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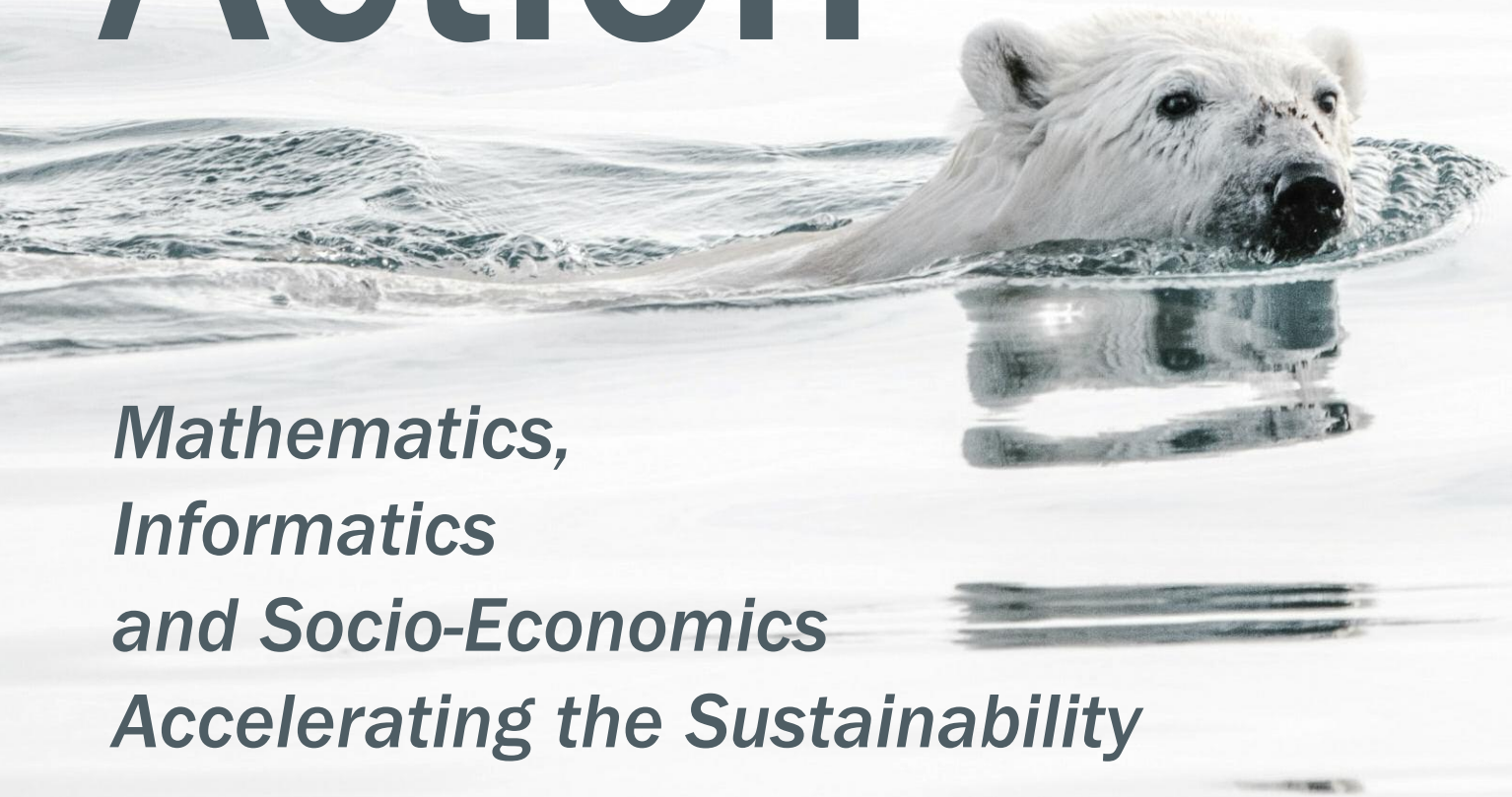
ERCIM NEWS

Special theme:

The Climate Action



Mathematics, Informatics and Socio-Economics Accelerating the Sustainability

Editorial Information

ERCIM News is the magazine of ERCIM. Published quarterly, it reports on joint actions of the ERCIM partners, and aims to reflect the contribution made by ERCIM to the European Community in Information Technology and Applied Mathematics. Through short articles and news items, it provides a forum for the exchange of information between the institutes and also with the wider scientific community. This issue has a circulation of about 6,000 printed copies and is also available online.

