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57th ESReDA Seminar on Advances in Reliability, Risk and Safety Analysis with Big Data

23rd and 24th October 2019

Universitat Politècnica de Valencia, Spain



1st Call for papers

Scope of the Seminar

Industrie 4.0 is an industrial action that corresponds to the increasing integration of industrial production and information and communication technologies. It includes different aspects, among them cyber-physical systems, big data, internet of things, augmented reality, cloud computing and cognitive computing.

With recent improvements in sensor technologies, including miniaturization, performance, cost and energy consumption and in information systems resulting in increased functionality at lower costs, obtaining very important quantities of data from running industrial equipment in a cost-effective manner is now a standard practice.

To treat all the data gathered by the sensors and to transform it in useful information, industries seek to make a greater use of Artificial Intelligence (AI), which can be defined as the science and engineering of automated problem solving. There are several AI techniques, as are Machine Learning, Predictive Modelling and Deep Learning.

Among the most promising applications of these concepts can be found in Reliability, Risk and Safety Analysis. In seeking, opportunistically, the benefits from these new technological capabilities, it is important to remain critical and to address potential side or adverse effects as well especially for high-risk industries where errors can become dramatic. It is the role of the ESReDA association to organise an expert debate and further collaborative work on this topic.

For this 57th ESReDA Seminar we are concerned and invite to focus on Big Data challenges and applications. So the main topics will be the discussion of the following subjects:

- Retention and quality of data:

The production of data is dependent on the quality of the sensors and their reliability. The use of the predictive maintenance and the prescriptive maintenance actions, that influence reliability, risk and safety during the life cycle of equipment, are dependent on the quality and validity of the data and on the capacity to understand its meaning in terms of the degradation processes leading to equipment failures. Also, it is important to know what data is important to retain and to use for data analytics, being aware of its variability with time. How to deal with these challenges?

- Data analytics:

How data analytics can improve reliability, risk and safety analysis, leading to less uncertainty in the analysis and providing more sustainable results? What are the AI models that have already been used or models with good potential to be used for the purpose of reliability, risk and safety analysis?

- Feature selection and extraction:

In all the AI models the data of a real world system has to be collected before the feature engineering is able to transform the data into a representation that the model can process. With the possibility of gathering data from different sources, what features are of actual importance for reliability, risk and safety analysis? How to select them?

- Identifying potential biases:

AI introduces "black-box" concerns and competencies issues. Mathematical algorithms introduce new risks as possible biases on data processing. Biases can be of different types and can also be introduced by human actions and decisions. Others can be created by organisational policy and culture. How to be aware of all types of biases along the chain of data collection and treatment and deal with them?

- Data ownership and security:

As any cyber system, artificial intelligence (AI) systems can be subjected to hacker attacks and shall be protected. Also, problems can arise from miscellaneous communication patterns, proprietary information and automation systems, heterogeneous data structures and interfaces. How this can affect Reliability, Risk and Safety Analysis?

- Databases:

Feedback from the field (its collection and processing) is the first affected by these new technologies and will profoundly affect all other themes of reliability, risk and safety management. We go from static feedback to dynamic feedback. How does it change data collection and its validity? How can we have useful databases in this context? What are the comparative added value of big data and natural language processing techniques and can they be combined?

The main point is: what can be done to improve the management of reliability, risk and safety making good use of these new capabilities?

This Seminar will be a forum to explore and discuss these topics. Authors are invited to present their proposals, based on their knowledge and experience, bringing new ideas, concepts, theories and applications.

The Seminar is aimed at addressing issues met by different industries. Papers are welcome from industrialists, consultants, universities, R&D organisations, ...

Seminar Organisation

Location

Technical University of Valencia / Universitat Politècnica de València (UPV)
Camino de Vera, s/n
46022 Valencia
SPAIN

Organisation

The Seminar is jointly organised by ESReDA and CMT Motores Térmicos (UPV).

Chairman of the Seminar

L. Ferreira (ESReDA President, Prof. University of Porto, Portugal)

B. Tormos (CMT senior researcher, Prof. Universitat Politècnica de València, Spain)

Technical Programme Committee

- Antonio Sola – Consultant, Spain
- André Lannoy – IMdR/ESReDA, France
- Bernardo Tormos – Universitat Politècnica de València, Spain
- Henk Wells – Consultant, The Netherlands
- Kaisa Simola – EC JRC Petten, The Netherlands
- Luís Ferreira – Universidade do Porto, Portugal
- Maria Grazia Gnoni – Università di Salento, Italy
- Micaela Demichela – Politecnico de Torino, Italy
- Mohamed Eid – CEA, France
- Mohammad Raza – GE Power, Switzerland
- Nicolas Dechy – Institut de radioprotection et de sûreté nucléaire, France
- Rasa Remenyte-Prescott – University of Nottingham, United Kingdom
- Siegfried Eisinger – DNV GL, Norway
- Tuuli Tulonen – Tukes, Finland,
- Vytis Kopustinskas – EC JRC Ispra, Italy
- Victor Borges – Thales, UK

List is not complete

Opening of the Seminar

To be announced

Closing of the Seminar

To be announced

Relevant dates:

- Submission of abstracts: 15th June 2019
- Notification to the authors: 12th July 2019
- Submission of camera-ready papers: 20th September 2019
- Project Groups meetings, Board of Directors meeting: 22nd October 2019:
- Seminar: 23rd and 24th October 2019
- ESReDA Gala Dinner: 23rd October 2019

Procedure to submit an abstract and to register

Abstracts, not exceeding 400 words, should address:

- Objectives
- Relevance for the Seminar,
- Novelty
- Methods and findings.

