EDITORIAL

Editorial: Summary of 2025

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Founded in May 2025, our journal *ICCK Transactions on Systems Safety and Reliability* has already published two issues. The published papers include both review papers and original research papers. These papers shed light on the state-of-art researches on the safety and reliability of various important systems, such as transportation systems, ecosystems, production systems, and computing systems. Some of them focus on pure reliability modelling methods whereas some others care about related optimization problems, such as maintenance strategy determination.

Specifically, there are 3 review papers. Gao et al. [1] focus on the recent works related to the operation of metro systems, which include the review of a series of works on vulnerability of metro systems. The challenges in current researches are identified and future research directions are suggested. Gao et al. [2] reviews the recent works on routing optimization of UAVs (Unmanned aerial vehicles), where lots of works consider different types of uncertainty and impacts that may cause failure of UAV missions. Given that the UAVs are more and more prevalent in different applications, there are a lot of future researches to be done. Mo et al. [4] review the recent works on the performability analysis of computing systems, where typical methods are identified and future directions are discussed.

There are 6 original research papers. Zhou et al. [7] proposes a deep learning framework based on a multi-branch serial-parallel fusion of CNN-BiLSTM-Transformer architectures for remaining residual life estimation. Experiments conducted on the C-MAPSS aero-engine dataset and the A123 lithium battery dataset validate the effectiveness of the proposed method. Zhao et al. [9] present a hybrid approach for remaining useful life (RUL) prediction of lithium-ion batteries, addressing the challenge of capacity regeneration through CEEMDAN decomposition, component-specific modeling with SVR and BiGRU, and hyperparameter optimization via SSA. Validation on the NASA dataset demonstrates superior accuracy and robustness compared to baseline models. Liang et al. [3] focuses on the preventive maintenance and competitive strategies in IIoT-enabled after-sales markets. Specifically, an additive degradation model is proposed to characterize the internal deterioration of products and the impact of efforts into preventive maintenance. It then introduces a sequential game model based on the IIoT platform, examining interactions between manufacturers and cooperative competitors under three competitive schemes. The profit and reliability functions of manufacturers and cooperative competitors under each competition scheme are analyzed. Zhao [6] focuses on the sustainability of ecosystems based on business model innovation, proposing a framework

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for achieving sustainable development goals within interconnected commercial networks. Wang et al. [5] introduces a novel approach for enhancing production decision-making by applying Reinforcement Learning to optimize the Economic Manufacturing Quantity (EMQ) model within discrete-time production-inventory systems. Numerical simulations show that the suggested Reinforcement Learning model surpasses conventional EMQ models and steady-state probability models in both convergence speed and cost-effectiveness. Li et al. [8] conduct a reliability analysis of non-invasive continuous glucose monitoring (CGM) systems using the Design Failure Mode and Effects Analysis (DFMEA) method. By decomposing key functional modules, identifying potential failure modes, and prioritizing risks via Risk Priority Numbers (RPNs), the study proposes targeted improvements for high-risk modes to enhance system reliability and patient safety in diabetes management.

In the year to come, *ICCK Transactions on Systems Safety and Reliability* welcome more submissions on the safety and reliability of critical systems.

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Conflicts of Interest

The author declares no conflicts of interest.

AI Use Statement

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Ethical Approval and Consent to Participate

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