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JOINT ERCIM ACTIONS

SPECIAL THEME

The special theme "The Climate Action" has been coordinated by Sobah Abbas Petersen (NTNU) and Phoebe Koundouri (Athens University of Economics and Business and Athena RC)

Introduction to the special theme

Therefore, we are interested in alternative AI algorithms in finding good (near-optimal) solutions in practical time for transport problems.

All these techniques will pave the way to the development of the new Railway 4.0.

The project is structured into six work packages (WPs):
- WP1 provides the reference taxonomy and state of the art of AI in railways and related sectors.
- WP2 addresses AI for railway safety and automation.
- WP3 explores AI applications in predictive maintenance and defect detection.
- WP4 is about AI for traffic planning and management.
- WP5 manages dissemination activities as well as definition of future roadmaps.
- WP6 deals with project management.

An overview of the project is provided in Figure 1.

The organisations participating to the project are: Consorzio Interuniversitario Nazionale per l'Informatica (CINI), Italy – project coordinator; Delft University of Technology, the Netherlands; University of Leeds, United Kingdom, and Linnaeus University, Sweden. The project is also supported by an industrial Advisory Board currently including Hitachi Rail STS (IT), Dutch State Railways (NL), The MathWorks (IT), First Rail (UK), Aitek (IT), Comesvil (IT), NextTechnologies (HU), and SYENMAINT (IT).

The project is funded by the European Union's Horizon 2020 research and innovation programme (Shift2Rail Joint Undertaking, Open Call S2R-OC-IPX-01-2019) under grant agreement No. 881782. It runs for three years, from 1 December 2019 to 30 November 2022.

Links:
[L1] https://cordis.europa.eu/project/id/881782
[L2] https://rails-project.eu

References:
[1] D. Burroughs: "The future of intelligence is artificial", International Railway Journal, September 2019, https://kwz.me/h4E
[2] G. Ho, "Artificial intelligence in rail: "Hype or reality?", Global Railway Review, May 2019, https://kwz.me/h4K
[3] D. Tokody, F. Flammini: "The intelligent railway system theory: The European railway research perspective and the development of the European digital railway strategy", International Transportation, Issue 1, 2017.

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A Formal Methods Demonstrator for Railways

by Franco Mazzanti and Davide Basile (ISTI-CNR)

The 4SECURail project – funded by the European Union Horizon 2020 Shift2Rail Joint Undertaking – has two overall objectives: to design a Computer Security Incident Response Team (CSIRT) for joint EU-Rail cybersecurity, and the setup of a Formal Methods Demonstrator for the evaluation, in terms of cost, benefits and required learning curve, of the impact of the use of Formal Methods for the rigorous specification of the components of a railway signalling infrastructure.

While it is recognized that the adoption by the railways infrastructure managers of a rigorous specification methodology based on formal methods would definitely improve the dependability of the subsystems - that still have to guarantee the safety and availability of the overall infrastructure even when they are likely to be developed by the different suppliers - a detailed analysis of the costs, benefits, and of the required learning curve, of such adoption of formal methods is still missing.

As part of the first Work Stream of the project, researchers from the Formal Methods and Tools group of ISTI-CNR will shed more light on this issue with the design of a Formal Methods Demonstrator to evaluate the potential impact of the use of Formal Methods within a system specification process that could be adopted by railway infrastructure managers. The ISTI-CNR demonstrator design efforts will be complemented in the project by SIRTI for the selection and specification of signaling subsystem to be used as case study, and by FIT Consulting for development of the Cost/Benefits analysis.

The second Work Stream of the project, led by Hit Rail B.V. with the collaboration of UIC (International Union of Railways) and Tree Technology, will deliver a collaboration platform for a European Railway Computer Security Incident Response Team (CSIRT), designed to coordinate the Cyber Security response actions of the separate railway security teams.

The 4SECURail project which has started in December 1st 2019 and it is expected to end in November 30th 2021, is coordinated by engineering consulting firm Ardanuy Ingeniería, S.A.

Links:
[L1] https://cordis.europa.eu/project/id/881775
[L2] http://www.4securail.eu

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ERCIM – the European Research Consortium for Informatics and Mathematics is an organisation dedicated to the advancement of European research and development in information technology and applied mathematics. Its member institutions aim to foster collaborative work within the European research community and to increase co-operation with European industry.

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Figure 1: