



Guest Editorial: special issue of ESREL2020 PSAM15

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This special issue contains extended papers selected as representative of the works presented at the ESREL 2020 PSAM 15 Conference, the 30th European Safety and Reliability Conference (ESREL 2020) and the 15th Probabilistic Safety Assessment and Management Conference (PSAM 15) which have been jointly held remotely on November 1–5, 2020.

The Conference has provided the opportunity for the presentation of developments in methods and advancements in technical applications for reliable design and operation of industrial components and systems, and for risk prevention and management in critical infrastructures.

The programme of the Conference has consisted in 728 abstracts and papers selected through a peer-review process conducted by more than 130 Track Directors, who have organized the work of more than 800 reviewers. The programme has been enriched by 10 plenary lectures offered by speakers of international excellence, 5 panels, 11 special sessions and 2 innovation challenges.

The Conference works have covered 55 topics and 31 application areas. This special issue presents selected works from the sessions on External Hazards Risk Assessment, Natural Hazards Risk Assessment, Environmental Risk Analysis, Consequence Modeling and Management, Crisis Management, Disaster Management, Industrial Safety, Cyber Security, Resilience Analysis and Assessment and Management.

The first paper in this special issue by Mariachiara Piraina and Paolo Trucco presents a capability-based approach for emergency management that is shown capable to foster

public–private collaboration for the development of critical infrastructures protection and resilience programmes. A pilot application on the Italy–Switzerland cross-border transportation infrastructure is reported.

The second paper by Federico Antonello, Piero Baraldi, Enrico Zio and Luigi Serio illustrates a novelty-based multi-objective evolutionary algorithm for identifying rare functional dependencies among very large infrastructure components and, from these, rare failure symptoms. An application on alarms generated in the complex technical infrastructures of CERN (European Organization for Nuclear Research) shows the feasibility of application.

The following paper by Clemens Heitsch, Michael Paßens and Jan C. Stiller proposes a generic methodology for identifying the organizational features involved in the operation and management of a facility and most relevant for the mitigation of, and recovery from catastrophic events. For demonstration, the methodology is applied to a nuclear facility.

In the work of Giada Feletti, Mariachiara Piraina, Boris Petrenj and Paolo Trucco, an integrated framework is presented for the classification, assessment and selection of good collaborative practices (i.e. local and national actions and programmes) for the management of emergency and resilience of critical infrastructures.

The paper by Prasannjeet Singh, Mehdi Saman Azari, Francesco Vitale, Francesco Flammini, Nicola Mazzocca, Mauro Caporuscio and Johan Thornadsson explores the capabilities of a novel technique known as Process Mining, which by log file analytics and machine learning can provide early diagnosis, prognosis and eventually self-healing for improving the resilience of Internet-of-Things devices within complex cyber-physical telecommunication systems.

Claudio M. Rocco, Kash Barker and Jose Moronta propose a framework to determine the most effective community detection algorithm for a set of networks, by comparing the resulting networks partitions. To illustrate the comparison, 16 alternative electric power infrastructures are analysed.

The paper by Kenatu Angassa, Berhanu Assefa, Kebede K. Kefeni, Thabo T. I. Nkambule and Jemal Fito presents

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a novel system for industrial wastewater remediation and contamination mitigation, whose performance is shown on a brewery wastewater system.

The paper by Bokolo Anthony Jnr provides an extensive literature review on the governance and control of distributed ledger technology adoption in intra-organizational domain, i.e. high-level cooperation between different departments of the same enterprise. A state-of-the-art of governance practices is presented, and a novel governance model is proposed to enhance the adoption of distributed ledger technology for accelerating the enterprises digital transition.

Mário Mollo Neto, Mariana Matulovic, Ana Karollina M. Novaes, Livia V. Sanches and Juliane C. Forti present a decision-making algorithm for wastewater treatment, with the objective of identifying the parameters that maximize hydrogen peroxide production and the sustainability of the related industrial processes.

The last but not least paper in the special issue is by Alinne Beteto, Vidal Melo, Jessica Lin, Marwan Alsultan, Eduardo Mario Dias, Elizabeth Korte, DeAndre A. Johnson, Negin Moghadasi, Thomas L. Polmateer and James H.

Lambert, and presents a novel method for anomaly and cyber fraud detection in complex infrastructures, such as pipelines and supply chains for liquid fuels.

In closing this guest editorial, we, the guest editors, would like to thank the authors for their outstanding contributions and the reviewers for their timely and professional work. We also wish to acknowledge that this special issue would have not been possible without the kind support of Igor Linkov and James H. Lambert, Co-Editors-in-Chief of the Journal, who have given us the opportunity and the assistance necessary to put together this collection of such interesting works. To all the above colleagues goes our sincere professional appreciation and personal gratitude.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.