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The 30th International Conference on Intelligent Computing in Engineering (EG-ICE): Sustainable, Smart and Resilient Buildings, Infrastructures and Cities

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This SI collects the extended best papers from the 2023 EG-ICE International Conference on Intelligent Computing in Engineering, which brings together international experts working on the interface between advanced computing and modern engineering challenges. Many engineering tasks require open-world resolution of challenges such as supporting multi-actor collaboration, coping with approximate models, providing effective engineer-computer interaction, searching in multi-dimensional solution spaces, accommodating uncertainty, including specialist domain knowledge, performing sensor-data interpretation and dealing with incomplete knowledge. While results from computer science provide much initial support for resolution, adaptation is unavoidable and most importantly, feedback from addressing engineering challenges drives fundamental computer-science research. Competence and knowledge transfer go both ways.

The 30th EG-ICE conference was held on July 4-7, at University College London. We invited 22 conference papers and nine of them have been accepted, which have been included in this SI. With the development of intelligent computing in engineering, the 30th EG-ICE conference would focus on Sustainable, Smart and Resilient Buildings, Infrastructures and Cities. From the perspective of smart and sustainable buildings, Chen et al. (2024) proposed an innovative approach for assessing and mitigating fire risks using raw building blueprints based on advanced computer vision techniques. Tao et al. (2024) proposed a blockchain-enabled common data environment (BECDE) framework that leveraged a knowledge graph (KG) and smart contract technology, to create a trustworthy BIM environment. From the perspective of smart and resilient infrastructures and cities, Lin et al. (2024) introduced an innovative framework for assessing dynamic congestion risks within transportation networks under flooding conditions. Ling et al. (2024) proposed a hybrid natural language processing (NLP)-based method to develop a knowledge graph for rock tunnel design. Moreover, many novel modelling approaches and dynamic scheduling methods have been introduced for the design and construction phases. Mehranfar et al. (2024) proposed an automated method for indoor 3D reconstruction using dense point clouds and images by integrating artificial intelligence capabilities in scene understanding with domain engineering knowledge. Kosse et al. (2024) introduced a dynamic scheduling (DS) framework to optimise precast element production. Furthermore, Teclaw et al. (2024) proposed a novel methodology for federating cross-domain BIM-based knowledge graphs and Fuchs et al. (2024) presented how Intermediate Representations (IRs) can be used to improve the semantic parsing quality.

With the development of artificial intelligence (AI) and intelligent computing, a growing range of technologies and algorithms are being deployed and developed within the engineering sector, offering enhanced support and solutions to address complex challenges in the built environment, including climate change. A more sustainable, smart and resilient built environment will be achieved through new knowledge, technologies and concepts.

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