with a record of publishing 25 (authored and edited) books, and over 200 prestigious peer-refereed papers along with approx. 17,000 citations (H-index factor 52). He is a distinguished/honorary professor with an exemplary teaching and R&D record at 11 universities around the globe. He is the founder and editor-in-charge of the MIT Press book series on Information Systems as well as the founder and editor-in-charge of the Springer-Verlag book series on Service Science. His expertise is in the areas of Distributed Systems, Service Oriented Computing, Cloud Computing, Data Engineering and Federated Databases, IoT, Software Engineering, Model Driven Architectures, and Smart Applications, such as Smart Cities and Smart Manufacturing.

Message from the Symposium Chairs

Hisham M. Haddad
Conference Co-Chair

Roger L. Wainwright
Conference Co-Chair

Richard Chbeir
Conference Vice-Chair

On behalf of the Organizing Committee, we welcome you to the 33rd Annual ACM Symposium on Applied Computing (SAC 2018), hosted by Université de Pau et des Pays de l'Adour (UPPA), Pau, France. For more than three decades this international forum has been dedicated to computer scientists, engineers, and practitioners for the purpose of presenting their research findings and results in various areas of applied computing. The organizing committee is grateful for your participation in this exciting international event. We hope that this conference proves interesting and beneficial for all of you. The Symposium on Applied Computing is sponsored by the ACM Special Interest Group on Applied Computing (SIGAPP), whose mission is to further the interests of computing professionals engaged in the design and development of new computing applications, interdisciplinary applications areas, and applied research. This conference is dedicated to the study of applied computing research of real-world problems. In addition, this event provides an avenue to discuss and exchange new ideas in the wide spectrum of applied computing areas. We all recognize the importance of updating the latest developments and research in our current areas of expertise.

SAC 2018 offers Tutorials, Technical Tracks, and Poster Sessions. The success of the conference can be attributed to the substantial contribution of dedicated Track Chairs and Co-Chairs. Each track maintains a program committee and a group of highly qualified reviewers. We wish to thank the Track Chairs, Committee Members, and participating reviewers for their hard work and effort to make SAC 2018 a high quality conference. We also thank our invited keynote speakers, Dr. Jose A. Lozano, University of País Vasco, Spain, and Prof. Michael P. Papazoglouholds, Tilburg University, Netherlands, for sharing their knowledge and expertise with SAC 2018 attendees. Most of all, we would like to especially thank the authors and presenters for sharing their experience with the rest of us, and all attendees for joining us in Pau, France this year.

The local organizing committee has been a major contributor to the success of the conference. Our gratitude goes to the Local Arrangement Chairs Dr. Philippe Lopisteguy, University of Pau & Pays Adour, France, and Dr. Haritza Camblong Ruiz, University of País Vasco, Spain. We extend our thanks to the Publication Chair, Dr. Hossain Shahriar, Kennesaw State University, Marietta, Georgia, USA, for his tremendous effort in putting together the conference proceedings, to the Posters Chair, Dr. Chih-Cheng Hung, Kennesaw University, Marietta, Georgia, USA, for managing the Poster Program, and to the Tutorials Chairs Drs. Ernesto Exposito and Philippe Arnould, University of Pau & Pays Adour France, for arranging an exciting set of Tutorials. Many thanks to Dr. Armin R. Mikler, University of North Texas, Denton, Texas, USA for organising the Student Research Competition. Finally, special thanks to our Program Co-Chairs Dr. Dongwan Shin, New Mexico Tech, Socorro, New Mexico, USA, and Dr. Maria Lencastre, University of Pernambuco, Recife, Pernambuco, Brazil, for coordinating and bringing together an excellent Technical Program.

Again, we welcome you to SAC 2018 in the beautiful city of Pau, France. We hope you enjoy the SAC 2018 conference and your stay in France. Next year, we invite you to participate in SAC 2019.

Message from the Program Chairs

Dongwan Shin
New Mexico Tech University
New Mexico, USA

Maria Lencastre
University of Pernambuco
Recife, Pernambuco, Brazil

Welcome to the 33rd International Symposium on Applied Computing (SAC 2018). For the past 32 years, SAC has become a major international venue for computing researchers and applied practitioners to convene and share ideas on recent developments in a variety of applied areas of computer science and information technology. The success of SAC has been the consolidation of a wide range of applied areas into specialized modules called *Tracks*. Each of the Tracks is then organized and administered by experts in the respective areas by instituting program committees, carrying out blind reviews according to the ACM guidelines, and finally selecting highly qualified papers for the Track. Since its inception fifteen years ago, the Poster Sessions at SAC have become a tradition, and this year again the Poster will be an integral part of the Technical Program at SAC 2018.

The open Call for Track Proposals and after prescreening the proposals, 40 Tracks were finally accepted for SAC 2018. The prescreening and selections were made based on the success of those Tracks in the previous SACs as well as targeting new and emerging areas. The Call for Papers for these Tracks attracted 931 final paper submissions from over 50 different countries. The submitted papers underwent the blind review process and 235 submissions were finally accepted as full papers for inclusion in the Conference Proceedings and presentation during the Symposium. The final acceptance rate for SAC 2018 is (25%) for the overall track. In addition to the accepted full papers, 53 submissions that received high enough review scores were accepted as poster papers for the Posters program. The Student Research Competition (SRC) program, sponsored by Microsoft Research, is designed to provide graduate students the opportunity to meet and exchange ideas with researchers and practitioners in their areas of interest. 51 SRC abstract submissions received and finally 19 (37%) submissions were accepted.

The Technical Program of SAC 2018 is made possible through the hard work of many people from the scientific community who have volunteered and committed many hours to make it a success. Much credit goes to all Track Chairs for making SAC 2018 Technical Sessions a huge success. Some of the popular Tracks had an unprecedented submissions and having at least three blind reviews for each paper was certainly a major challenge. Once again this year, we follow the previous years' tradition in organizing various tracks into five different themes. The Symposium Proceedings and the technical presentations are focused around these themes to form a series of related track sessions. On behalf of the entire SAC 2018 Organizing Committee, we congratulate all the authors for having their papers accepted in their respective Tracks, and we wish to thank all of those who made this year's technical program a great success. Specifically, we wish to thank the speakers, posters chair, SRC chair, track chairs, reviewers, technical program committee members, session chairs, presenters, and all the attendees. We also wish to convey our special thanks to the local organizing committee. We wish you all a pleasant stay in Pau, France, and have the opportunity to share and exchange your ideas and foster new collaborations. We also hope to see you at SAC 2019.

Track Chairs

Theme: Artificial Intelligence and Agents

ACMCMPH - Advanced Computational Methods in Biomedical Imaging and Population Health Track

Soon Ae Chun, City University of New York, USA
Ayman EL-Baz, University of Louisville, USA
Mohammed EL Hassouni, Mohammed V University in Rabat, Morocco
Rachid Jennane, University of Orleans, France
Armin Mikler, University of North Texas, USA

BIO - Bionformatics Track

Juan Manuel Corchado, University of Salamanca, Spain
Paola Lecca, University of Trento, Italy
Dan Tulpan, National Research Council, Canada

CIVIA - Computational Intelligence and Video & Image Analysis Track

Yin-Fu Huang, National Yunlin University of Science and Technology, Taiwan
Agostinho Rosa, University of Lisbon, Portugal

CoCo - Cognitive Computing Track

Mauro Dragoni, Fondazione Bruno Kessler (FBK), Italy
Marco Rospocher, Fondazione Bruno Kessler (FBK), Italy

IRMAS - Intelligent Robotics and Multi-Agent Systems Track

Rui P. Rocha, ISR – University of Coimbra, Portugal
Daniel Kudenko, University of York, UK
Shaojie Shen, HKUST, Hong Kong, China

KEGeoD - Knowledge Extraction from Geographical Data Track

Maguelonne Teisseire, UMR TETIS, France
Christian Sallaberry, University of PAU & PAYS ADOUR, France
Eric Kergosien, University of LILLE, France
Cyril de Runz, University of Reims, France
Thomas Guyet, AGROCAMPUS-OUEST/IRISA, France

KRR - Knowledge Representation and Reasoning Track

Stefano Bistarelli, Università di Perugia, Italy
Martine Ceberio, Univerity of Texas El Paso, USA
Eric Monfroy, Universite´ de Nantes, France
Francesco Santini, Università di Perugia, Italy

Theme: Distributed Systems

CC - Cloud Computing Track
SD Madhu Kumar, National Institute of Technology Calicut, India
Priya Chandran, National Institute of Technology Calicut, India

CCS – Collective and Cooperative Systems Track
Maurice ter Beek, ISTI-CNR, Italy
Barbara Re, University of Camerino, Italy
Mirko Viroli, University of Bologna, Italy
Rachid Anane, Coventry University, UK
Rami Bahsoon, University of Birmingham, UK

DADS - Dependable, Adaptive, and Secure Distributed Systems Track
Karl Goeschka, UAS Technikum Vienna, Austria
Rui Oliveira, Universidade do Minho, Portugal
Peter Pietzuch, Imperial College London, UK
Giovanni Russello, University of Auckland, New Zealand

IoT - Internet of Things Track
Gail-Joon Ahn, Arizona State University, USA
Seong-je Cho, Dankook University, South Korea
Jun Zheng, New Mexico Institute of Mining and Technology, USA

MCA - Mobile Computing and Applications Track
Hong Va Leong, The Hong Kong Polytechnic University, Hong Kong, China
Sheikh Iqbal Ahamed, Marquette University, USA

NET - Networking Track
Mário M. Freire, University of Beira Interior, Portugal
Marília Curado, University of Coimbra, Portugal
Ivan Ganchev, University of Limerick, Ireland

WCN - Selected Areas of Wireless Communications and Networking Track
Dongkyun Kim, Kyungpook National University, South Korea
Wei Wang, San Diego State University, USA

WT - Web Technologies Track
Tim A. Majchrzak, University of Agder - Kristiansand, Norway
Cristian Mateos, UNICEN University - Tandil, Argentina
Francesco Poggi, University of Bologna - Bologna, Italy

Theme: Information Systems

BPMEA - Business Process Management & Enterprise Architecture
Davide Rossi, University of Bologna, Italy
Marco Brambilla, Politecnico di Milano, Italy

DM - Data Mining Track
Hasan Jamil, University of Idaho, USA
Rosa Meo, Università degli Studi di Torino, Italy

DS - Data Streams Track
Albert Bifet, LTCI, Telecom ParisTech, France
Andre Carvalho, ICMC, USP, Brazil
Joao Gama, University of Porto, Portugal

DTTA - Database Theory, Technology, and Applications Track
Ramzi Haraty, Lebanese American University, USA
Apostolos Papadopoulos, Aristotle University, Greece
Junping Sun, Nova Southeastern University, USA

IAR - Information Access and Retrieval Track
Gloria Bordogna, CNR-IREA Consiglio Nazionale delle Ricerche, Italy
Gabriella Pasi, Università degli Studi di Milano Bicocca, Italy

SONAMA - Social Network and Media Analysis Track
Sang-Wook Kim, Hanyang University, South Korea

SWA - Semantic Web and Application Track
Hyoil Han, Illinois State University, USA
Soon Ae Chun, City University of New York, USA
Sangsoo Sung, Google Inc, USA

Theme: Software Design and Development

OOPPS - Object Oriented and Parallel Programming and Systems Track
Davide Ancona, University of Genova, Italy
Frédéric Loulergue, Northern Arizona University, USA

PL - Programming Languages Track
Barrett Bryant, University of North Texas, USA
Rajeev Raje, Indiana University-Purdue University-Indianapolis, USA
Marjan Mernik, University of Maribor, Slovenia

RE - Requirements Engineering Track
Jaelson Castro, Universidade Federal de Pernambuco, Brazil
João Araújo, Universidade Nova de Lisboa, Portugal

SATTA - Software Architecture: Theory, Technology, and Applications Track
Marina Mongiello, Politecnico di Bari, Italy
Diego Perez-Palacin, Linnaeus University, Sweden
Sungwon Kang, Korea Advanced Institute of Science and Technology, S. Korea
Patrizia Scandurra, DIGIP, University of Bergamo, Italy

SE - Software Engineering Track
Eunjee Song, Baylor University, USA
Byungjeong Lee, University of Seoul, South Korea
Tao Zhang, Harbin Engineering University, China

SOAP - Service-Oriented Architecture and Programming Track
Massimo Bartoletti, University of Cagliari, Italy
Gwen Salaün, Université Grenoble Alpes, France
Luís Cruz-Filipe, University of Southern Denmark, Denmark

SP - Software Platforms Track
Jinman Jung, Hannam University, South Korea
Jun Huang, Chongqing University of Posts and Telecom, China
Hong Min, Hoseo University, South Korea

SVT - Software Verification and Testing Track
Yliès Falcone, Univ. Grenoble Alpes, France
Leonardo Mariani, University of Milano Bicocca, Italy

UE - Usability Engineering Track
Eduardo Mosqueira Rey, University of A Coruña, Spain
Vicente Moret Bonillo, University of A Coruña, Spain
David Alonso Ríos, University of A Coruña, Spain

VSPLE - Variability and Software Product Line Engineering Track
Abdelhak-Djamel Seriai, University of Montpellier, France
Tewfik Ziadi, University Pierre et Marie Curie, France

Theme: System Software and Security

CPS - Cyber-Physical Systems Track
Ai-*Chun Pang, National Taiwan University, Taiwan*
Chun Jason Xue, City University of Hong Kong, China
Jingtong Hu, University of Pittsburgh, USA

EMBS - Embedded Systems Track
Li-Pin Chang, National Chiao-Tung University, Taiwan
Marco Di Natale, Scuola Superiore S. Anna, Italy

HCI - Smart Human Computer Interaction Track
Soon Ki Jung, Kyungpook National University, South Korea
Anand Paul, Kyungpook National University, South Korea
Ganesh Kumar, Anna University, India

OS - Operating Systems Track
Bongjae Kim, Sun Moon Univeristy, South Korea
George Hamer, South Dakota State University, USA
Jaeheung Lee, Daejeon University, South Korea

PDP - Privacy by Design in Practice Track
Ronald Petrlic, The Commissioner for Data Protection and Freedom of Information Baden-Württemberg, Germany
Christoph Sorge, Saarland University, Germany

RS - Recommender Systems: Theory, User Interactions and Applications Track
Yong Zheng, Illinois Institute of Technology, USA
Li Chen, Hong Kong Baptist University, Hong Kong, China
Markus Zanker, Free University of Bolzano, Italy

SEC - Computer Security Track
Giampaolo Bella, Università di Catania, Italy
Lieven Desmet, Katholieke Universiteit Leuven, Belgium

SiSoS - Software-intensive Systems-of-Systems Track
Khalil Drira, LAAS-CNRS – Univ. Toulouse, France
Flavio Oquendo, UMR CNRS IRISA – Univ. Bretagne Sud, France
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SiSoS - Software-intensive Systems-of-Systems Track

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Track Co-Chairs: Jinman Jung, Hannam University, South Korea
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Daniel Hamm, RWTH Aachen University, Germany
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Yuta Maezawa, National Institute of Informatics, Japan
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SWA - Semantic Web and Application Track

Track Co-Chairs: Hyoil Han, Illinois State University, USA
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Hajer Baazaoui-Zghal, University of Manouba, Tunisia

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Andrea G.B. Tettamanzi, University of Côte d'Azur, France

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Theme: Software Design and Development

UE - Usability Engineering Track

Track Co-Chairs: Eduardo Mosqueira Rey, University of A Coruña, Spain
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Marcelo Soares Pimenta, Federal University of Rio Grande do Sul, Brazil

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Maicon Bernardino, Federal University of Pampa, Brazil
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Theme: Software Design and Development

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Track Co-Chairs: Abdelhak-Djamel Seriai, University of Montpellier, France
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Track Co-Chairs: Tim A. Majchrzak, University of Agder - Kristiansand, Norway
Cristian Mateos, UNICEN University - Tandil, Argentina
Francesco Poggi, University of Bologna - Bologna, Italy

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Editorial Message

Special Track on Bioinformatics (BIO)

http://www.nrcbioinformatics.ca/acmsac2018

Paola Lecca, *Department of Mathematics,*
University of Trento, Italy
Dan Tulpan, *Information and Communication Technologies,*
National Research Council, Canada
Jouan Manual Corchado, *Department of Computer Science and Automation,*
University of Salamanca, Spain

Goals and focus

The Bioinformatics Track purpose is to promote current advances in biological sciences thanks to the contribution of analytical methods brought by mathematical, physical and computer sciences.

The track focuses on the solution of timely open biological questions with the use of computational techniques. Three application domains in life sciences have been identified due to the potential benefits that the results of mathematical and computational research may bring to them. In particular, the track hosted innovative studies aimed at (i) the understanding of molecular and cellular mechanisms behind the development of diseases, (ii) the development of drugs and strategies of intervention on individuals and population, (iii) the understanding of population dynamics of diseases.

Statistics

SAC ACM BIO attracted 20 submissions from 8 countries (Brazil, Canada, France, India, Italy, Japan, Tunisia and United States of America). The acceptance rate was 25%, with 4 manuscript accepted for oral presentations and 1 manuscript accepted for poster presentations. The BIO Track Student Research Competition received 2 submissions.

Description of accepted papers

The accepted papers cover a large number of timely hot research areas in bioinformatics and computational biology such as genomics, metagenomics, protein structure prediction, protein residue contact point estimation, protein-ligand interaction visualization, long non-coding RNA identification, NGS-based sequence comparison and enzyme predictions. The track also accepted manuscripts on specific applicative domains from medical analysis and healthcare, such as CNV-based tumour classification, and prediction of cancer cell sensitivity to drugs.