The language of the seminar is English. Abstract template is available on ESReDA website at the [57th seminar's page](#).

Authors wishing to present a paper are invited to submit an abstract/paper online via EasyChair (weblink will be available on ESReDA website soon).

In case of difficulty or for any question, authors can contact and also send abstract: Luís Andrade Ferreira (lferreir@fe.up.pt) or Inga Šarūnienė (inga.saruniene@lei.lt).

If the abstract is accepted, authors are expected to prepare a full paper for publication in the seminar proceedings. Template will be provided by email and on website. After the seminar, the final proceedings will be published by EC JRC and available online on ESReDA's website (free download).

Registration and Seminar Fee

Registration will be accepted until the 20th of September 2019.

A registration form and information package for the venue will be made available on the ESReDA website.

The fees according to ESReDA's rules are:

- Speakers: one speaker per accepted paper may participate without paying seminar fees.
- ESReDA members: up to three participants of ESReDA members are taken in charge by organization.
- Participant: 300€ per participant.
- Accompanied persons for Gala Dinner: 50€ per person.

Fees are to be paid by bank transfer to ESReDA account:

Holder: ESReDA
Bank: BNP Paribas Fortis Bank, Boulevard Jamar 1 D, 1060 Brussels, Belgium
IBAN: BE69 0012 3728 1678
BIC: GEBABEBB
Subject: Registration to the 57th ESReDA Seminar

Universitat Politècnica de València

The Universitat Politècnica de València is a public, dynamic and innovative institution, dedicated to research and teaching that, while maintaining strong links with the social environment in which it carries out its activities, opts for a strong presence abroad. It is a young university, which celebrates its 50th anniversary during the academic year 2018-2019.

Its community is made up of about 34,000 students, 3,600 professors and researchers and 1,500 administrative and service professionals distributed among its three campuses located in Alcoy, Gandia and València.

At present, the UPV is constituted by 13 university centers, of which 9 are higher technical schools, 2 are faculties and 2 are higher polytechnic schools. In addition, it has a Doctoral School and 3 affiliated centers (Florida University, Berklee College of Music and EDEM Business School).

The Seminar will be supported by C-Motores Termicos at the Universitat Politècnica de València:



CMT-Motores Térmicos is a research and educational center fully involved in the development of the future combustion engine, and incorporating more than 100 people. For more than 35 years have conducted basic research for better understanding the relevant physical processes involved, and applied studies for optimizing the engine behavior and assisting in its development.

From the deep scientific knowledge to the real-life problems of the automotive industry, we combine experimental tests conducted in our state-of-the-art facilities, and theoretical studies providing relevant technical and scientific results. Our interdisciplinary approach covers different research areas, and aims at Excellence and Innovation.

More information available in: <https://www.cmt.upv.es/>

European Safety, Reliability & Data Association (ESReDA)

ESReDA is a European Association which provides a forum for the exchange of information, data and current research in Safety and Reliability and a focus for specialist expertise.

The Safety and Reliability of processes and products are topics which are the focus of increasing interest Europe wide. Safety and Reliability Engineering is viewed as being an important component in the design of a system. However the discipline and its tools and methods are still evolving and expertise and knowledge

dispersed throughout Europe. There is a need to pool the resources and knowledge within Europe and ESReDA provides the means to achieve this.

ESReDA was established in 1992 to promote research, application and training in Reliability, Availability, Maintainability and Safety (RAMS). The Association provides a forum for the exchange of information, data and current research in Safety and Reliability and a focus for specialist expertise.

ESReDA membership is open to organisations, privates or governmental institutes, industry researchers and consultants, who are active in the field of Safety and Reliability. Membership fees are currently 1000 € for organisations and 500 € for universities and individual members. Special sponsoring or associate membership is also available.

For more information on ESReDA, contact: inga.saruniene@lei.lt

ESReDA General Secretary, Dr. Inga Šarūnienė
Senior Researcher at Lithuanian Energy Institute

Any interested party is welcome to contribute to ESReDA project groups.

ESReDA Project Group on Big Data, Reliability, Risk and Safety Analysis

The project group (PG) “Big Data, Reliability, Risk and Safety Analysis” aims to write a working technical document, if possible a book, in which it will try to identify the evolutions, paradigm shift and challenges caused by the emergence of Big Data in the Reliability, Risk and Safety Analysis of industrial equipment.

In doing so, the PG will attempt to identify the advantages and disadvantages of its use for equipment users by identifying the techniques to be applied, the standardization needs (if any) and the existing challenges to an application of new scientific knowledge in these areas.

We expect that this technical document will be published with a EUR Tech-Doc reference number.