

INVITED SESSION SUMMARY

Title of Session:

Semantic Applications for Critical Infrastructures (SACI)

Name, Title and Affiliation of Chair:

Dr. José Miguel Blanco
ETSI de Telecomunicación, Universidad Politécnica de Madrid, Spain

Prof. Dr. Mouzhi Ge
Faculty of ECRI, Deggendorf Institute of Technology, Germany

Details of Session (including aim and scope):

Semantic applications have been applied to various Critical Infrastructures (CI) such as energy, transportation, water supply, and communication systems. Using domain-specific semantics, the semantic applications can improve decision-making and maintain reliability for CIs. The development of semantic solutions such as ontology engineering, data quality assurance, and regulatory compliance has demanded domain expertise for CIs. Those related technologies such as real-time data integration, predictive analytics, semantic search, and anomaly detection are employed to monitor and manage operations effectively. These semantic approaches enable effective monitoring and management in critical infrastructure systems and smart cities.

Moreover, the convergence of semantic technologies with emerging paradigms such as the Internet of Things (IoT), artificial intelligence (AI), and digital twins has opened new opportunities for innovation in critical infrastructure management. By using these emerging techniques, semantic applications can facilitate data interoperability and automate complex workflows. This session therefore focuses on bringing together researchers, practitioners, and industry leaders to explore cutting-edge advancements in semantic technologies and their impact on critical infrastructures. Participants will gain insights into the latest methodologies, share best practices, and discuss challenges and opportunities in deploying semantic solutions to build resilient and sustainable infrastructure systems.

Aim

In this invited session, we aim to provide a platform for discussing approaches, models, results and case studies addressing a broad range of issues related to semantic application in the context of critical infrastructures. This invited session is to attract papers that can be based on quantitative and qualitative methods, design science as well as experimental and simulation. The invited session is also to bring together researchers working in various areas related to semantic web, CIs, and Web applications in order to share interesting results, ongoing work, and foster future collaborations.

Topic of Interests

Topics of interest include but are not limited to:

- Use of semantics in CIs applications
- Real-time data reasoning
- AI and semantic applications
- Semantics-based Smart City applications
- Digital Twins in CIs
- Distributed computing for CIs
- Semantic applications and smart cities
- Data Analytics in CIs
- Semantic applications with IoT and robotics

- Edge/Cloud computing for CIs
- Content analysis with semantics
- Analysis of Linked Data in Web of Things
- Semantic description and ontology integration in CIs
- Semantic data digestion for AI deployment
- Use of semantics in industry applications
- Knowledge extraction in CIs
- Novel web architectures
- Machine learning for semantic applications
- Formal ontologies for CIs

Main Contributing Researchers / Research Centres (tentative, if known at this stage):

Laboratory of Real-Time Systems and Architecture of Telematic Services, Technical University of Madrid, Spain

European Campus Rottal-Inn at Deggendorf Institute of Technology, Germany

Website URL of Call for Papers (if any):

<https://sites.google.com/view/kes2025-saci/home>

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