Acknowledgments

The SAC ACM BIO Track organizers like to express their gratitude to the Steering Committee of the SAC ACM 2018, for their responsiveness and guidance with all the logistic and procedural aspects of the Track.

The Track organizers are extremely grateful to the Track Program and Reviewers Committee Members for their professionalism, valuable scientific expertise and outstanding punctuality that ensured the selection of high-quality papers:

Alain Tchagang, Information and Communications Technologies, NRC, Canada.
Alex Graudenzi, University of Milano - Bicocca, Italy.
Anu Surendra, Information and Communications Technologies, NRC, Canada.
Chaouki Regoui, Information and Communications Technologies, NRC, Canada.
Chiara Damiani, Department of Informatics, Systems and Communication, Università degli Studi di Milano-Bicocca, Italy.
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Daniela Giacomazza, Institute of Biophysics, National Research Council, Italy.
Eleonora Lusito, The FIRC Institute of Molecular Oncology Foundation, The European Institute of Oncology, Italy.
Eric Paquet, Information and Communications Technologies, NRC, Canada.
Guylaine Poisson, Department of Information and Computer Sciences, University of Hawaii, USA.
Mahdi Belcaid, Department of Information and Computer Sciences, University of Hawaii, USA.
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Michela Lecca, Bruno Kessler Foundation, Center for Information Technology, Italy.
Pablo Carbonell, Manchester Institute of Biotechnology, Manchester, U.K..
Paolo Cazzaniga, University of Bergamo, Italy.
Roberto Montemanni, Dalle Molle Institute for Artificial Intelligence, University of Lugano and SUPSI, Switzerland.
Umberto Ferraro Petrillo, Department of Statistical Science, University of Roma, Italy.

EDITORIAL MESSAGE
Special Track on Business Process Management & Enterprise Architecture

Marco Brambilla, *Politecnico di Milano, Italy*
Davide Rossi, *University of Bologna, Italy*

The Business Process Management & Enterprise Architecture (BPMEA) track aims at gathering researchers and practitioners around the broad topics of business processes and enterprise architecture with a special interest in modeling. These disciplines are quickly evolving and intertwining with each other, and are often referred to with the broad term of business modeling. While several researches are addressing these aspects, there is still a strong need of exploring new paths of improvement and consolidation, especially in light of the recent trends in the business, which put a lot of emphasis on large-scale system engineering, through modeling techniques that are applied at global scale, and data analysis approaches that combine cloud-based big data analytics with enterprise and system models.

Topics of relevance for the BPMEA track include enterprise and systems architecture and modeling, multilevel models tracing and alignment, models transformation, IT & business modeling and goals alignment and big data analysis applied to enterprise-wide data, tackling both technical (languages, systems, patterns, tools) and social (collaboration, human-in-the-loop) issues.

In this second edition of the track we received 28 paper submissions from countries as diverse as Belgium, Canada, Egypt, Estonia, France, Germany, India, Italy, Japan, the Netherlands, Portugal, Spain and the USA

All papers have been reviewed by a Program Committee of 26 members, granting at least 3 extensive reviews per submission; 7 of the submitted papers have been accepted as full papers.

In the opinion of the track chairs, these numbers together with the high quality of the submissions mark a success for the second edition of the ACM SAC track on Business Process Management & Enterprise Architecture. The quality of the contributions presented in this proceeding is surely due to the talent and inspiration of our authors to whom we would like to extend our thanks for their interest in the track but also to the hard work of the members of the program committee that we would hereby like to thank as well.

Ahmed Awad - Cairo University, EG
Alberto Sillitti - Innopolis University, RU
Andrea Mauri - Delft University of Technology, NL
Barbara Re - Università di Camerino, IT
Christoph Czepa - University of Wien, AT
Ekaterina Bazhenova - Hasso-Plattner Institute, DE
Eric Umuhoza - Politecnico di Milano, IT

Eugenio Zimeo - Università del Sannio, IT
Filippo Ricca - Università di Genova, IT
Florian Daniel - Politecnico di Milano, IT
Francesca Zerbato - Università di Verona, IT
Francesco Poggi - Università di Bologna, IT
Iman Helal - Cairo University, EG
Lerina Aversano - Università del Sannio, IT
Manuel Wimmer - Technische Universität Wien, AT
Marcello La Rosa - Queensland University of Technology, AU
Marco Winckler - Université Paul Sabatier (Toulouse 3), FR
Maria-Eugenia Iacob - University of Twente, NL
Maurizio Leotta - Università di Genova, IT
Rainer Schmidt - Munich University, DE
Ralf Laue - University of Applied Sciences of Zwickau, DE
Schahram Dustdar - TU Wien, AT
Sven Casteleyn - Universitat Jaume I, ES
Søren Debois - IT University of Copenhagen, DK

Special thanks also go to the ACM SAC 2018 Conference Chairs and Program Chairs for their support and guidance.

Marco Brambilla
Davide Rossi

EDITORIAL MESSAGE
Special Track on Cloud Computing

***S.D Madhu Kumar**, NIT Calicut, India*
***Priya Chandran**, NIT Calicut, India*

Cloud Computing, the computing paradigm of the decade, continues to make inroads into newer domains and applications with each passing day. Cloud computing has already proved its potential in meeting the challenges of increased data storage and processing demands of compute and data intensive applications, and also promises to be the backbone of the Internet of Everything. The leading companies in the IT sector have already chosen clouds as their platform for offering their services. The academia has also shown keen interest in this hot area with an abundance of funded research projects at the leading universities across the globe.

This track on Cloud Computing, organized consecutively for the eighth time at ACM SAC, had been started with the intention of providing a forum for presenting research on various aspects of cloud computing with emphasis on those describing research on different forms of virtualization techniques. The response to the track has been as overwhelming as ever this year too. We received high quality papers from all parts of the world, contributing a total of 31 submissions. The review process was very competitive with each paper receiving at least three reviews, and finally 8 full papers and 2 poster papers were selected for the track, bringing the acceptance rate to approximately 25% for full papers.

The selected papers deal with a wide variety of cloud computing issues including those listed below:

1. Reducing Map Reduce Job Latency in Virtualized Environments
2. Efficient Distribution of Map Reduce Jobs for maximizing profit
3. Near optimal resource allocation through integer linear programming
4. I/O Access Control for tenant isolation
5. Mitigating data skew in Hadoop using Portfolio theory
6. Distributed graph processing for service placement
7. Side channel attack Vulnerability in co-resident VM applications
8. Cloud Storage Consolidation
9. Bounding the cost of VM migration
10. Strict Policy Consistency for improved performance for cloud transactions

We thank all the authors who submitted valuable papers to this track. We are grateful to the members of the Program Committee and to the additional reviewers. Without their support, the organization of the track's sessions would not have been possible. We also express our gratitude to organizations that made this track happen, namely the ACM Special Interest Group on Applied Computing (SIGAPP), National Institute of Technology Calicut, India. We are grateful to the Symposium Program Chairs for their help in all aspects of the organization of this track.

We are certain that issues pertaining to cloud computing offer rich opportunities for research and this track on Cloud Computing will continue to be a success in future editions of ACM SAC.

EDITORIAL MESSAGE
Special Track on Collective and Cooperative Systems (CCS)

Maurice H. ter Beek, *ISTI-CNR, Pisa, Italy*
Barbara Re, *University of Camerino, Italy*
Mirko Viroli, *University of Bologna, Italy*
Rachid Anane, *Coventry University, UK*
Rami Bahsoon, *University of Birmingham, UK*

This CCS track brings together the CAS track on Collective Adaptive Systems and the COSYS track on Cooperative Systems, which have been organized successfully as separate events in previous editions of the annual ACM/SIGAPP Symposium on Applied Computing.

Many aspects of our daily life are affected by pervasive technology, consisting of a vast amount of heterogeneous components (e.g., devices, software applications, smart objects), featuring complex interactions among themselves and potentially with humans. Modern distributed systems are governed by collective and cooperative schemes; they leverage intelligent mechanisms to manage deployment, operation, coordination, and evolution over time. These systems are characterized by dynamic and adaptive interactions between various entities and their environments, in order to provide services that help achieve specific goals.

Collective systems are enhanced with dynamic and autonomous adaptation capabilities, to effectively deal with the changes in their environments and to manage the interactions between themselves. Collective systems are also cooperative systems as they involve a large number of cooperating components, trading off individual tasks with overall system goals. Cooperative systems are characterized by their level of distribution, the underlying mode of interaction, and the degree of autonomy of the entities. Resources are also harnessed and marshalled across dynamic and heterogeneous environments in order to realize synergies between humans and systems.

In pervasive environments, for example, symbiotic relationships and seamless transitions are initiated and maintained, within secure and trusted environments. Effective cooperation requires that autonomous systems and their components overcome environmental heterogeneity and resolve semantic differences. Adherence to common abstractions and models facilitates the unfolding of processes such as data and system integration, coordination of behavior, resource access and sharing, and participation in complex activities. In managing the differences between entities, systems and environments, a range of methods and techniques are called upon to support interoperation and facilitate semantic interoperability. Resource and process management, configuration, adaptation, and negotiation define a wide spectrum of cooperation, from reactive behavior to proactive intervention. These tasks are being enhanced by ontologies, context awareness and self-configuration.

The development of collective and cooperative systems is closely related to, and overlaps with other contemporary software and system engineering areas, such as self-adaptive systems, component-based systems, service-based systems, and middleware platforms, as well as other areas of computer science, such as distributed artificial intelligence, agent-based programming, pervasive computing, internet of things, and

autonomic computing. This track aims to provide researchers and practitioners in these areas with a forum for discussing their different viewpoints and for sharing their ideas. The main objective of CCS is to attract relevant and innovative contributions from many different research communities. Of particular interest to the track are foundational approaches (e.g., theories, methods, formalisms, models) and practical and experimental implementations (e.g., systems, programming languages, middleware, development and runtime environments, tools).

CCS 2018 received a total of 15 submissions, many of which were of high quality and in line with the main themes of the track. Each submission was subjected to a systematic and rigorous review process by at least 3 PC members, often more. This resulted in the selection of the following four papers for an oral presentation at the conference (an acceptance rate of 26%):

- Comparing Languages for Engineering Server Software: Erlang, Go, and Scala with Akka, by Ivan Valkov, Natalia Chechina and Phil Trinder
- Coordinated Composition of Continuous Service Collaborations in Decentralized Smart Computing Environments, by Markus Wutzler, Thomas Springer and Alexander Schill
- Online Team-Based Game Development Discussions Patterns Summarised using Probabilistic Models, by Akiko Teranishi, Minoru Nakayama, Theodor Wyeld and Eid Mohamad
- No Longer Alone: Finding Common Ground In Collaborative Virtual Environments, by Li Liu and Adam Kaplan

In addition to these full papers, the following submission was selected for a poster presentation at the conference:

- A Pipelining-based Framework for Processing Events in Multimedia Sensor Networks, by Chinnapong Angsuchotmetee, Richard Chbeir, Yudith Cardinale and Shohei Yokoyama

We would like to thank the PC members for their detailed reports and the ensuing and stimulating discussions during the reviewing phase. We would also like to thank the authors of all submissions, the session chairs, and the attendees for contributing to the success of the track. Finally, we would like to thank the chairs of SAC 2018 for their invitation to organize the CAS and COSYS tracks, which led to this joint CCS track, and for their excellent assistance and support throughout the process.

EDITORIAL MESSAGE
Special Track on the Computational Intelligence and Video & Image Analysis

***Agostinho Rosa**, LaSEEB - ISR – IST, Portugal*

***Yin-Fu Huang**, National Yunlin University of Science and Technology, Taiwan*

The special track on the Computational Intelligence and Video & Image Analysis (CIVIA) is a forum for engineers, researchers and practitioners throughout the world to share technical ideas and experiences related to the implementation and applications of Computational Intelligence, to Video & Image Analysis, and even to Systems Biology & BioMedicine. Many conferences have been dedicated to Evolutionary Computing (ICEC, GECCO, PPSN, etc), Video & Image Analysis (ICIAR, ICIAP, ICASSP, IJCAI, etc) and Systems Biology & BioMedical Engineering (ICSB, RECOMB, BME, etc), but they don't offer much on the blending of Computational Logic, Boolean Satisfiability and Soft Computing tools to address practical applications of Image Analysis and Bio Systems Modeling and Simulations. Thus, the research papers involved with applying computational intelligence techniques to video and image analyses would be welcome no matter how theoretical they are, should they have practical applications.

Totally, we have 30 submissions for the CIVIA track. To keep the acceptance rate less than 25% for the regular papers, we only accept 7 oral papers. By the way, 2 poster papers are accepted for the poster section. In summary, including posters, we have 30% (9/30) acceptance rate for the CIVIA track.

The accepted oral or poster papers are involved in different subfields, including video segmentation, image segmentation, simultaneous location and mapping, deep learning, image processing, computer vision, multi-objective optimization, image retrieval, and image moments. These subfields are all related to the topics or themes of the CIVIA track.

Finaly, we would like to thank all reviewers for their efforts in reviewing these papers. These reviewers consist of the program committee members and some professionals. Without their hard work, we could not complete this review process.

EDITORIAL MESSAGE
Special Track on Cognitive Computing

Mauro Dragoni **Marco Rospocher**
Fondazione Bruno Kessler, Trento, Italy

The SAC2018 special track on Cognitive Computing (https://coco.fbk.eu/sac2018/) aims to promote a forum for scientists, engineers and practitioners, in academia and industry, to share and discuss latest advances, breakthrough results, and real-world experiences in the Cognitive Computing area. This is an interdisciplinary emerging research area, at the core of Artificial Intelligence, investigating the development of self-learning systems, that naturally interact with humans in complex environments, and are capable to adapt to context and changes in language and meaning.

This was the second edition of the Cognitive Computing track at SAC organized thanks also to the great interest registered at SAC2017 where more than 50 people attended our session. We invited original contributions combining and complementing the scientific results from various disciplines, such as Natural Language Processing, Knowledge Representation and Reasoning, Audio and Video Analysis, Computer-Human Interaction, Neuroscience and Cognition, and so on. The call for papers was circulated in several international mailing lists. We received 16 regular papers. Each submission was reviewed by at least three Programme Committee members. The selection process for the track was very competitive, resulting in the acceptance of:

- 4 full papers (acceptance rate: 25%):
  - Deep Reinforcement Learning Boosted by External Knowledge (*Nicolas Bougie and Ryutaro Ichise*)
  - Review-Level Aspect-Based Sentiment Analysis Using an Ontology (*Sophie de Kok, Linda Punt, Rosita van den Puttelaar, Karoliina Ranta, Kim Schouten and Flavius Frasincar*)
  - Predicting Incorrect Mappings: A Data-Driven Approach Applied to DBpedia (*Mariano Rico, Nandana Mihindukulasooriya, Dimitris Kontokostas, Heiko Paulheim, Sebastian Hellmann and Asunción Gómez-Pérez*)
  - Predicting Facebook-Users' Personality based on Status and Linguistic Features via Flexible Regression Methodologies (*Alfredo Cuzzocrea*)

- 2 posters:
  - A proposal of a new framework to define personality traits of people in social contagion situations (*Eric Fernandes de Mello Araújo, Bojan Simoski and Michel Klein*)
  - MindWare: an exploratory cognitive technology to support the automatic evaluation of students written argumentation (*Noureddine Elouazizi*)

We would like to thank the members of the Program Committee and the additional reviewers for their time and efforts in reviewing the contributions submitted to the track. All accepted contributions have been revised and improved based the PC feedback, thus setting the basis for an exciting track session at the conference.

- Tanvi Banerjee, Kno.e.sis (Wright State University)
- Francesco Barile, University of Naples "Federico II", Italy
- Valerio Basile, INRIA, Sophia Antipolis, France
- Loris Bozzato, Fondazione Bruno Kessler, Trento, Italy
- Gerard Casamayor, Pompeu Fabra University
- Philipp Cimiano, University of Bielefeld
- Francesco Corcoglioniti, Fondazione Bruno Kessler, Trento, Italy
- Chiara Di Francescomarino, Fondazione Bruno Kessler, Trento, Italy

- Antske Fokkens, VU Amsterdam
- Ilias Gialampoukidis, CERTH
- Marco Guerini, Fondazione Bruno Kessler, Trento, Italy
- Antonio Lieto, University of Turin, Italy
- Dimitrios Liparas, CERTH
- Vasileios Mezaris, CERTH
- Lyndon Nixon, University of Modul
- Alessandro Oltramari, Carnegie Mellon University
- Matteo Palmonari, University of Milano-Bicocca
- Simone Paolo Ponzetto, Universität Mannheim
- Giuseppe Rizzo, Istituto Superiore Mario Boella
- Silvia Rossi, University of Naples "Federico II", Italy
- Rafal Rzepka, Hokkaido University, Sapporo
- Sara Tonelli, Fondazione Bruno Kessler, Trento, Italy
- Marieke Van Erp, VU Amsterdam
- Jacco van Ossenbruggen, CWI Amsterdam
- Piek Vossen, VU Amsterdam
- Amal Zouaq, University of Ottawa

Organizers' Short Bios

Dr. **Mauro Dragoni** (http://www.maurodragoni.com) is a researcher scientist at Fondazione Bruno Kessler within the Process and Data Intelligence research unit (PDI). He received his Ph.D. in Computer Science from the University of Milan in 2010. His main research topics concerns knowledge management, cognitive computing, information retrieval, and machine learning by focusing on the development of real-world prototypes as outcome of his research activities. He has been involved in a number of international research projects, including Organic.Lingua (FP7), Medical CPS (EIT), PROMO (FESR), and Presto (FESR). He co-authored more than 50 scientific publications in international journals, conferences, and workshop.
He co-organized OWLED 2015; the Challenge on Conceptual Sentiment Analysis co-located with ESWC 2015 and 2016; the Workshop on Emotion and Sentiment Analysis co-located with ESWC 2016; and he will be the general chair of OWLED 2016.

Dr. **Marco Rospocher** (http://dkm.fbk.eu/rospocher) is a tenured research scientist at Fondazione Bruno Kessler (FBK), within the Data and Knowledge Management (DKM) research unit. He received his PhD in Information and Communication Technologies from the University of Trento in 2006. His current research interests are in the area of Cognitive Computing, focusing in particular on ontologies, formalisms for Knowledge Representation and Reasoning, and methodologies and tools for Knowledge Acquisition and Information Extraction. He has been involved in a number of international research projects, including the EU-funded projects APOSDLE (FP6), PESCaDO (FP7), and NewsReader (FP7). He coauthored more than 70 scientific publications in international journals, conferences and workshops. He usually serves in the programme committees of relevant international conferences and workshops. He co-chaired the Posters and Demonstrations track of the 13th International Semantic Web Conference and co-organized the 4th International Workshop on Detection, Representation, and Exploitation of Events in the Semantic Web (DeRiVE 2015).

EDITORIAL MESSAGE
Special Track on CPS

Ai-Chun Pang, *National Taiwan University, Taiwan*
Jason Xue, *City University of Hong Kong, Hong Kong*
Jingtong Hu, *University of Pittsburgh, USA*

Cyber-physical Systems (CPS) are engineered systems whose operations are monitored, coordinated, controlled, and integrated by a computing and communication core embedded in all types of objects and structures in the physical environment. CPS has emerged as a unifying name for systems where the cyber parts, i.e., the computing and communication parts, and the physical parts are tightly integrated, both at the design time and during operation. Such systems use computations and communication deeply embedded in and interacting with physical processes to add new capabilities to physical systems. Such systems must be operated safely, dependably, securely, efficiently and in real-time. These cyber-physical systems include a wide range of applications, such as transportation, healthcare, automotive, energy, manufacturing, entertainment, consumer electronics, environmental monitoring, aerospace, robotics, etc., all of which will be essential pieces of our social infrastructure. Therefore, advances in this field will have great technical, economic and societal impacts in the near future. However, the vision of CPS faces some core challenges of multidisciplinary research, as their relevant technologies appear in diverse areas of science and engineering. Therefore, there is an emerging consensus that new methodologies and tools need to be developed to support cyber-physical systems.

In this year's CPS track, all the papers went through a competitive selection process. Each paper is reviewed by at least 3 reviewers. We accepted 4 excellent papers out of 14 submissions, which results in an acceptance ratio of 28%. These 4 papers cover different interesting aspects of CPS, including security, intelligence, and performance. The first paper presents a prediction scheme to detect misbehaviors of the system and try to improve the security features. The second paper presents a testbed for integrated evaluation of large-scale CPS systems. This testbed utilizes the web-based metamodeling and modeling tool WebGME to design the CPS system and experiment models and execute the integrated networked co-simulations in a cloud based environment. It provides sophisticated capabilities for analyzing the security and resilience of CPS. These two works provide timely security solutions for future CPS. The third paper presents a low power implementation of convolutaional neural network with RRAM-based crossbar, which can be essential components for building intelligent CPS. Last but not the least, the fourth paper presents a high-performance programming scheme for flash-memory chips in embedded systems, which is also an integral part of any CPS systems.

The track chairs would also like to thank all the reviewers for their volunteer work. It is only possible with their valuable efforts and time that we can select these high-quality research works in this track.

EDITORIAL MESSAGE
Special Track on Dependable, Adaptive and Trustworthy Distributed Systems

***Karl M. Goeschka**, UAS Technikum Vienna, Austria*
***Rui Oliveira**, Universidade do Minho, Portugal*
***Peter Pietzuch**, Imperial College London, United Kingdom*
***Giovanni Russello**, University of Auckland, New Zealand*

Introduction

While computing is provided by the cloud and services increasingly pervade our daily lives, dependability and security are no longer restricted to mission or safety critical applications, but rather become a cornerstone of the information society. Unfortunately, the most innovative systems and applications (Internet of Things, Smart Environments, Mashups, NewSQL) are the ones that also suffer most from a significant decrease in dependability and security when compared to traditional critical systems. In accordance with Laprie we call this effect the dependability gap, which is widened in front of us between demand and supply of dependability, and we can see this trend further fueled by volume, velocity and variety, as well as the demand for resource awareness, green computing, and increasing cost pressure.

Among technical factors, software development methods, tools, and techniques contribute to dependability and security, as defects in software products and services may lead to failure and also provide typical access for malicious attacks. In addition, there is a wide variety of fault and intrusion tolerance techniques available, including persistence provided by databases, redundancy and replication, group communication, transaction monitors, reliable middleware, cloud infrastructures, fragmentation-redundancy-scattering, and trustworthy service-oriented architectures with explicit control of quality of service properties and service level agreements. Furthermore, adaptiveness is envisaged in order to react to observed, or act upon expected changes of the system itself, the context/environment (e.g., resource variability or failure/threat scenarios) or users' needs and expectations. Provided without explicit user intervention, this is also termed autonomous behavior or self-properties, and often involves monitoring, diagnosis (analysis, interpretation), and reconfiguration (repair). In particular, adaptation is also a means to achieve dependability and security in a computing infrastructure with dynamically varying structure and properties.

Statistics

This year, we received 20 submissions, of which 5 could be accepted after being reviewed by six to seven members of the program committee. The resulting acceptance rate is 25%.

Acknowledgements

We would like to thank our program committee members for their support, their timely reviews and the numerous suggestions for improvements of papers.

Overview of the Sessions and Papers

The DADS track provides a forum for scientists and engineers in academia and industry for their latest research findings on selected topics in dependable, adaptive and trustworthy distributed systems. The following papers comprise this track:

1. **Adaptive Information Distribution for Dynamic Sets**
   Matthias Prellwitz, Helge Parzyjegla, Steffen Steiner and Gero Mühl

2. **Secure Publish and Subscribe Systems with Efficient Revocation**
   Sana Belguith, Shujie Cui, Muhammad Rizwan Asghar and Giovanni Russello

3. **Dynamic Adaptation of Byzantine Consensus Protocols**
   Carlos Carvalho, Daniel Porto, Luís Rodrigues, Manuel Bravo and Alysson Bessani

4. **Towards a Model for Comprehending and Reasoning about PoW-based Blockchain Network Sustainability**
   Sotirios Liaskos and Bo Wang

5. **EcoVMBroker: Energy-aware Scheduling for Multi-layer Datacenters**
   Rodrigo Fernandes, Jose Simao and Luís Veiga

In addition, three posters have been accepted:

6. **Safe and Efficient Fleet Operation for Autonomous Machines: An Actor-based Approach**
   Ali Jafari, Jayasoorya Jayanthi Surendran Nair, Stephan Baumgart and Marjan Sirjani

7. **Modeling and Verifying SDN with Multiple Controllers**
   Lili Xiao, Shuangqing Xiang and Huibiao Zhu

8. **Trigger Correlation for Dynamic System Reconfiguration**
   Mahin Abbasipour, Ferhat Khendek and Maria Toeroe

Also, one student research competition abstract has been accepted:

9. **IT-Security in Self-Organizing Decentralized Virtual Power Plants**
   Marius Stübs

EDITORIAL MESSAGE
Special Track on Data Mining (DM)

Hasan Jamil, *University of Idaho, USA*
Rosa Meo, *Università degli Studi di Torino, Italy*

ACM SAC Data Mining has a successful history of accepting quality papers and offering a stimulating platform for the exchange of ideas and disseminating cutting edge research to the community. The 2018 ACM SAC Data Mining Track is the eighteenth such event in the 33 years of ACM SAC tradition, co-chaired by Hasan Jamil and Rosa Meo.

Similar to previous years, the 2018 ACM SAC Data Mining Track solicited original, unpublished and novel papers for publication and presentation at the symposium. The response to the track was significant. We have received a total of 30 high quality papers from all parts of the world from both academia and industry. These submissions contain novel ideas and applications in a wide variety of areas in data mining. The review process was very competitive with each paper receiving at least three reviews, and finally seven full papers and one poster paper were accepted for the track, bringing the acceptance rate to approximately 24%. We take this opportunity to thank all the authors who submitted their contributions making this track an increasingly popular and scholarly venue for exchanging ideas in data mining.

The seven research articles and one poster paper included in this year's track program can be summarized as follows:

In "Weight-based search to find clusters around medians in subspaces" Sergio Peignier, Christophe Rigotti, Anthony Rossi and Guillaume Beslon show that a pure median-based subspace clustering allows obtaining satisfactory clusters. The authors used a hill climbing algorithm and their solution inherits all the benefits of the usage of the medians, such as being robust w.r.t. the presence of noise and outliers.

In "Sentiment Phrase Generation Using Statistical Methods" Dirk Reinel, Jörg Scheidt, Andreas Henrich and Niko Brucker describe a new approach to the generation of lexical resources in the field of sentiment analysis. They used a corpus of customer reviews and determined the candidate elements for the sentiment lexicon solely by calculating a word co-occurrence measure and words frequencies. Furthermore, the sentiment value of every element is derived automatically from the review titles and the associated ratings. The authors renounced the use of natural language processing methods in order to ensure language independency of the algorithm which was able to identify rather unusual word combinations, such as idiomatic expressions.

In "A Novel Join Technique for Similar-Trend Searches supporting Normalization on Time-Series Databases" Junho Song, Sungchae Lim and Sang-Wook Kim propose a new join-like mechanism that can process similar-trend searches having arbitrary-lengths without false dismissals. They devise a cost function that reduces the number of subsequences and the query processing time significantly.

In "Error Analysis and Topology Modifications of a Self-Organizing Incremental Neural Network" Xiaoyu Wang, Osamu Hasegawa and Shiming Ge propose a mathematical analysis and topological modifications of an online learning method, self-organizing incremental neural network. They also provide a novel model of generalized hyper-geometric ensembles with adaptive dyadic propensities and a modified non-parametric support vector clustering approach.

In "Vehicle emission prediction using remote sensing data and machine learning techniques" Jiazhen Chen, Gillian Dobbie, Yun Sing Koh, Elizabeth Somervell and Gustavo Olivares propose a 3-step machine learning approach to establish a model for the nitric oxide emissions forecast. The emission factor prediction model uses remote sensing data that were collected over a 10-year span between 2005 and 2015.

In "An efficient hybrid SVDD/Clustering approach for anomaly-based intrusion detection" Tayeb Kenaza, Khadidja Bennaceur and Abdenour Labed propose an hybrid solution that enhances the quality of anomaly detection systems using Supports Vectors Data Description. The model is trained using only the class of normal user behavior whose scatter is supposed to be random shaped. For this generalization, the model could be less accurate due to the presence of some voids in

the instance space where the model is created. The authors propose a set of improvements in order to fit better the model against the data.

In "On the Behavior of the Infinite Restricted Boltzmann Machine for Clustering" Nikolas A. Huhnstock, Alexander Karlsson, Maria Riveiro and H. Joe Steinhauer perform a descriptive study of the influence of several regularization and sparsity settings on the clustering behavior. The results show that sparsity is a key adaption when infinite restricted Boltzmann Machines are used for clustering, both from the improvement of the clustering performances and for setting the number of clusters.

The lone poster paper included in the technical program of the Data Mining Track titled "A Quality Control Method for Fraud Detection on Utility Customers without an Active Contract" is authored by Bernat Coma-Puig and Josep Carmona. It introduces a semi-autonomous method for fraud detection in energy consumption in a real use case. The solution adopts a model based on tree boosting for the generation of a customer fraud score and Lime, an explanatory method of the classifier decisions. The combination of the models and the presence of a human expert are able to alleviate the problem of the lack of consumption records of the customers with no contract and plan campaigns of on field verification.

Finally, we would like to thank the members of the track program committee below for their contributions and help in reviewing and selecting the papers. They worked diligently and in a timely manner within a very short period of time.

Fabrizio Angiulli, Università della Calabria, Italy
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Sanguthevar Rajasekaran, University of Connecticut, USA
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Christophe Rigotti, Institut National des Sciences Appliquées Lyon, France
Domenico Sacca, Università della Calabria, Italy
Lorenza Saitta, Università degli Studi del Piemonte Orientale, Italy
Daniel Sanchez, University of Granada, Spain
Maria Luisa Sapino, University of Torino, Italy
Franco Turini, University of Pisa, Italy

We have an exciting program for SAC Data Mining Track, and overall SAC symposium in 2018. We hope to welcome you in Pau, France.

EDITORIAL MESSAGE
Special Track on Data Streams

***Albert Bifet**, LTCI, Telecom ParisTech, France*
***Andre Carvalho**, ICMC, USP, Brazil*
***João Gama**, INESC Porto, University of Porto, Portugal*

The rapid growth in data science and technology, in particular in the complexity and volume of Big Data, has introduced new challenges for the research community. Several of these are related to the nature of data generation, since most of the data sources produce data continuously. Examples include sensor and wireless networks, radio frequency identification, customer click streams, telephone records, multimedia and scientific data, and sets of retail chain transactions, among others. These sources are called data streams, ordered sequences of instances that can typically be read only once or a small number of times due to its their high speed of flow and continuous nature. Data streams are characterized by being open-ended, and generated by non-stationary distributions. Thus, they are increasingly important in the research community, as new algorithms are needed to efficiently process this streaming data, to enable rapid and real-time updated understanding of the data. The goal of this track is to convene researchers who work with data streams, defining models, processing continuous queries, developing sampling, filtering and stream mining methods, machine learning, and visualization techniques and related issues.

This year, we received 13 submissions from 9 different countries: Italy, Germany, Brazil, Portugal, USA, UK, France, Netherlands and China. After a rigorous review process, where each paper was reviewed by at least 3 PC members, only 3 papers were accepted as full papers, giving the track an acceptance rate of 23%. The papers cover topics such as dependency tracking on multiple data streams, feature selection, dynamic topic modelling, situation mining from data streams, graph based clustering, and recommender systems.

We would like to thank the Program Committee, who was comprised of several experts from the field: *Annalisa Appice*, Università degli Studi di Bari, Italy, *Albert Bifet*, Telecom Paris, France, *Christian Bockermann*, University Dortmund, Germany, *José del Campo-Ávila*, Universidad de Málaga, Spain, *André Carvalho*, University of Sao Paulo (USP), Brazil, *Raja Chiky*, ISEP, France, *Carlo Combi*, University of Verona, Italy, *Alfredo Cuzzocrea*, ICAR-CNR and University of Calabria, Italy, *Carlos Ferreira*, University of Porto, Portugal, *Mohamed Gaber,* Tasmanian ICT Centre, Australia, *João Gama*, University of Porto, Portugal, *Ricard Gavaldà*, Universitat Politècnica de Catalunya, Spain, *João Gomes*, Institute for Infocomm Research, Singapore, *Geoff Holmes*, University of Waikato, New Zealand, *Elena Ikonomovska*, Josef Stefan Institute, Slovenia, *Petr Kosina*, University of Porto, Portugal, *Shonali Krishnaswamy,* Monash University, Australia, *Cyril Labbe*, University Grenoble, France, *Mark Last*, Ben Gurion University, Israel, *Byung Suk Lee*, University Vermont, US*, Florent Masseglia*, INRIA, France, *Rodrigo Mello*, University of Sao Paulo, Brazil, *Rosa Meo*, University of Torino, Italy, *João Moreira*, University of Porto, Portugal, *Irene Ntoutsi*, LMU Munich, Germany*, Vincent Becker*, ETH, Switzerland; *Mykola Pechenizkiy*, Eindhoven University of Technology, The Netherlands, *Pedro Rodrigues*, University of Porto, Portugal, *Josep Roure*, Universitat Politècnica de Catalunya, Spain, *Elaine Sousa*, University of Sao Paulo, Brasil, *Eduardo Spinosa*, Federal University of Parana, Brazil, *Philip Yu,* University of Illinois at Chicago, US, and *Indrė Žliobaitė*, Aalto University, Finland, *Hadi Fanaee*, University of Porto, Portugal, *Bernhard Pfahringer*, Univ. Waikato, New Zealand, *Felipe Pinage*, UFAM, Brazil

We wish also to thank all the authors, and the Program Chairs of SAC 2018 for making this a successful meeting point for researchers interested in data streams.

EDITORIAL MESSAGE
Special Track Database Theory, Technology, and Applications

Ramzi A. Haraty, Lebanese American University, Lebanon
Apostolos N. Papadopoulos, Aristotle University, Greece
Junping Sun, Nova Southeastern University, USA

The world nowadays revolves around dealing with extreme large amount of data presented in various formats. So it is inevitable that researchers focus on advancing the state of managing information. From here, the importance of database technology ranks amongst the hottest areas of research, taking into account the consistent need for faster query processing as well as for managing huge amounts of data. This year the track has received many papers covering different areas of databases.

A total of 17 papers were submitted to the Database Theory, Technology, and Applications track. The track received papers from many countries – from Asia, Australia, Europe, North America, and South America – making this track a forum to share technical ideas and experiences relating to implementation and application of database theory and technology and to exchange ideas among international researchers in the area of database systems. Each paper was sent out to at least three reviewers. The selection process was more difficult this year, because the acceptance ratio was about 23.5%. More specifically, among the 17 submitted papers only 4 papers have been selected as regular papers.

The selected papers cover a wide range of topics including: multi-way join processing over data streams, queries over web services, XML data management, query languages, similarity query processing in software repositories.

We would like to take this opportunity to thank the colleagues who worked hard to make ACM SAC 2018 possible. Our special thanks go to all the authors and referees who all contributed to the success of DTTA track. We look forward to your participation and cooperation in the upcoming ACM SAC 2019.

EDITORIAL MESSAGE
Special Track on Information Access and Retrieval

Gloria Bordogna, *Consiglio Nazionale delle Ricerche – CNR IREA*
Gabriella Pasi, *Università degli Studi di Milano Bicocca – DISCo*

The special Track on Information Access and Retrieval (IAR) was first organized within the ACM International Symposium on Applied Computing in 2002, to the main aim of allowing researchers and practitioners to present and discuss their proposals and experiences in the middle of the theory-practice spectrum of Information Retrieval and Information Filtering.

With the diffusion of the Web and Search Engines and social networks, Information Retrieval, Information Filtering and Recommendation tasks need to cope with several issues related to the widespread and pervasive diffusion of huge amounts of user generated contents of distinct nature and format (videos, images, maps, audio, texts), of distinct genre and topics (geographic information, products' and organizations' descriptions, scientific research documentations, news, opinions expressed in social network messages and blogs, etc.), from etherogenous sources (universities, governamental institutions, private companies, and individuals), and created with distinct rates and frequency (news steams, social network posts, etc.). Thus the research in this field besides the traditional topics of information content representation, document relevance modeling and information categorization, needs to face novel issues such as relevant information source selection, dynamic query results and stream summarization, and the users' intention modeling both when searching for information and when creating information. These tasks are strictly related with modeling the context in which the search is carried out by considering the information topicality, location, trust, reputation, freshness, etc., all contributing to define the relevance of documents to personal information needs.

This year the special track is in its 17th edition in the context of SAC, and it includes six full papers (with an acceptance rate of 25%), and a poster paper. Each paper was peer reviewed by at least 3 members of the Program Committee (listed in these proceedings) to whom we express our greatest gratitude: their help has been invaluable for carrying out a high quality selection process.
The full papers cover different hot research topics in information retrieval: pseudo-relevance feedback, document and stream summarization, flexible querying, prediction training in recommender systems and specialized information source selection.
The first paper entitled "*LiMe: Linear Methods for Pseudo-Relevance Feedback"* by Daniel Valcarce, Javier Parapar and Álvaro Barreiro explores the use of linear methods for pseudo-relevance feedback by proposing a matrix decomposition model. It involves the computation of an inter-term similarity matrix which is used for expanding the original query and a linear least squares regression with regularisation to solve the proposed decomposition with non-negativity constraints. The proposal is evaluated on five datasets against strong state-of-the-art baselines methods of pseudo relevance feedback showing improvements in terms of MAP, nDCG and robustness index.

The paper entitled "*Towards Coherent Single-Document Summarization: An Integer Linear Programming-based Approach*" by Rodrigo Garcia, Rinaldo Lima, Bernard Espinasse and

Hilário Oliveira presents an unsupervised summarization system as an attempt towards coherent extractive single document summarization. It relies on Integer Linear Programming (ILP) as an optimization technique for selecting the smallest subset of sentences of a document maximizing the coverage of relevant concepts. Furthermore, the proposed solution uses a graph-based algorithm for both representing sentences and concepts and enabling local coherence scoring among the sentences in the generated summaries. The proposed system is evaluated on two single-document benchmark datasets using ROUGE measures, and compared with other state-of the-art summarizers showing competitive results.

The paper "*Fuzzy Query By Example"* by Aurélien Moreau, Olivier Pivert and Grégory Smits approaches flexible querying to databases by fuzzy examples, in order to help users retrieve data without any prior knowledge of the database schema or any formal querying language. The user is solicited to evaluate, in a binary way, pre-selected items of the database. A characterization-based strategy is designed to identify the properties shared by the examples (resp. counter-examples) positively (resp. negatively) evaluated by the user. These properties are finally used to express a fuzzy query using linguistic terms from a fuzzy vocabulary to ensure that the user has a good understanding of the inferred query.

The paper entitled "*CoRec: A Co-Training Approach for Recommender Systems"* by Arthur Fortes da Costa, Marcelo Manzato and Ricardo J. G. B. Campello starting from the consideration that Recommender Systems need a large amount of labeled data to generate good predictions, activity that needs huge human effort, proposes a method to create predictions, named CoRec, which is based on a co-training two recommenders to agree with each other's predictions to generate their own. By using three publicly available datasets from movies, jokes and books domains, as well as two well-known recommender algorithms, the paper demonstrates the efficiency of the approach under different configurations. The experiments show that better accuracy can be obtained when recommender algorithms are simultaneously co-trained from multiple views to make predictions.

The paper entitled "*Optimization Framework Model For Retrospective Tweet Summarization"* by Abdelhamid Chellal and Mohand Boughanem faces the problem of automatically generating a concise summary of tweets stream containing relevant and non-redundant posts that capture key aspects of
information needs. They propose a novel approach that formulates the summary generation as an optimization problem modeled using Integer Linear Programming so as to select a subset of tweets that maximizes the global summary relevance and fulfils constraints related to non-redundancy, coverage, temporal diversity and summary length. They test the methods with experiments on TREC RTF 2015 and TREC RTS 2016 datasets and show the effectiveness of our approach.
.
The last full paper entitled "*Source Selection of Long Tail Sources for Federated Search in an Uncooperative Setting"* by Günter Urak, Hermann Ziak and Roman Kern faces the topic of source selection in federated searches in uncooperative setting scenarios under which the sources do not provide information about their content in a standardized way and by focusing on specialized sources offering few relevant documents, i.e., knowledge bases with long-tail content. Their proposed system uses a combination of two main ranking functions of the

sources, evaluating both a number of different general criteria such as topical closeness, estimation of the market share of the sources, and specific criteria for long tail sources classification using external knowledge bases, mainly WordNet Domains and Wikipedia for Schools. The approach is evaluated using the TREC 2014 Federated Web Search dataset and they show that a severe drop in performance occurs when the share of long-tail sources is higher than 40%. Based on this findings they merge only a few relevant long-tail sources integrated into the list of more popular knowledge bases, in order not to yield low performance.

Finally the poster paper entitled "*Word Embedding for Graph-based Automatic Keyphrase Extraction*" by Faneva Ramiandrisoa, Josiane Mothe and Michael Rasolomanana analyses various unsupervised automatic keyphrase extraction methods based on graphs as well as the impact of word embedding. Evaluation is made on three datasets, SEMEVAL3, 100 academic papers from ACM digital library, INSPEC3 , 2000 journal paper abstracts, and BIOMED, 3632 publications in Biomedecine and IR, and hows that there is no differences when using word embedding and when not using it.

20th December 2017

Gloria Bordogna and Gabriella Pasi

EDITORIAL MESSAGE
Special Track on Internet of Things (IoT)

Gail-Joon Ahn, *Arizona State University, USA*
Seong-Je Cho, *Dankook University, South Korea*
Jun Zheng, *New Mexico Institute of Mining and Technology, USA*

The Internet of Things (IoT) is a network of smart objects with pervasive and autonomous communication through internet connectivity. It has been emerged as a powerful and promising technology with significant technical, social and economic impacts. However, there are also lots of challenges to overcome to realize the potential benefits of IoT. The IoT track aims at bringing together researchers, experts, and practitioners from academia, industry, and government, to discuss current trends in research, practices, and education efforts of IoT. The track intends to foster the identification of the challenges facing IoT and approaches for solving them.

The IoT track attracted 33 submissions this year. After a rigorous double-blind review process, 8 were accepted as full papers. The overall acceptance rate is at a highly competitive 24%. The accepted papers are listed in the following which cover a wide range of topics in the IoT area:

- "Leaking data from enterprise networks using a compromised smartwatch device" by Shachar Siboni, Asaf Shabtai, and Yuval Elovici
- "Energy efficient scheduling in IoT networks" by Smruti R. Sarangi, Sakshi Goel, and Bhumika Singh
- "Fuzzy logic and MCDA in IoT resources classification" by Renato Dilli, Amanda Argou, Renata Reiser, and Adenauer Yamin
- "Hybrid controller synthesis for the IoT" by Arthur Gatouillat, Youakim Badr, and Bertrand Massot
- "A graph partitioning-based heuristic for runtime IoT data placement strategies in a Fog infrastructure" by Mohammed Islam Naas, Laurent Lemarchand, Jalil Boukhobza, and Philippe Raipin
- "Lightweight secure bootstrap and message attestation in the Internet of Things" by Clementine Gritti, Refik Molva, and Melek Önen
- "Combining hardware nodes and software components ordering-based heuristics for optimizing the placement of distributed IoT applications in the Fog" by Ye Xia, Xavier Etchevers, Loïc Letondeur, Thierry Coupaye, and Frédéric Desprez
- "FI-MApp: a web application for managing FI-WARE environments in Internet of Things" by Phelipe Feio, José Neto, Vagner Nascimento, and Antônio Abelém

In addition, one submission was accepted as a poster paper: "AffectiveROAD system and database to assess driver's arousal state" by Neska El Haouij, Jean-Michel Poggi, Sylvie Sevestre-Ghalila, Raja Ghozi, and Mériem Jaïdane.

The program committee (PC) of the track features 34 well-established researchers in the IoT area. In alphabetical order, the PC members are: Rakesh Bobba (Oregon State University, USA), Jinsung Cho (KyungHee University, South Korea), Kim-Kwong Raymond Choo (University of Texas at San Antonio, USA), Zongming Fei (University of Kentucky, USA), Sepideh Ghanavati (Texas Tech University, USA), Jinhua Guo (University of Michigan, USA), Junyoung Heo (Hansung University, South Korea), Hongxin Hu (Clemson University, USA), Eul Gyu Im (Hanyang University, South Korea), BooJoong Kang (Queen's University Belfast, UK), Bongjae Kim (Sun Moon University, South Korea), Yoohwan Kim (University of Nevada, Las Vegas, USA), Younghyun Kim (University of Wisconsin - Madison, USA), Ram Krishnan (University of Texas at San Antonio, USA), Parag Kulkani (Toshiba Research

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We would like to express our deepest gratitude to the PC members for their dedication to the high quality review process. We would also like to thank all the authors for submitting their work to the track. Your contributions are essential for the success of the track!

EDITORIAL MESSAGE
Special Track on Intelligent Robotics and Multi-Agent Systems

Rui P. Rocha, *ISR – University of Coimbra, Portugal*
Daniel Kudenko, *University of York, United Kingdom*
Shaojie Shen, *HKUST, Hong Kong, China*

Foreword

The special track on Intelligent Robotics and Multi-Agent Systems (IRMAS) focuses on all aspects of intelligent robotics and multi-agent systems (MAS) including related areas and applications. Its primary goal is to exploit synergies between robotics and artificial intelligence (AI), more precisely between intelligent robotics and MAS, and bring together researchers from both fields. For many years, robotics and AI researchers have worked separately, both fields have matured enormously, and today there is a growing interest in getting the two research fields together. Many in robotics believe that the focus in the near future should be adding capabilities to robots that lie at the core of AI research. Reciprocally, AI researchers aim at embedding their techniques in physical robots that can perceive, reason and act in real, dynamic environments.

We invited papers to address the research topics covered by this track through a call for papers distributed in worldwide mailing lists on robotics and AI and in private mailing lists of the Programm Committee (PC) members. The accepted papers cover important topics of this track, both on intelligent robotics and MAS.

In this fourth edition, there were 16 papers submitted from Europe (7), North Africa (4), Brazil (2), USA (1), and South Asia (2). After a rigorous blind peer review process by 62 PC members, 4 regular papers and 2 poster papers were accepted for the conference, resulting in an overall acceptance rate of 38%.

Acknowledgment

Many people contributed to the success of this track. First of all, we would like to thank to all members of the international PC for their efforts in attracting quality papers and in providing thoughtful reviews on time. The PC members are listed here in alphabetical order:

Alberto Ruiz - University of Murcia, Spain
Alberto Viseras - German Aerospace C., Germany
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Alessandro Farinelli - University of Verona, Italy
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Armando Sousa - University of Porto, Portugal
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Carlo Pinciroli - Worcester Polyt. Inst., MA, USA
Cesar Cadena - ETH Zurich, Switzerland
Christophe Grand - French Aerospace Lab, France
Chris. Kiekintveld - Un. Texas El Paso, TX, USA
Daniele Nardi - Univ. di Roma La Sapienza, Italy
Danilo Tardioli - University of Zaragoza, Spain
David Portugal - Ingeniarius Ltd, Portugal
Denis Wolf - University of São Paulo, Brazil
Diego R. Faria - Aston University, UK
Enda Howley - Nat. Univ. Ireland Galway, Ireland
Fernando Cheein - Un. Técn. Fed. St. María, Chile
Gabriel Oliver - Universitat Illes Balears, Spain

Giovanni Beltrame – Éc. P. Montréal, QC, Canada
Giuseppe Loianno - Un. Pennsylvania, PA, USA
Hakim Mabed – Univ. Bourgogne F.-C., France
James Edmondson - CMU, PA, USA
Jesús Capitán - University of Seville, Spain
João Sequeira - University of Lisbon, Portugal
Jorge Cortés - University of California, CA, USA
Jun Okamoto Jr. - University of São Paulo, Brazil
Jun Ota - University of Tokyo, Japan
Kurt Geihs - Kassel University, Germany
Kyriakos Efthymiadis - Vrije U. Brussel, Belgium
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Luís Correia - University of Lisbon, Portugal
Luis Merino - Pablo de Olavide University, Spain
Luis Paulo Reis - University of Minho, Portugal
Luiz Chaimowicz - Fed. Un. Minas Gerais, Brazil
Luiz Mirisola - Tech. Institute Aeronautics, Brazil
Manuel Silva - Polytechnic of Porto, Portugal
Mark Hanheide - University of Lincoln, UK
Mauro Dragone - Heriot-Watt University, UK
Micael S. Couceiro – Ingeniarius Ltd., Portugal
Ming Liu - HKUST, China
Nicola Basilico - University of Milan, Italy
Nuno Lau - University of Aveiro, Portugal
P.B. Sujit - Indraprastha Inst. Inform. Techn., India
Patricia A. Vargas - Heriot-Watt University, UK
Paulo Drews Jr. – Fed. Univ. Rio Grande, Brazil
Pedro Miraldo - University of Lisbon, Portugal
Pedro Núñez - University of Extremadura, Spain
Pooyan Fazli - Cleveland State Univ., OH, USA
Pratap Tokekar - Virginia Tech Univ., VA, USA
Raúl Marín Prades - Universitat Jaume-I, Spain
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Robert Krug - Örebro University, Sweden
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Thomas Hellström - Umeå University, Sweden
Tomas Krajnik - Czech Tech. Univ., Czech Rep.
Yen-Chen Liu – Nat. Cheng Kung Univ., Taiwan
Yu Zhang - Arizona State University, USA

We also want to thank all the authors who contributed to the SAC 2018 IRMAS track. Finally, we offer special thanks to the SAC 2018 Organizing Committee and the ACM SIGAPP.

About the Track Chairs

Rui P. Rocha is an assistant professor in the Dept. of Electrical and Computer Engineering and a permanent researcher in the AP4ISR team of ISR at the University of Coimbra, Portugal. His main research interests are multi-robot systems, cooperative perception, distributed control, autonomous robots, and AAL.

Daniel Kudenko is a lecturer in computer science at the University of York, United Kingdom, where he leads the Reinforcement Learning Group. His research interests include machine (reinforcement) learning, multi-agent systems, user modeling, and artificial intelligence for games and interactive entertainment.

Shaojie Shen is an assistant professor in the Dept. of Electrical and Computer Engineering at Hong Kong University of Science and Technology (HKUST), where he leads the HKUST Aerial Robotics Group in the HKUST Robotics Institute. His research interests are in the areas of robotics and unmanned aerial vehicles.

EDITORIAL MESSAGE
Special Track on Knowledge Representation and Reasoning (KRR)

Stefano Bistarelli, *Università di Perugia, Italy*
Martine Ceberio, *Univerity of Texas El Paso (UTEP), US*
Eric Monfroy, *LS2N UMR 6004, Université de Nantes, France*
Francesco Santini, *Università di Perugia, Italy*

The topic of the track covers an important field of research in Artificial Intelligence: KRR is indeed a trending topic (for instance, in Argumentation-theory subfield). A similar dedicated conference is the International Conference on Principles of Knowledge Representation and Reasoning, but all the major conferences in AI (e.g., AAAI, IJCAI, AAMAS, ECAI) have KRR among their topics of interest. KRR track will be a venue for all the researchers and practitioners working on the fundamentals (but also applications) of reasoning, and the cross-fertilization among different approaches (e.g., Argumentation and Belief Revision).

Knowledge-Representation and Reasoning (KRR) is the field of artificial intelligence that focuses on designing computer representations that capture information about the world that can be used to solve complex problems. Its goal is to understand and build intelligent behavior from the top down, focusing on what an agent needs to know with the purpose to behave intelligently, how this knowledge can be represented symbolically, and how automated reasoning procedures can make this knowledge available as needed. In KRR a fundamental assumption is that an agent's knowledge is explicitly represented in a declarative form, suitable for processing by dedicated reasoning engines. Topics of interest include, but are not limited to:

- Argumentation
- Belief revision and update, belief merging, etc.
- Commonsense reasoning
- Constraint solving, programming, technologies
- Contextual reasoning
- Description logics
- Diagnosis, abduction, explanation
- Inconsistency- and exception tolerant reasoning, para-consistent logics
- KR and autonomous agents: intelligent agents, cognitive robotics, multi-agent systems
- KR and decision making, game theory, social choice
- KR and machine learning, inductive logic programming, knowledge discovery and acquisition
- Logic programming, answer set programming, constraint logic programming
- Non-monotonic logics, default logics, conditional logics
- Preferences: modeling and representation, preference-based reasoning
- Reasoning about knowledge and belief, dynamic epistemic logic, epistemic and doxastic logics
- Reasoning systems and solvers, knowledge compilation
- Spatial reasoning and temporal reasoning, qualitative reasoning
- Uncertainty, representations of vagueness, many-valued and fuzzy logics

The special track was a huge success. An excellent Programme Committee was assembled to help with the review process. A total of 18 papers were submitted for anonymous review. Each paper was reviewed by 3 members of the Programme Committee, which was made of 34 experts of the field. From the submissions received, 5 papers were accepted and appear in the proceedings. The rate of acceptance for the track is in line with that of the conference as a whole.

Three papers are related to different aspects of Argumentation. One paper links the backbone of Constraint Satisfaction problems (i.e., the variables that take the same values in all solutions) to the backbone of the so-called ideal semantics in Abstract Argumentation. A second paper improves the computation of warrant statuses in Defeasible Logic Programming, which correspond to the main output of a dialectical process. The third paper introduces a purely model-theoretic characterization of a labelling-based semantics for Abstract Argumentation Frameworks: the distinctive aspect of such a semantics is that it is settled on an infinite-valued approach. The other two papers accepted in the track respectively propose probabilistic extensions of OWL 2 RL and OWL 2 EL by using a probabilistic soft logic, and how some of the dynamic aspects of the image schema containment can be formally approached by using an image schema logic based on different languages, as Linear Temporal Logic over the reals.

As special track co-chairs, we would like to express our thanks to all those whose hard work made this track such a success. We express a very special word of thanks to all the authors who submitted papers to the special track. We also sincerely acknowledge the hard work of the Programme Committee for reviewing the papers in such a detailed and timely fashion. Finally, we would like to thank the organizers of SAC-2018 for providing so much help and assistance in supporting this special track.

The track chairs of the Special Track on Knowledge Representation and reasoning (KRR)

Stefano Bistarelli, Martine Ceberio, Eric Monfroy, Francesco Santini

EDITORIAL MESSAGE
Special Track on Mobile Computing and Applications

***Hong Va Leong**, The Hong Kong Polytechnic University, Hong Kong*
***Sheikh Iqbal Ahamed**, Marquette University, USA*

1. THE MOBILE COMPUTING AND APPLICATIONS TRACK

For the past 15 years, Mobile Computing and Applications Tracks had been running successfully. The papers have been improving in quality and the competition has also become more and more severe, with dropping acceptance rate. This year, the track is experiencing a challenge in receiving fewer submissions than the past. Nevertheless, the submissions are still coming from all over the world, so are the accepted papers. The track features research papers drawn from a highly diversified spectrum of mobile computing, with a strong orientation towards various applications on the mobile device and mobile platform. There are papers representing the recently upcoming area of machine learning and image analysis, to complement the more conventional activity applications. To summarize, the track is dedicated to draw upon research efforts and expertise from different areas of research, so as to promote better synergy and to bring forth not only core communications and security protocols for application development and data management, but also important and upcoming research applications to realize the benefits of anywhere, any place and anytime pervasive and ubiquitous computing.

2. THE REVIEW PROCESS

It is to our great honor to have invited many well-established researchers with strong track records in the area of mobile computing and mobile data management to serve on the international program committee. We would like to express our deepest gratitude to the program committee members for their dedication to the high quality review process, within a relatively short review cycle. Each paper is sent to at least three independent reviewers in the program committee, under a blind review process. In the end, all papers received at least three review reports, commenting on their relative merits and shortcomings. Acceptance was based on the scores recommended by the reviewers, their relative level of confidence in the papers, as well as their written comments. We concur that the papers we accept are of high quality and it is indeed unfortunate that many good quality papers could not be included in the proceedings, even as posters. We would especially like to thank the program committee members and additional reviewers for their dedicated efforts and help in reviewing the papers:

Mohammad Adibuzzaman from Purdue University, USA; *Tanim Ahsan* from Marquette University, USA; *Angelo Brayner* from Federal University of Ceara, Brazil; *Ying Cai* from Iowa State University, USA; *Guadalupe Canahuate* from University of Iowa, USA; *Alvin Chan* from Singapore Institute of Technology, Singapore; *Chi-Yin Chow* from City University of Hong Kong, Hong Kong; *Ling Feng* from Tsinghua University, China; *Osman Gani* from Miami University, USA; *Md Munirul Haque* from Purdue University, USA; *Takahiro Hara* from Osaka University, Japan; *Md Kamrul Hasan* from Marquette University, USA; *Charles Hu* from National Central University, Taiwan; *Niharika Jain* from Marquette University, USA; *Rasib Khan* from Northern Kentucky University, USA; *Dik Lee* from Hong Kong University of Science and Technology, Hong Kong; *Guanling Lee* from National Dong Hwa University, Taiwan; *Ken Lee* from Microsoft, USA; *Wang-Chien Lee* from Pennsylvania State University, USA; *Po-Ruey Lei* from ROC Naval Academy, Taiwan; *Seng Loke* from Deakin University, Australia; *Stephane Maag* from Institut Telecom SudParis, France; *AKM Majumder* from Miami University, USA; *Mohammad Rahman* from TnTech, USA; *Rodolfo Resende* from Universidade Federal de Minas Gerais, Brazil; *Weidong Shi* from University of Houston, USA; *Antonio Si* from Nexant Inc, USA; *Chandana Tamma* from Marquette University, USA; *Mi-Yen Yeh* from Academia Sinica, Taiwan; *Seongwook Youn* from Korea National University of Transportation, Korea; *Arkady Zaslavsky* from CSIRO, Australia; *Baihua Zheng* from Singapore Management University, Singapore.

In response to the Call-for-Papers, we received 17 submissions from 9 different countries, spanning across 5 continents, with most submissions coming from North America, followed very closely by submissions from South America and Europe. There are also submissions from Asia and Africa. The distribution is as follows: North America (6), South America (5), Europe (4), Asia (1.8) and Africa (0.2). After a rigorous review process, 4 papers are selected for inclusion in the Proceedings, with an equal share among the four key origins of papers, namely, one each for North America, South America, Europe and Asia collaborating with Africa. We are faced with a tough selection process, and the acceptance rate for regular papers is only 23.5%. Two papers with favorable reviewers' comments that would have been accepted as regular papers in the past can only be accepted as poster papers, coming also from South America and one from Asia. This completes the profile of the Mobile Computing and Applications Track for SAC 2018.

3. THE CONTRIBUTED PAPERS

This year, the contributed papers demonstrate a very heavy concentration on the application natures of mobile computing, whist deploying the upcoming and important research paradigms and technologies in machine learning and image processing, to address various mobile applications. It is enlightening to us that all the accepted papers represent collaborative efforts across institutions, across countries and even across continents. The poster session comprises of two papers echoing closely the regular papers, on mobile applications and web browsing characteristics.

Session: Mobile Applications

The first paper in the track is authored by Yasser Mohammad, Kazunori Matsumoto and Keiichiro Hoash, entitled "*Deep Feature Learning and Selection for Activity Recognition*". This paper represents an international and inter-continental work, addressing the problem of recognizing human physical activity from sensor data generated from wearable and smart devices. State-of-the-art deep learning algorithms can lead to good performance of activity classification but they execute slowly. The authors propose an intermediate approach utilizing a deep neural network, namely, multi-convolutional neural network, to learn potentially useful features from the abundant time-series sensor data in order to recognize human activities. This is followed by feature selection and classification. Seven experiments are conducted to compare its performance with several state-of-the-art approaches. The proposed approach is found to perform better in six of them. The second paper is entitled "*Estimating Local Coverage Areas for Location Dependent Queries*" by Jorge Bernad, Carlos Bobed and Eduardo Mena. This paper is the result of a piece of international joint research work. In order to support location-based services, there must be an efficient mechanism to monitor the area covered by the application domain via a given set of monitoring objects and to estimate their actual coverage when communication range is not necessarily circular, i.e. fixed disk. In this paper, the authors propose several algorithms to estimate the real coverage area of an object from its detected location which may change over time, including adaptive disk, convex hull, polar grid, Delaunay triangulation and a combined adaptive algorithm. Their accuracy and efficiency are compared against synthetic and real scenarios with varying topologies and obstacles. The real dataset is on the signal strength of GoogleWiFi in a zone in Mountain View, California. The next paper is by Agnese Chiatti, Mu Jung Cho, Anupriya Gagneja, Xiao Yang, Miriam Brinberg, Katie Roehrick, Sagnik Ray Choudhury, Nilam Ram, Byron Reeves and C. Lee Giles, entitled "*Text Extraction and Retrieval from Smartphone Screenshots: Building a Repository for Life in Media*". This paper represents a joint national effort conducted by authors geographically widely separated. The authors propose to extract life experience information from the screen shots of a mobile phone, which a user will be viewing over a period of time. Screen shots are information-rich and various texts contained therein are extracted. A dataset generated by 17 participants involving 13K random images is constructed from a complete set of images collected over 10 days to 1 month with 54 users for text extraction via OCR, based on OpenCV image-processing and Tesseract OCR modules. The text extraction accuracy is then evaluated. The last paper in the track is "*A Smartphone Application to Measure the Quality of Pest Control Spraying Machines via Image Analysis*" jointly by Bruno Brandoli Machado, Gabriel Spadon, Mauro Arruda, Wesley Goncalves, Andre Carvalho and Jose Rodrigues-Jr. This final paper also represents a joint national effort across institutions. The authors note that it is important to develop a low-cost and highly-portable approach to accurately predict how well the spraying of pesticides can cover the intended crop to enhance agricultural productivity. In this paper, a new methodology based on a smartphone app is proposed. There are five key image processing steps, i.e. color space conversion, threshold noise removal, convolutional operations of dilation and erosion, detection of contour markers in water-sensitive cards, and identification of droplets. Successful experiments were conducted based on synthetic cards and a real-world crop.

Poster Session

Two high quality papers have been selected to be presented as posters. The first joint research paper by Taeho Hwang, Myungsik Kim, Seongjin Lee and Youjip Won is entitled "*On the I/O Characteristics of the MobileWeb Browsers*", which analyzes the I/O characteristics of five popular web browsers on mobile phones: Chrome, Firefox, Opera, Dolphin, and UC, when accessing a web-site of 52 objects with a size of 509K. It is found that browsing generates a lot of writes, with a high Browser Write Amplification Factor. Other non-user configurable features also lead to a further reduction on the battery life. This is followed by the paper "*MaE! A Service for Supporting People Meeting at Events*" by Wender Xavier, Mateus Silveira, Josemar Caetano and Humberto Marques-Neto, which proposes a Meeting-at-an-Event service providing features in locating friends, getting service data and network load. It aims to deliver relevant real-time information to attendees, improving their experience. An empirical test was conducted with data from a soccer match between Brazil and Chile, with an attendance of 53,331 generating 45,168 calls of a mobile-phone carrier across the city and some patterns are observed.

4. THE TRACK CHAIRS

Hong Va Leong received his PhD from the University of California at Santa Barbara, and is currently an associate professor at the Hong Kong Polytechnic University. He is the program co-chairs of several conferences, including IMMCN, HS@I, CIC, and the track chair of SAC 2003 to 2017. He has served on the organizing committees for SIGMOD and VLDB and on the program committees of VLDB, EDBT, ICDE, ICDCS, MDM, CIKM and many others. He had also served as symposium and workshop chairs at IEEE COMPSAC for a number of years. He is a reviewer for ACM Transactions on Computer Systems, IEEE Transactions on Parallel and Distributed Systems, on Knowledge and Data Engineering, on Mobile Computing, on Multimedia, and on Computers, Information Systems, and other journals. His research interests are in mobile computing, internet computing, distributed systems, distributed databases, and digital libraries. He is a member of the ACM, IEEE Computer Society and IEEE Communications Society.

Sheikh Iqbal Ahamed is currently a professor of Computer Science and director of Ubicomp Lab at Marquette University, USA. He is a senior member of the IEEE, ACM, and the IEEE Computer Society. He completed his Ph.D. in Computer Science from Arizona State University, USA in 2003. His research interests include mHealth, security and privacy in pervasive computing, affective computing, middleware for ubiquitous/pervasive computing. Currently, he has over $1M research grants in mHealth and mobile/pervasive computing. He has a number of collaborative mHealth projects with the researchers of different universities and non-profit organizations in USA and international mHealth projects in Bangladesh, Nepal, Taiwan and China. He has published 100+ peer reviewed journal, conference and workshop papers and received twelve best paper/posters awards in last five years. He serves regularly on international conference program committees in mobile computing, software engineering and pervasive computing. He has been serving as the Steering Chair of COMPSAC since 2015. He is the Guest Editor of Computer Communications Journal, Elsevier. Here is a link of one of his high impact mHealth projects: http://www.marquette.edu/research/documents/discover-2011-mobile-md.pdf.

EDITORIAL MESSAGE
Special Track on Object Oriented and Parallel Programming and Systems

Davide Ancona, DIBRIS, *University of Genova, Italy*
Frédéric Loulergue, *Northern Arizona University, USA*

Introduction

Object-oriented programming and parallel architectures has become pervasive in the development of complex software systems in most application domains.

However, existing OO languages and platforms need to evolve and parallel programming is still reserved to experienced programmers. Programming languages need to meet the continuous demand for new abstractions, features, and tools able to reduce the time, effort, and cost of creating object-oriented software systems, and improving their performance, quality and usability. For parallel programming the trend is towards the increase of cores in processors and the number of processors in multiprocessor machines: The need for scalable computing is everywhere. But parallel and distributed programming is still dominated by low-level techniques such as send/receive message passing and POSIX threads. Thus high-level approaches should play a key role in the shift to scalable computing in every computer.

To this aim, the Special Track on Object Oriented and Parallel Programming and Systems (OOPPS, http://oops.disi.unige.it) is seeking for research advances bringing benefits in all those typical aspects of software development, such as modeling, prototyping, design, implementation, concurrency and distribution, code generation, analysis, verification, testing, debugging, evaluation, deployment, maintenance, reuse, and software evolution and adaptation.

Statistical Information

In response to the call for papers, 17 papers were submitted to the track. All manuscripts were reviewed by at least three PC members, but, in fact, several of them received four high quality reviews. The program committee consisted of the following academic and industrial researchers.

Marco Aldinucci, University of Torino, Italy
Mohamad Al Hajj Hassan, Huawei, Germany
Davide Ancona, University of Genova, Italy
Lorenzo Bettini, University of Firenze, Italy
Carl Friedrich Bolz, Germany
Mathias Bourgoin, LIFO, Université d'Orléans, France
Viviana Bono, University of Torino, Italy
Marcello Bonsangue, Leiden University, The Netherlands
João Costa Seco, Universidade Nova de Lisboa, Portugal
Inês de Castro Dutra, Universidade do Porto, Portugal
Kento Emoto, Kyushu Institute of Technology, Japan
Sebastian Erdweg, TU Delft, The Netherlands
Erik Ernst, Google Inc., USA
Alexandros Gerbessiotis, NJIT, USA
Paola Giannini, University of Piemonte Orientale, Italy
Khaled Hamidouche, AMD Research, USA
Geoff Hamilton, Dublin City University, Ireland

Robert Hirschfeld, Hasso-Plattner-Institut, University of Potsdam, Germany
Hideya Iwasaki, The University of Electro-Communications, Japan
Jaakko Järvi, University of Bergen, Norway
Clinton Jeffery, University of Idaho, USA
Herbert Kuchen, Westfälische Wilhems-Universität Münster, Germany
Arnaud Lallouet, Huawei Technologies, France
Doug Lea, Suny Oswego, USA
Frédéric Loulergue, Northern Arizona University, USA
Hidehiko Masuhara, Tokyo Institute of Technology, Japan
Rosemary Monahan, Maynooth University, Ireland
Virginia Niculescu, Babes Bolya University, Romania
Tobias Pape, Hasso-Plattner-Institut, University of Potsdam, Germany
Nick Papoulias, IRD, UPMC, Sorbonne University, France
Pavel Parizek, Charles University, Czech Republic
Susanna Pelagatti, University of Pisa, Italy
Md. Wasi-ur Rahman, Intel, USA
António Ravara, Universidade Nova de Lisboa, Portugal
Jean Charles Régin, Université de Nice Sophia Antipolis, France
Guido Salvaneschi, TU Darmstadt, Germany
Christian Schute, KTH Royal Institute of Technology, Sweden
Julien Tesson, Université Paris-Est Créteil, France
Vincent von Hof, University of Münster, Germany

We are very grateful to the members of the program committee and to the authors for submitting their contributions. Without their valuable support, it would not have been possible to schedule such a high quality program for the track.

List of Accepted Papers

Full papers

Textual Alignment in SPMD Programs. Frederic Dabrowski.

Enabling lock-free concurrent workers over temporal graphs composed of multiple time-series. Francois Fouquet, Thomas Hartmann, Sébastien Mosser and Maxime Cordy.

OOlong: An Extensible Concurrent Object Calculus. Elias Castegren and Tobias Wrigstad.

A type and effect system for uniqueness and immutability. Paola Giannini, Marco Servetto and Elena Zucca.

Implementing Modular Class-based Reuse Mechanisms on Top of a Single Inheritance VM. Pablo Tesone, Guillermo Polito, Luc Fabresse, Noury Bouraqadi and Stéphane Ducasse.

Poster papers

CBM: A Compact Representation and its Parallel Search for Query Processing on GPU Framework on GPU. Chantana Chantrapornchai, Chidchanok Choksuchat and Sergei Gorlatch.

Automatic Scalable Parallel Test Case Execution. Introducing the Münster DiStributed Test Case Runner for Java (MiDSTR). Vincent Christoph von Hof and Andreas Fuchs.

SRC papers

Node-level Optimization by Caching Data and Choosing the Optimal Tile Size for Parallel Dense Linear Algebra on Distributed Systems. Yonghyun Ryu.

EDITORIAL MESSAGE
Special Track on Operating Systems (OS)

Bongjae Kim, *Sun Moon Univeristy, Korea*
George Hamer, *South Dakota State University, USA*
Jaeheung Lee, *Daejeon University, Korea*

The purpose of Operating Systems track is to bring together researchers, designers, and developers who are interested in methodologies for the design and analysis of operating systems and/or applications that are highly adaptive to user needs. In recent years, we have noticed a tremendous growth on the demands for highly-efficient operating systems in various fields. At the same time, adaptive applications have also become more and more complex, and it imposes new challenging issues never faced before in this application field. It is thus clear that nowadays the development and design of operating systems must rely, even more than in the recent past, on specific solutions both in the hardware and in the software components. Moreover, the needs to timely tackle changes in the market pushes toward the employment of methodologies to shorten the development time and to drive the evolution of existing products. The solutions to new problems emerging in this setting call for a joint effort from the academics and industry.

The designs of high-performance operating systems and adaptive applications must take into account a wide variety of constraints: Performance, code size, real-time performance, maintainability, eneragy efficiency, and scalability. This track provides a forum for the presentation of high-quality, original research covering all aspects of operating systems and adaptive applications design, analysis, implementation, evaluation, and case-studies. Solutions might be proposed at different levels of abstractions, making use of an assortment of tools and methodologies. Researchers and practitioners would have a chance to propose new ideas and to compare experimentations. The focus of this track is on the application of both novel and well-known techniques to the operating systems and adaptive applications development.

In this year, a total of 32 submissions were received around the world. Each paper was reviewed by more than 3 blind reviewers and provided careful and thoughtful reviews on which the selection process was based. The reviewing process was done by the technical program committee and additional reviewers. Over the 32 submissions, 8 papers were accepted as full papers, and 3 paper was accepted as poster papers after a rigorous reviewing process. Many excellent papers could not be accepted because of the conference policy in this year.

We would like to thank all of the authors who contributed to the ACM SAC 2018 OS Track. We also like to thank all of the reviewers for their hard and on-time work. Finally, we give special thanks to the SAC organizing committee, who believes in the potential of the OS Track, as well as to the ACM SigAPP.

EDITORIAL MESSAGE
Special Track on Privacy by Design in Practice

Ronald Petrlic, The *Commissioner for Data Protection and Freedom of Information Baden-Württemberg, Germany*

Christoph Sorge, *Saarland University, Germany*

The aim of the privacy by design in practice track is to promote research on privacy-preserving technologies to be used in practice. "Privacy by Design" (PbD) is a requirement in the new EU data protection regulation, which will be applied in the EU countries from May 2018. Thus, privacy needs to be considered by engineers from the beginning and built in to newly developed systems properly. A lot of research has been done in the field of privacy-enhancing technologies (PETS) in the past years. However, very few of those approaches have found their way into practice. The *ACM Symposium on Applied Computing (SAC)* provides a great opportunity for researchers to present practical research on privacy by design, leading to more privacy-friendly technology in the future.

Privacy by design encompasses techniques from various fields of computer science. Therefore, the track greatly benefits from the conference's diverse research agenda and its broad audience. We aim at promoting the (legal) need to deal with privacy protection to those people who perform research on new technology. Legal researchers bringing in their view on privacy protection are very welcome to join this track to foster multi-disciplinary research. The track is also of interest for data protection agencies (DPAs), as they will need to deal with PbD in the future as well.

Statistics

This is the first edition of the privacy by design in practice track at SAC. We received 16 papers and one student research abstract. Each paper was reviewed by a minimum of three reviewers. According to the ACM SAC guidelines, only 4 full papers could be accepted for the track, resulting in an acceptance rate of 25%. A number of quality papers had to be rejected. Additionally, we accepted two papers as poster papers, providing the authors the opportunity to present their work as a poster and retrieve valuable input from the conference participants.

Accepted Papers

Michael Colesky, Julio C. Caiza, Jose M. Del Alamo, Jaap-Henk Hoepman and Yod-Samuel Martín start the track program by proposing a system of privacy patterns for user control. After that, *Amir Shayan Ahmadian, Jan Jürjens and Daniel Strüber* continue by extending model-based privacy analysis for the industrial data space by exploiting privacy level agreements. Next, *Sourya Joyee DE and Abdessamad Imine* show how to balance user-centric social benefit and privacy in online social

networks. *Farzaneh Karegar, Nina Gerber, Melanie Volkamer and Simone Fischer-Hübner* end the session by helping John to make informed decisions on using social login.

In the poster session, *Kim Wuyts, Dimitri Van Landuyt, Aram Hovsepyan and Wouter Joosen* present an approach for an effective and efficient privacy threat modeling through domain refinements and *Erik Sy, Tobias Müller, Matthias Marx and Dominik Herrmann* propose AppPETs: A framework for privacy-preserving apps.

Program Committee

Christoph Bösch, Ulm University, Germany

Claude Castelluccia, INRIA France

Tooska Dargahi, University of Rome Tor Vergata, Italy

Martin Degeling, CMU USA

Isao Echizen, National Institute of Informatics, Japan

Felix Gomez Marmol, Universidad de Murcia, Spain

Bart Knijnenburg, Clemson University, USA

Sebastian Pape, Goethe University Frankfurt, Germany

Andreas Reiter, TU Graz, Austria

Burkhard Schafer, University of Edinburgh, GB

Francesc Sebe Feixas, University of Lleida, Spain

We are very grateful for the support of our program committee, which did an excellent job.

Overall, we are happy that our new track could attract such a high number of high-quality papers and we are looking forward to SAC 2018.

EDITORIAL MESSAGE
Special Track on Programming Languages

Barrett R. Bryant, *University of North Texas, USA*
Rajeev Raje, *Indiana University-Purdue University-Indianapolis, USA*
Marjan Mernik, *University of Maribor, Slovenia*

1. Objectives of the track

The Programming Languages (PL) Track provides researchers and practitioners with a forum to present their ideas and experience in designing new programming concepts and implementing programming languages. It includes the topics of Compiling Techniques, Domain-Specific Languages, Formal Semantics and Syntax, Garbage Collection, Language Design and Implementation, Languages for Modeling, Model-Driven Development and Model Transformation, New Programming Language Ideas and Concepts, New Programming Paradigms, Practical Experiences with Programming Languages, Program Analysis and Verification, Program Generation and Transformation, Programming Languages from All Paradigms (Agent-Oriented, Aspect-Oriented, Functional, Logic, Object-Oriented, etc.), and Visual Programming Languages.

2. Statistical information

Twenty-four papers were originally submitted from ten different countries: Brazil, Denmark, Germany, Hungary, Korea, Japan, the Netherlands, Portugal, the UK, and the USA. Among those, eight regular papers were selected for an acceptance rate of 33.3% as well as one poster. The Track Program Committee had 16 members: Roberto da Silva Bigonha (Universidade Federal de Minas Gerais, Brazil), Walter Cazzola, (University of Milan, Italy), Igor Dejanović (University of Novi Sad, Serbia), Tom Dinkelaker, (Ericsson, Germany), Michael Felderer (University of Innsbruck, Austria), Esther Guerra (Universidad Autónoma of Madrid, Spain), Pedro Henriques (University of Minho, Portugal), Geylani Kardas (Ege University, Turkey), Hans-Wolfgang Loidl (Heriot-Watt University, UK), Vineeth Paleri, (NIT Calicut, India), Nikolaos Papaspyrou (National Technical University of Athens, Greece), Marco Patrignani (University of Leuven, Belgium), Peter Pirkelbauer (University of Alabama at Birmingham, USA), Adam Porter (University of Maryland, USA), Boštjan Slivnik (University of Ljubljana, Slovenia), and Jingling Xue (University of New South Wales, Australia).

3. The contributed papers

Full papers:

1. *Jan C. Dageförde and Herbert Kuchen. A Constraint-logic Object-oriented Language.* The authors propose an approach, which facilitates an integrated implementation of both enterprise software and complicated search problems with dynamic constraints.

2. *Sérgio Medeiros and Fabio Mascarenhas. Syntax Error Recovery in Parsing Expression Grammars.* Parsing Expression Grammars (PEGs) with labeled failures are extended to provide for syntax error recovery in PEGs.

3. *Paul Tarau. Declarative Algorithms for Generation, Counting and Random Sampling of Term Algebras.* Prolog's multiple-answer generation mechanism is used to derive a generic algorithm that counts terms of a given size, generates them all, or samples a random term given the signature of a term algebra.

4. *Tiago Carvalho and João M. P. Cardoso. An Approach based on a DSL + API for Programming Runtime Adaptivity and Autotuning Concerns.* This paper presents a flexible approach to support analysis of program hotspots and adaptivity opportunities, code restructuring, and programming of adaptivity strategies.

5. *Ankica Barišić, Vasco Amaral, Miguel Goulão, João Cambeiro, and Tarquinio Mota. Leveraging Teenagers Feedback in the Development of a Domain-Specific Language -- the Case of Programming Low-cost Robots.* This paper evaluates how the usability of the Gyro Creator Language (GCL), an open-source DSL for controlling low-cost rover-like Arduino robots, may be improved, based upon the experiences of novice users of the language.

6. *Ciro Medeiros, Martin A. Musicante, Umberto Souza da Costa. Efficient Evaluation of Context-Free Path Queries for Graph Databases.* Given a graph and a query defined over a context-free grammar, an algorithm is presented which identifies paths on the graph which form words of the language generated by the grammar.

7. *Takafumi Kataoka, Tomoharu Ugawa, and Hideya Iwasaki. A Framework for Constructing JavaScript Virtual Machines with Customized Datatype Representations.* This paper presents a framework that can generate a customized JavaScript VM on the basis of datatype specifications, operand specifications and instruction definitions.

8. *Luís Cruz-Filipe, Fabrizio Montesi, and Marco Peressotti. Communications in Choreographies, Revisited.* A new model is introduced for choreographic programming with a primitive for grouped interactions that allows multiple values to be communicated among two or more parties, like multicast, scatter-gather, and atomic exchanges.

Posters:

1. *Tetsuro Yamazaki and Shigeru Chiba. Buffered Garbage Collection for Self-Reflective Customization.* Buffered garbage collection is a new garbage-collection algorithm, which allows customizing a garbage collector through computational self-reflection.

Acknowledgements

We would like to thank all authors for their valuable contributions. We also thank the program committee members who voluntarily supported us to recruit good papers and review the papers.

Editorial Message
Special Track on Requirements Engineering

Jaelson Castro, *Universidade Federal de Pernambuco, Brazil*
João Araújo, *Universidade Nova de Lisboa, Portugal*

1. INTRODUCTION

Requirements Engineering (RE) is the branch of Software Engineering concerned with the real-world goals for, functions of, and constraints on software systems. RE is also concerned with the relationship of these factors to precise specifications of software behaviour and to their evolution over time and across software families. RE is increasingly recognized as a critical activity in any systems engineering process. Independently of the nature of the software, the elicitation, analysis, negotiation, specification, validation and management of requirements are fundamental for establishing quality in complex software. Only by fully understanding stakeholders' needs, and documenting them in a concise and unambiguous way, can we consistently deliver quality products designed to meet the complexity of our advanced information society.

The objective of this track is to explore different advances in RE, its relation with different areas, thereby reducing the gap between software engineering solutions and the way one specific domain of knowledge was seen up to given point.

2. CONTENTS OF THE TRACK

The Requirements Engineering Track of ACM-SAC 2018 received 22 (twenty-two) submissions from several countries in the Americas, Asia and Europe. A board of 31 specialists reviewed all submissions and selected 6 (six) regular papers and 1 (one) poster, covering different areas of the field.

The paper "*Comparing Alternative Goal Model Visualizations for Decision Making: an Exploratory Experiment*" comes from the York University (Canada) and University of Toronto (Canada). It assesses alternative ways for decision problem visualization within goal models. In particular, the authors made an experimental evaluation contrasting treemaps and pie charts combined with bar charts, to test how these options compare, with respect to accuracy, speed and confidence while solving decision problems within goal models.

The paper "*Building a Software Requirements Specification and Design for an Avionics System: An Experience Report"* is written by authors from Université du Québec à Montreal, Canada. Its main goal is to present an avionics software case study of a landing gear control software (LGCS) and the observations, challenges and issues experienced during its construction following the DO-178C guideline, and its DO-331 and DO-332 supplements.

The paper *"SafeTrace: A Safety-Driven Requirement Traceability Framework on Device Interaction Hazards for MD PnP"* is a collaboration among University of Illinois at Urbana-

Champaign (USA), Tsinghua University (China) and Illinois Institute of Technology (USA). The authors describe a traceability framework for change impact analysis in the context of safety-critical systems engineering, especially to support the safety analysis to avoid hazards for medical device plug-and-play (MD PnP).

The paper *"A Gamified Requirements Inspection Process for Goal Models"* reports on a joint research of the Universidade Federal Rural de Pernambuco (Brazil), Universidade Federal de Pernambuco (Brazil) and Universidade de Pernambuco (Brazil). It discusses and evaluates a gamification strategy for the inspection of i* models. The authors propose a multi-player game that iterates through the goal model with numbered entities. Entity-specific game cards (e.g., for goals, for actors) tell the player what to check.

The paper *"Deriving Services from KAOS Model"* is presented by authors from Universidade Nova de Lisboa, Portugal. The authors propose a service requirements elicitation approach based on KAOS models. The key contribution is a set of heuristic rules for transforming goal decomposition structures into service process models, and the identification of candidate services from operations.

The paper *"Improving Self-adaptive Systems Conceptual Modeling"* is a collaboration between researchers from The Universidade Federal do Rio Grande do Sul (Brazil) and Universidade Federal do Pampa (Brazil). The authors suggest a conceptual modeling approach for the self-adaptive system requirements specification, composed of a metamodel and a modeling process. The process defines how to instantiate the metamodel from requirements specifications to create the conceptual models.

The poster *"Applying a Requirement Engineering Based Approach to Evaluate the Security Requirements Engineering Methodologies"*, is written by authors from the Institut de Recherche en Informatique de Toulouse/Université Paul Sabatier, France. It proposes a KAOS-based methodology for selecting a methodology for security requirements analysis. The proposal is illustrated with with a comparison of three methodologies: STS, KAOS and SEPP.

3. ACKNOWLEDGEMENTS

Thanks to the authors who have submitted their works to the RE-Track. They have been a major contributor to the success of this track in SAC 2018 conference. Our gratitude goes to the program committee who works hard reviewing and discussing the papers. We are extremely grateful to our social media and publicity chair Isabel Brito (Instituto Politécnico de Beja, Portugal) who actively advertised our event via social media and mailing lists as well as our webmaster Camilo Almendra (Universidade Federal de Pernambuco, Brazil). We extend our thanks to the SAC 2018 general organization for bringing together an excellent Technical Program and organization.

EDITORIAL MESSAGE
Special Track on Recommender Systems: Theory, User Interactions and Applications

***Yong Zheng**, Illinois Institute of Technology, USA*
***Li Chen**, Hong Kong Baptist University, Hong Kong, China*
***Markus Zanker**, Free University of Bolzano, Italy*

The Track on Recommender Systems: Theory, User Interactions and Applications at ACM/SIGAPP Symposium on Applied Computing (ACM SAC) 2018 provides a dedicated forum to researchers in the area of reommender systems (RecSys) and user modeling, as well as other applied computing areas, for discussing the open research problems, solid solutions, latest challenges, novel applications and innovative research approaches in RecSys. The development of RecSys promotes various research topics, such as user interaction and interfaces, algorithm design and evaluations, computational efficiency, and recommendation explanations. As one of applied sciences, the field of recommender systems attracts experts and receives contributions from multidisciplinary areas. This track was hosted in ACM SAC in the year of 2013, 2014 and 2017 previosuly. And this is the 4th time to have a track on recommender systems associated with the ACM SAC.

The submissions and the selected papers from our track deal with a wide variety of recommender system issues including (not limited to) the topics as follows:

- **Recommender Systems**
  Conversational recommender systems
  Context-aware/Trust-based/Group/Social/Mobile and multi-channel recommenders
  Recommendation explanation
  New recommender applications
  Data mining and machine learning for development
  Novel paradigms, Theoretical foundations
  Preference elicitation
  Privacy and security issues in recommender systems
  Recommendation algorithms, Algorithm scalability, Evaluation metrics and studies
  Semantic technologies for recommendation
- **User modeling in Recommender Systems**
  User interface design
  User-adaptive interaction and personalization
  Empirical user studies
  Explanations in recommender systems
  User behavior analytics and user modeling
  User-centric studies and evaluations in recommender systems
  Privacy and security issues in recommender systems
  Recommender systems based on users' psychological characteristics, such as personality and emotion

This year, we received 37 valid submissions – 33 long papers and 4 short papers. The review process was very competitive with each paper receiving at least three reviews, and finally 8 long papers and 2 short papers were selected for the track, bringing the acceptance rate to 24% for long papers. We give oral presentations to the accepted long submissions, while the short papers will be presented as posters in the ACM SAC 2018.

This year, our track is featured with 23 program committee members who are the experts in the area of recommender systems. They work hard to provide valuable reviews or feedbacks to the submissions in our track. We provide the list of program committee members below.

- Alejandro Bellogin, Universidad Autónoma de Madrid, Spain
- Shlomo Berkovsky, Data61, CSIRO, Australia
- Derek Bridge, Insight Centre for Data Analytics, Ireland
- Robin Burke, DePaul University, USA
- Ivan Cantador, Universidad Autónoma de Madrid, Spain
- Liang Dong, Google, Inc, USA
- Zhenhua Dong, Huawei, Inc, China
- Mehdi Elahi, Free University of Bozen, Italy
- Jonathan Gemmell, DePaul University, USA
- Guibing Guo, Northeastern University, China
- Dietmar Jannach, TU Dortmund, Germany
- Bart Knijnenburg, Clemson University, USA
- Andrej Košir, University of Ljubljana, Slovenia
- Pasquale Lops, University of Bari Aldo Moro, Italy
- Cataldo Musto, University of Bari Aldo Moro, Italy
- Weike Pan, Shenzhen University, China
- Shaghayegh Sahebi, University at Albany, SUNY, USA
- Alan Said, University of Skovde, Sweden
- Zhu Sun, Nanyang Technological University, Singapore
- Marko Tkalcic, Free University of Bozen, Italy
- Jie Yang, Delft University of Technology, Netherlands
- Tong Yu, Carnegie Mellon University, USA
- Yong Zhuang, Carnegie Mellon University, USA

We thank all the authors who submitted valuable papers to this track. We are grateful to the members of the Program Committee and to the additional reviewers. Without their support, the organization of the track's sessions would not have been possible. We also express our gratitude to organizations that made this track happen. We believe this track will continue to be a success in the future editions of ACM SAC.

Track Chairs

Yong Zheng, Illinois Institute of Technology, USA; yong.zheng@iit.edu
Li Chen, Hong Kong Baptist University, Hong Kong, China; lichen@comp.hkbu.edu.hk
Markus Zanker, Free University of Bolzano, Italy; markus.zanker@unibz.it

EDITORIAL MESSAGE
Special Track on Software Architecture: Theory, Technology, and Applications (SA-TTA)

***Marina Mongiello**, Politecnico di Bari, Italy*

***Diego Perez-Palacin**, Linnaeus University, Sweden*

***Sungwon Kang**, Korea Advanced Institute of Science and Technology, Daejeon, South Korea*

***Patrizia Scandurra**, DIGIP, University of Bergamo, Italy*

Introduction

The Sixth Edition of the track on *Software Architecture: Theory, Technology, and Applications* (SA-TTA 2018) will be held in Pau (France) as part of the 33rd ACM/SIGAPP Symposium on Applied Computing (SAC).

Software Architecture is a consolidated and necessary discipline centered on the idea of reducing complexity in software development and evolution through abstraction and separation of concerns. The goal of the track SA-TTA is to bring together researchers, practitioners and educators having the common objective of transforming *Software Architecture* into a mature discipline leveraging on both solid scientific foundations and validated engineering methodologies and tools. The main focus is in *Applied Software Architecture*, namely practical engineering concerns, experiences in tools development, and software architecture case studies. SA-TTA is focused broadly on how to address functional requirements and quality characteristics in the design, maintenance, and adaptation and evolution of software architectures through the support of automated techniques and tools. Of special interest are architecture description languages, formalisms, techniques, methodologies, tools, and runtime environments that support these activities, possibly exploiting model-driven engineering principles. A special emphasis is put also on technical aspects of software architectures development for specific class of software systems and application domains.

Statistics

The track received 23 submissions, each carefully reviewed by the 3 program committee members. According to a strict acceptance rate of 25%, the program committee accepted 6 submissions as research papers and 3 contributions as posters. There was also one SRC abstract contribution that was accepted.

Description of accepted papers

Tere were interdisciplinary research contributions covering a variety of topics related to: formal semantics of architecture description languages, software architecture reconstruction and runtime recovering, architecture models for enriching contexts of adaptive distributed systems, and security threat modelling.

Acknowledgments

We thank all authors who wrote articles for this track helping us to make it a success. We also thank the program committee members and all reviewers for their evaluations and critiques of manuscripts:

Program committee members:

- Yamine Ait-Ameur - IRIT/ENSEEIHT, France
- Jesper Andersson - Linnaeus University, Sweden
- Paolo Arcaini - Charles University in Prague
- Oliver Barais - INRIA, France
- Georg Buchgeher - SCCH GmbH Hagenberg, Austria
- Radu Calinescu - University of York, UK
- Rafael Capilla - University Rey Juan Carlos of Madrid, Spain
- Guglielmo De Angelis - IASI CNR, Italy
- Naranker Dulay - Imperial College London, UK
- Sam Guinea - Politecnico di Milano, Italy
- Kenneth Johnson - Auckland University of Technology, New Zealand
- Jens Knodel - Fraunhofer IESE, Kaiserslautern, Germany
- Eva Kühn - Vienna University of Technology, Austria
- Patricia Lago - VU University, Amsterdam
- Chan-gun Lee - Chung-Ang University, Korea
- Jihyun Lee - Dept. of Software Engineering, Chonbuk National University
- Hernan Melgratti - University of Buenos Aires, Argentina
- José Javier Merseguer - University of Saragoza, Spain
- Henry Muccini - University of L'Aquila, Italy
- Elisa Yumi Nakagawa - University of São Paulo, Brazil
- Francesco Nocera - Politecnico di Bari, Italy
- Ileana Ober - IRIT/University of Toulouse
- Hongyu Pei-Breivold - ABB Corporate Research, Västerås, Svezia
- Alexander Raschke - Universität Ulm, Germany
- Elvinia Riccobene - University of Milan, Italy
- Ella Roubstova - Open Universiteit Nederland
- Antonino Sabetta - SAP Research, France
- Lionel Seinturier - Univ. Lille & IUF - LIFL & Inria ADAM
- Wang Shuai - Simula Labs, OSLO, Norway
- Romina Spalazzese - Malmö University, Sweden
- Maria Spichkova - School of Computer Science and Inf., RMIT Univ. Melbourne, Australia
- Catia Trubiani - GSSI L'Aquila, Italy
- Danny Weyns - University of Linnaeus, Sweden
- Xiwei Xu - SSRG, NICTA, Sydney, Australia

EDITORIAL MESSAGE
Special Track on Software Engineering

Eunjee Song, *Baylor University, USA*
Byungjeong Lee, *University of Seoul, Korea*
Tao Zhang, *Harbin Engineering University, China*

A special track on Software Engineering (SE Track) aims to be a forum for scientists, engineers and practitioners, in academia and industry to share new ideas, experiences and results, and to present their latest findings in any aspects of Software Engineering. SE Track emphasizes the design, implementation, management and applications of Software Engineering.

The Call for Papers for SE Track attracted 54 final paper submissions from 23 different countries. All submitted papers underwent the blind review process and 13 papers were finally accepted as full papers for inclusion in the Conference Proceedings and presentation during the Symposium. The final acceptance rate for SE Track is 24%. In addition to the accepted full papers, one paper that received high enough review scores was accepted as short paper for the Poster Program. The Student Research Competition (SRC) program is designed to provide graduate students the opportunity to meet and exchange ideas with researchers and practitioners. Two papers, out of three submissions, were finally accepted for the SRC program in SE Track.

This year's SE Track is divided into three sessions: related presentations in Project Management, Metrics and Measurement, Maintenance, Verification and Validation, Testing and Quality Assurance, Open-Source Project and Security Engieering will be associated to a session, so as to promote sharing and discussion of ideas through the whole audience of a topic. Please check the program schedule for details.

On behalf of the entire SAC 2018 Organizing Committee, we congratulate all the authors for having their papers accepted in the SE Track. We are grateful to the members of the Program Committee and to the additional reviewers. Without their support, the organization of such high-quality track sessions would not be possible. We also wish to convey our special thanks to the SAC 2018 symposium's main organizers, especially Program Chairs, Dongwan Shin and Maria Lencastre, for their continuous help and advice and Publication Chair, Hossain Shahriar, and Poster Chair, Chih-Cheng Hung, for their invaluable support.

Last but not least, we thank you for attending the conference on behalf of the Software Engineering Track and hope that you enjoy the program we have prepared for you.

EDITORIAL MESSAGE
Special Track on Computer Security

***Giampaolo Bella**, Università di Catania, Italy*
***Lieven Desmet**, Katholieke Universiteit Leuven, Belgium*

As chairs of the Computer Security track, we are pleased to welcome you to its seventeenth edition at the ACM Symposium on Applied Computing. The Program Committee for this track, as in past years, is composed of eminent representatives from both industry and academia. Here is the list of members of this year's committee, in alphabetical order:

- Denis Butin (TU Darmstadt, Germany)
- Nicholas Carlini (University of California, Berkeley, USA)
- Vincent Cheval (Loria, France)
- Adam Doupé (Arizona State University, USA)
- Rosario Giustolisi (IT University of Copenhagen, Denmark)
- Dieter Gollmann (TU Hamburg, Germany)
- Christian Hammer (Potsdam University, Germany)
- Martin Johns (SAP Research, Germany)
- Alexandros Kapravelos (North Carolina State University, USA)
- Sokratis K Katsikas (Norwegian University of Science & Technology, Norway)
- Sebastian Lekies (Google, USA)
- Marius Minea (Politehnica University of Timisoara, Romania)
- Chris Novakovic (University of Birmingham, UK)
- David Nowak (CNRS & Lille 1 University, France)
- Martin Ochoa (Singapore University of Technology and Design, Singapore)
- Kenneth Radke (Queensland University of Technology, Australia)
- Tamara Rezk (Inria, France)
- Konrad Rieck (Technische Universitaet Braunschweig, Germany)
- William Robertson (Northeastern University, USA)
- Sebastian Schinzel (Muenster University of Applied Sciences, Germany)
- Hossain Shahriar (Kennesaw State University, USA)
- Steven Van Acker (Chalmers University of Technology, Sweden)
- Ruoyu Wang (UC Santa Barbara, USA)

This year we received 35 submissions, as usual from virtually everywhere in the world. The review process, which also involved a number of qualified delegates, was double-blind in the sense that the paper authors were kept anonymous from the reviewers. Each paper received at least 3 reviews, and all papers and reviews were ultimately discussed in depth by the entire Program Committee. As a result of this scientifically thrilling process, papers were marked either for acceptance or for rejection. In the end, only 8 papers were accepted, resulting in an acceptance rate of 22.9%. We are therefore confident of the high quality of the published material, and remain indebted to the reviewers for their thorough work.

Here is this edition's programme:

- *Miedl et al.* evaluate whether power dissipation measurements of multicore processors can be used to establish a covert channel between two isolated applications on the same system; the power covert channel. They present a theoretical and experimental evaluation of the power covert channel on two platforms based on Intel processors.
- *Kim et al.* propose a novel combinatorial subset difference (CSD) public key algorithm for secure multicast. It allows a generalized subset different representation in which wildcards can be placed at any position.
- To bridge the gap between scalability and privacy of electronic identity (eID) systems, *Hölzl et al.* propose a scalable and efficient revocation scheme suitable for smart cards in a mobile eID architecture. Their scheme preserves unlinkability and anonymity of the eID holder beyond revocation and does not require online connectivity to a trusted party.
- *Ami et al.* present AntiBotics - a novel system for application authentication-based file access control, which incorporates periodic identification/authorization challenges. The authors evaluate AntiBotics with contemporary ransomware programs, and validate that these ransomware programs are unable to encrypt any of the protected files.
- *Ghaeini et al.* propose state-aware anomaly detection for industrial control systems (ICS), and evaluate the anomaly detection technique on a real-world ICS. It uses state dependent detection thresholds, which provide tighter constraints for an attacker trying to manipulate the process.
- To accurately distinguish botnet and non-botnet traffic, *van Roosmalen et al.* apply deep learning on flows of TCP/UDP/IP-packets. Their experimental results with a large dataset obtain accuracy results comparable to or better than conventional botnet detection approaches, while reducing efforts on feature engineering and feature selection.
- *Alizadeh et al.* apply behaviour analysis to study the use of the Break-The-Glass (BTG) procedures in hospitals. The authors present an approach to analyse user behaviour, by partitioning users into different subgroups and build self-explanatory histogram-based profiles. This provide meaningful insights facilitates the investigation of suspicious behaviours.
- *Chandramouli et al.* propose a scalable mechanism to automatically detect E-mail header injection vulnerabilities. They apply this technique to quantify the prevalence of E-mail header injection vulnerabilities on the web.

About the track chairs

Giampaolo Bella is Associate Professor at the University of Catania, doing teaching and research in Computer Security and Formal Methods. He has chaired the Computer Security track at ACM SAC since its inception. After his Ph.D. from Cambridge University, he was a research associate at TU Munich, Cambridge University, and a senior researcher at SAP Research France. He has recently been developing formal approaches and methodologies to studying the security problem as a socio-technical, trans-disciplinary one.

Lieven Desmet is a Senior Research Manager on Secure Software within the DistriNet research group at the KU Leuven (Belgium). Lieven outlines and implement the research strategy on software security within the university, he coaches junior researchers in (web) application security and coordinates the broad portfolio of valorisation activities (including contract research, training and spin-offs).

Editorial Message

Track on Software-intensive Systems-of-Systems (SiSoS) of the 33rd ACM/SIGAPP Symposium On Applied Computing (SAC 2018)

Khalil Drira, LAAS-CNRS – Univ. Toulouse, France
Flavio Oquendo, UMR CNRS IRISA – Univ. Bretagne Sud, France
Axel Legay, INRIA, France
Thais Vasconcelos Batista, DIMAp – UFRN, Brazil

Scope

Pervasiveness of networks has made possible to interconnect systems that were independently developed, operated, managed, and evolved, yielding a new kind of complex system, i.e. a system that is itself composed of systems, the so-called System-of-Systems (SoS). Software-intensive SoS (SiSoS) has become a hotspot in the last years, from both the research and industry viewpoints. Indeed, various aspects of our lives and livelihoods have progressively become dependent on some sort of Software-intensive SoS. This is the case of SiSoS found in different areas as diverse as energy, healthcare, manufacturing, and transportation; and applications that address societal needs, e.g. environmental monitoring, distributed energy grids, emergency coordination, global traffic control, and smart cities. Moreover, ubiquitous platforms such as the Internet of Things and nascent kinds of SoS such as Cyber-Physical SoSs are accelerating the deployment of Software-intensive SoS in the near future. Definitely, the unique characteristics of Software-intensive SoS raise a grand research challenge for the future of software-reliant systems in our industry and society due to its intrinsic features, among which evolutionary development and emergent behavior.

Statistics

The SiSoS Track received 22 regular paper submissions and 3 SRC submissions. Each submission was reviewed by three members of the Track Program Committee. The Track Program Committee selected 5 full papers out of the 22, giving an acceptance rate of 23%. These papers were selected based on originality, quality, soundness, and relevance to this conference track. Moreover, 2 poster papers have been accepted for publications in the proceedings of the conference.

Key Topics

This track fosters (but is not limited to) submissions in the following topics:

- SiSoS Mission
  - Specification and analysis
  - Formal contracts, contract-based approaches
  - Goal-orientation, task orientation
  - Ontologies, reasoning
  - Relationships with emergent behaviors
- SiSoS Modeling
  - Model-driven engineering
  - Models-at-runtime

    - Model-based approaches
    - Formal modeling foundations
- **SiSoS Design**
    - Architectural and detailed design
    - Design evaluation
    - Correction by design
    - Design for evolution, scalability or
    - Design for emergent behavior
- **SiSoS Verification and Validation**
    - Testing
    - Compositional/statistical model checking
    - Simulation, co-simulation
    - Simulation of emergent behaviors
- **SiSoS Construction and Evolution**
    - Evolutionary development
    - Correction by construction
    - Techniques &er; technologies for SoS engineering
    - Service-orientation
    - Component and middleware frameworks
- **SiSos Security and Privacy**
    - SoS cybersecurity
    - SoS privacy and trust
    - Security against emergent behaviors in SoS
- **SiSoS Experience**
    - Reports from real projects
    - Case studies in real-scale projects
    - Controlled experiments
    - Experience from SoS stakeholders
- **SiSoS General issues**
    - Taxonomies, ontologies
    - Software processes
    - Project management
    - Acquisition in the development of SoS
- **SiSoS Applications**
    - Energy
    - Transportation
    - Global traffic control
    - Emergency coordination
    - Environmental monitoring
    - Smart grids
    - Healthcare
    - Manufacturing
    - Smart cities
    - Any other application domain
- **Future perspectives, challenges, and directions**

Acknowledgment

We would like to thank the members of the Track Program Committee for providing thoughtful and knowledgeable reviews and for their substantial effort in making SiSoS a successful conference track.

Track Program Committee

- Nicola Accettura, LAAS-CNRS, France
- Jesper Andersson, Linnaeus University, Sweden
- Paris Avgeriou, University of Groningen, The Netherlands
- Jakob Axelsson, SICS Swedish ICT, Sweden
- Muhammad Ali Babar, University of Adelaide, Australia
- Fabrizio Biondi, INRIA, France
- Ismael Bouassida Rodriguez, REDCAD, Univ. Sfax, Tunisia
- Jan F. Broenink, University of Twente, The Netherlands
- Henry Broodney, IBM Watson IoT, USA
- Everton Cavalcante, Federal University of Rio Grande do Norte, Brazil
- Carlos E. Cuesta, Rey Juan Carlos University, Spain
- Remco de Boer, ArchiXL, The Netherlands
- Flavia C. Delicato, Federal University of Rio de Janeiro, Brazil
- Remo Ferrari, Siemens Industry, USA
- Juan Garbajosa, Technical University of Madrid, Spain
- Gilles Geeraerts, Université libre de Bruxelles, Belgium
- Bernhard Josko, OFFIS, Germany
- John Klein, Software Engineering Institute, USA
- Charles Kremer, IRT SystemX, France
- Patricia Lago, Vrije Universiteit Amsterdam, The Netherlands
- Kim G. Larsen, Aalborg University, Danmark
- Nazim H. Madhavji, University of Western Ontario, Canada
- José Carlos Maldonado, University of Sao Paulo, Brazil
- Tiziana Margaria, University of Limerick & Lero, Ireland
- Raffaela Mirandola, Politecnico di Milano, Italy
- Elisa Yumi Nakagawa, University of Sao Paulo, Brazil
- Linda Northrop, Software Engineering Institute, USA
- Alvaro Oliveira, Smarter City Services, Portugal
- Roberto Passerone, University of Trento, Italy
- Patrizio Pelliccione, Chalmers Univ. & Univ. of Gothenburg, Sweden
- Jennifer Pérez, Technical University of Madrid, Spain
- Paulo Pires, Federal University of Rio de Janeiro, Brazil
- Jean Quilbeuf, IRISA - University of South Brittany, France
- Ralf Reussner, KIT / FZI, Germany
- Heinrich Schmidt, RMIT University, Australia
- Sarah Sheard, Software Engineering Institute, USA
- Bedir Tekinerdogan, Wageningen University, The Netherlands
- Louis-Marie Traonouez, INRIA, France
- Petr Tuma, Charles University, Czech Republic
- Danny Weyns, KU Leuven, Belgium
- Brian White, CAU-SES, USA
- Xiwei (Sherry) Xu, Data61 / CSIRO, Australia
- Uwe Zdun, University of Vienna, Austria
- Huibiao Zhu, East China Normal University, China
- Andrea Zisman, The Open University, UK

EDITORIAL MESSAGE
Special Track on Service-Oriented Architectures and Programming

Massimo Bartoletti, *University of Cagliari, Italy*
Gwen Salaün, *Université Grenoble Alpes, France*
Luís Cruz-Filipe, *University of Southern Denmark, Denmark*

Service-Oriented Programming (SOP) is quickly changing our vision of software development, bringing a paradigmatic shift in the methodologies followed by programmers when designing and implementing distributed systems. SOP originally triggered a radical transformation of the Web, from being a means of presenting information to a wide spectrum of people to becoming a computational fabric. In such fabric, loosely-coupled services publish their interfaces and, through them, discover and interact with each other abstracting from their internal implementations. While this transformation still continues today, it has also already generated other shifts in how programmers deal with resource handling (Cloud Computing) and the scalability of software architectures from the very small to the very large (Microservices).

Research on SOP is giving strong impetus to the development of new technologies and tools for creating and deploying distributed software. In the context of this modern paradigm we have to cope with an old challenge, like in the early days of Object-Oriented Programming (OOP) when consistency in the programming model definition was not achieved until the definition of key features like encapsulation, inheritance, and polymorphism, together with proper design methodologies. The complex scenario of SOP needs to be clarified on many aspects, both from the engineering and from the foundational points of view.

The SOAP track aims to bring together researchers and practitioners with the objective of transforming Service-Oriented Programming into a discipline with solid scientific foundations and mature software engineering development methodologies supported by dedicated tools. From the foundational point of view, many attempts to use formal methods for specification and verification in this setting have been made. Session correlation, service types, contract theories and communication patterns are only a few examples of the aspects that have been investigated. Moreover, several formal models based upon automata, Petri nets and algebraic approaches have been developed. However, most of these approaches concentrate on only a few features of service-oriented systems in isolation, and a comprehensive approach is still far from being achieved.

From the engineering point of view, there are open issues at many levels. At the system design level, both traditional approaches based on UML and approaches taking inspiration from business process modelling, like BPMN, are used. At the composition level, orchestration and choreography are continuously improved both formally and practically, with an evident need for their integration in the development process. At the description and discovery level, there are two separate communities pushing respectively the semantic approach (like ontologies and OWL) and the syntactic one (like

WSDL). In particular, the role of discovery engines and protocols is not clear yet. In this respect, adopted standards are still to be achieved, taking features like Quality of Service, security and dependability into account.

The 2018 edition of SOAP included double blind reviewing of papers, in order to increase fairness and avoid bias in reviewing. Papers were blinded for submission, with authors' names and identifying details removed. Each paper was reviewed by four PC members, and altogether three papers and one poster were accepted for publication. We would like to thank the authors of all the submitted papers for their interest in the special track. We are grateful for the efforts of the PC members: Nazareno Aguirre, Farhad Arbab, Luís Barbosa, Maurice ter Beek, Antonio Bucchiarone, Romain Demangeon, Shuiguang Deng, Schahram Dustdar, Gian Luigi Ferrari, José Fiadeiro, Saverio Giallorenzo, Ross Horne, Vasileios Koutavas, Alberto Lluch Lafuente, Hernán Melgratti, Alberto Núñez, Jorge A. Perez, Gustavo Petri, António Ravara, Víctor Rivera, Alceste Scalas, Nikolay Shilov, Hugo Torres Vieira, Farouk Toumani, Emilio Tuosto, Yuhong Yan, Gianluigi Zavattaro, and Roberto Zunino. We warmly thank the publicity chair, Stefano Lande, for disseminating the SOAP call for papers. We also thank the SOAP Steering Committee members, Claudio Guidi, Ivan Lanese, Manuel Mazzara, and Fabrizio Montesi, for their help and support. Finally, we thank the SAC 2018 organizers, in particular the general chairs, for providing an excellent environment for the preparation of the event.

EDITORIAL MESSAGE
Special Track on Social Network and Media Analysis (SONAMA)

***Sang-Wook Kim**, Hanyang University, Korea*

With the advent of social network services such as Twitter, Facebook, Tumbler, and Google+, the research on social network and media analysis has been greatly advanced. In recent years, the interactions among people, sharing of knowledge and experiences, community activities in social network services increase greatly, which would make the research on social networks more important. Furthermore, as social media contents within social network services are rapidly being produced and consumed, the social media contents now account for the majority of content published on the world wide web. Social media is differentiated from traditional media in many aspects such as its frequency, quality, usability, immediacy, and permanence, which leads to significant potential to the social media analysis research.

The ACM SAC has been an important venue for the past 32 years, attracting computer scientists, computer engineers, software engineers, and application developers from around the world. The Social Network and Media Analysis (SONAMA) track of ACM SAC will provide a forum that brings together researchers and practitioners for exploring technologies, issues, experiences, and applications with a specific focus on the recent research trends and industrial needs in the related fields. Since social network and media analysis encompasses a variety of highly cross-disciplinary research issues, the SONAMA will foster collaborations and exchange of ideas and experiences among researchers working in various fields such as computer science, linguistics, statistics, sociology, geography, economics, and business.

This year, the 5th of the SONAMA track, we received a total of 41 submissions of high-quality papers from all over the world. The review process was very competitive with each paper receiving at least three reviews. We accepted 10 papers for oral presentations and 3 papers for poster presentations. We would like to thank all the authors who submitted their inspiring contributions to our track. Also, we sincerely appreciate our program committee members listed below who devoted their invaluable time and efforts for reviewing the submissions. Without their help, our track program could not be made so successful. Finally, we would like to give special thanks to program co-chairs Maria Lencastre and Dongwan Shin for their nice guidance and support. We look forward to seeing all of you in Pau, France.

Program Committee Members

Ladjel Bellatreche	National Engineering School for Mechanics and Aerotechnics, France
Tru Hoang Cao	Ho Chi Minh University of Technology, Vietnam
Seong Je Cho	Dankook University, Korea
Chang Choi	Chosun University, Korea
Freddy Chong-Tat Chua	Singapore Management University, Singapore
Christian Esposito	University of Salerno, Italy
Sheng Gao	BUPT, China
Ji-Woon Ha	Naver Corp, Korea
Masoud R. Hamedani	Dankook University, Korea
Dominic Heutelbeck	Forschungsinst. fur Telekommunikation e.V., Germany
Yoshinori Hijikata	Osaka University, Japan
Kuo-Wei Hsu	National Cheng Chi University, Taiwan
Hao Huang	Ge Global Research, USA
Shu Huang	Microsoft, USA

Heasoo Hwang	University of Seoul, Korea
Mirjana Ivanovic	University of Novi Sad, Serbia
Jamil Hasan	University of Idaho
Min-Hee Jang	Samsung Electronics, USA
Jason J. Jung	Yeungnam University, Korea
Carlos Kamienski	Federal University of ABC, Brazil
U Kang	Seoul National University, Korea
Pinar Karagoz	Middle East Technical University, Turkey
Hyunchul Kim	Sangmyung University, Korea
Hyoungshick Kim	Sungkyunkwan University, Korea
Han Joon Kim	University of Seoul, Korea
Chulyun Kim	Gachon University, Korea
Younghoon Kim	Seoul National University, Korea
Sang-Chul Lee	Hyundai Heavy Industries, Korea
Jongwuk Lee	Pennsylvania State University, USA
Ki Yong Lee	Sookmyung Women's University, Korea
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EDITORIAL MESSAGE
Special Track on Software Platforms

Jinman Jung, *Hannam University, Korea*
Jun Huang*, Chongqing University of Posts and Telecom, China*
Hong Min*, Hoseo University, Korea*

The software platforms are in a constant state of change with new devices and technologies introduced almost every day. As a result, software platform developers and researchers continue to evolve software technologies that are used for increasing mobile conversions and enhancing relationships among users. The structure of software systems involves working with a wide variety of software platforms and technologies range from embedded devices and smart-phones on the low end, to enterprise and distributed systems on the high end. Many research questions remain open from limited battery to remote access control, interaction with external devices, assurance in quality of service, context-aware adaptation to the environment, interface modeling or other issues (security and privacy problems) that are obstacles to thrive software platform technologies. This track aims to share research results and experiences in Software Platforms field with researchers and developers, the track addresses all of these research issues related to software platforms. This track has received 13 submissions from different countries around the world. Each paper has underwent a blind review process by three members of the track Technical Program Committee (TPC), and 3 regular full papers (with acceptance ratio 23%) and 1 poster paper have been accepted for publications in the proceedings of the conference. The regular papers accepted by this track include:

- A New Architecture and Implementation Strategy for Non-Invasive Software Measurement Systems
- Development of a plugin based extensible feature extraction framework
- Smart IoT Monitoring Framework based on oneM2M for Fog Computing

The ACM SAC 2017 Software Platforms track was chaired by Drs. Jinman Jung, Jun Huang, and Hong Min who wish to thank all the TPC members for their valuable time and technical input for running such an excellent track. Without their support and contributions, this track would not be successful. The special thanks will be given to the Drs. Dongwan Shin and Maria Lencastre for their leadership and superb work to organize the SAC conference. Finally, the track chairs would like to thank all the authors who contributed to this track.

December 2017,
Drs. Jinman Jung, Jun Huang and Hong Min
Track Chairs, Software Platforms

EDITORIAL MESSAGE
Special Track on Usability Engineering

Eduardo Mosqueira Rey, *University of A Coruña, Spain*
Vicente Moret Bonillo, *University of A Coruña, Spain*
David Alonso Ríos, *University of A Coruña, Spain*

Introduction:

From a socio-cultural point of view, usability becomes increasingly important with the rise of the so-called information society and the new and innovative ways of interacting with computers in the post-PC era.

However, achieving good usability is not easy: Usability has always been difficult to define, measure, and evaluate. Since usability is a multifaceted concept, we need a great diversity of usability techniques to perform a usability study. The study of usability has been somewhat disconnected from the development life cycle of a product. Usability results of real products are usually kept secret, as companies prefer not to openly disclose the defects of their products, etc.

In this track we seek original, unpublished contributions that are mainly focused on applying usability engineering models and techniques to real products or theoretical studies with clear practical potential of being applied.

Statistics:

To this track eleven papers were presented and three of them were accepted as full papers (27% of acceptance for full papers) and one of them was accepted as poster (36% of acceptance for papers and posters jointly).

Descriptions:

The papers accepted address novel aspects within the field of usability. Two of them study domain-specific languages (DSLs) that are programming languages dedicated to a particular problem domain with the goal to decreasing program complexity and increasing programmer productivity within the domain. One of the papers presents an experience report of applying an iterative process for evaluating DSL readability for a given DSL in the context of safety-critical software in robotics. The other one presents a usability evaluation framework for DSLs, called Usa-DSL.

One of the papers studied the use of gamification strategies, that is, the use of video game elements (instead of full-fledged games) in non-game applications to improve the user experience. In this case they studied gamification in learning environments with the idea of improving students' motivation and engagement. Interestingly, they found out that, as a mean, gamification was either indifferent or positive.

Finally, as web pages and mobile applications are accessible to more people, we have to take into account also accessibility proplems. In this paper authors aimed to investigate the accessibility problems encountered by visually disabled users on websites and native applications using mobile devices. They also studied the same webs and applications with mainstream users and found usability problems for normal-vision users. The study indicates that it is necessary to examine deeply problems encountered by visual disabled users to provide designers with recommendations that make it possible to develop accessible websites and mobile applications.

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Program committee:

- Damiano Distante, Unitelma Sapienza University, Italy
- Hermann Kaindl, Vienna Univ. of Technology, Austria
- José Ignacio Panach, University of Valencia, Spain
- Ahmed Seffah, Lappeenranta University of Technology, Finland
- Marcos Seruffo, Federal University of Pará, Brasil
- Jean Vanderdonckt, Univ. Catholique de Louvain, Belgium

Collaborators:

- Diego Álvarez Éstevez
- Isaac Fernández Varela
- Fabiola Araújo
- Harold Dias de Mello Junior
- Daniel Souza
- Yomara Pires
- Tássio Carvalho
- Jorge Souza
- Bruno Lyra
- José Jailton Júnior
- Marcelino Silva da Silva

EDITORIAL MESSAGE
Special Track on Web Technologies

Tim A. Majchrzak, *University of Agder - Kristiansand, Norway*
Cristian Mateos, UNICEN University - Tandil, Argentina
Francesco Poggi, *University of Bologna - Bologna, Italy*

The World Wide Web is changing. The advent of HTML5, the increasing importance of AJAX and client-side scripting, the explosion of Web-based Social Networks as well as the advent of the Federated Social Web, the new frontiers of Semantic Web, and the importance of the integration of Web technology and Mobile Computing are some examples of this general trend.

Web applications are relentlessly evolving into rich and flexible environments where users can easily access information sources, publish content, listen to music, watch videos, draw pictures, and play directly via browsers. This class of ubiquitous software systems is gaining momentum and fosters the evolution of new ways for people to interact, collaborate and cooperate. Hence, novel approaches and techniques, new tools and frameworks are needed to address the increasing complexity of these applications.

This track aims at bringing together researchers and practitioners from industry and academia working on both practical and foundational aspects of Web technologies, as well as other technologies that in the Web framework have found new and unexpected application fields.

We received 23 paper submissions from different countries such as the France, Portugal, Austria, Brazil, Canada, Spain, Japan, China, United Kingdom and USA. We believe this reaffirms both the interest of researchers and practitioners in the track, and the relevance of the theme. Submitted papers have been reviewed by a Program Committee of 27 members, granting 3-4 extensive reviews per submission; 6 of the submitted papers have been accepted as full papers (for an acceptance rate of about 25%) whereas 1 has been accepted as poster.

In the opinion of the track chairs these numbers, when put in context, together with the quality of the submissions, mark a success of the ACM SAC track on Web Technologies. The quality of the contributions presented in this proceeding is also due to the hard work of the members of the program committee; we would hereby like to thank:

- Marco Brambilla, Politecnico di Milano, Italy
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- Alfredo Cuzzocrea, DIA Department, University of Trieste, Italy
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- Angelo Di Iorio, University of Bologna, Italy
- Andrés Flores, National University of Comahue, Argentina
- Celso Hirata, Instituto Tecnologico de Aeronautica, Brazil
- Irena Holubova (Mlynkova), Charles University, Czech Republic
- Tatsuo Nakajima, Waseda University, Japan
- Amedeo Napoli, LORIA, France
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- Maria da Graça Pimentel, Universidade de Sao Paulo, Brazil
- Stephane Sire, Oppidoc, France
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- Alejandro Zunino, UNICEN University, Tandil, Argentina

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We wish you a pleasant and stimulating read.