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Preface

The 9th International Conference on Computer Science and Application Engineering (CSAE 2025) was successfully held online during October 19-20, 2025. It is held annually to provide a comprehensive global forum for experts and participants from academia to exchange ideas and present results of ongoing research in the most state-of-the-art areas of computer science and application engineering.

This year we received over 80 paper submissions from 9 countries around the world, and 11 high-quality papers were accepted as oral or poster presentations. Each contributed paper was rigorously peer-reviewed by reviewers who were drawn from a large pool of technical committee members as well as other international reviewers in related fields.

We would like to express our gratitude to the reviewers of these manuscripts, who provided rational, constructive comments & suggestions to the authors, and extend our sincere thanks to the authors for their valuable contributions. Finally, our sincere gratitude goes to the ACM Publishing editors and managers for their helpful cooperation during the preparation of the conference proceedings.

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Editorial

The 9th International Conference on Computer Science and Application Engineering (CSAE 2025) was successfully held from October 19-21, 2025, Shanghai, China. This annual conference serves as a comprehensive global forum for experts and participants from academia to exchange ideas and present ongoing research in the most state-of-the-art areas of computer science and application engineering. The previous conferences were held in Shanghai (2024)[1] Wuhan (2023)[2], Nanjing (2022)[3], Sanya (2021[4], 2020[5] and 2019[6]), Hohhot (2018)[7]. This year, participants and presenters from nine countries.

The proceedings of the CSAE2025 conference feature 11 accepted contributions, selected from over 80 submissions through a rigorous peer-review process. These contributions reflect cutting-edge research and innovative applications addressing real-world challenges in computer science and application engineering.

This editorial presents an overview of the articles included in this volume, highlighting their significance, diversity, and the forward-looking research they represent. The collection showcases practical and innovative work addressing real-world challenges across several major themes. Many contributions advance artificial intelligence and machine learning, introducing new approaches to anomaly detection, multimodal fusion, spatiotemporal modelling, and model interpretability. Others focus on industrial intelligence, robotics, and automation, presenting sophisticated solutions for mechanical parts recognition, intelligent manufacturing processes, and sensor-based system reliability. The proceedings also feature important developments in software engineering and cybersecurity, including improved methods for software defect prediction, automated penetration testing, and reinforcement learning for more dependable systems. Research in computational social science broadens the conversation by applying data-driven

[1] https://dl.acm.org/doi/proceedings/10.1145/3704814
[2] https://dl.acm.org/doi/proceedings/10.1145/3627915
[3] https://dl.acm.org/doi/proceedings/10.1145/3565387
[4] https://dl.acm.org/doi/proceedings/10.1145/3487075
[5] https://dl.acm.org/doi/proceedings/10.1145/3424978
[6] https://dl.acm.org/doi/proceedings/10.1145/3331453

techniques to issues such as poverty analysis, cultural translation, and equipment design decisions. Meanwhile, work on knowledge engineering, RAG systems, and large language models demonstrates how domain-specific models, multimodal retrieval, and integrated knowledge bases are reshaping enterprise intelligence and scientific inquiry. Together, these contributions illustrate the continuing evolution of computational research and its growing impact across both industry and society.

The proceedings start with Article 1, where *Jiajing Guo and Chang Liu (2025)* introduce an AI-driven framework for predicting steel manufacturing quality across multiple production stages. By combining evolutionary optimisation with feature selection, their model delivers stronger and more reliable predictions. Article 2 follows with the work of *Yilin Chen, Xinyi Gong, and Xian Tao (2025)*, who present the FRD framework for unsupervised anomaly localisation. Using simulated defects and joint feature reconstruction, their method achieves leading performance across several industrial datasets. Continuing with advances in software engineering, Article 3 features *Hongming Dai, Aiping Xiao, Hailin Wang, Jianqing Xi, and Hong-Liang Dai (2025)*, who propose an enhanced SAC-CGAN approach for just-in-time software defect prediction. Their method reduces concept drift and significantly improves model accuracy. In Article 4, *Yong Li and Zhao Shi (2025)* examine relative poverty in Western China using CFPS data and an interpretable XGBoost-SHAP model. Their results show that education, information literacy, and income are key contributors to multidimensional poverty.

Article 5 moves into industrial automation. Here, *Cheng Lu, Xuanmiao Ye, and Fuzhong Wu (2025)* present a streamlined, yet accurate mechanical parts recognition model based on an improved YOLOv8 architecture. Their design boosts precision while cutting computational cost by more than 30%. Next, Article 6 showcases the work of *Ziqi Wang, Hao Zhang, and Huaxuan Li (2025)*, who propose the GNN-Transformer model for detecting anomalies in escalator sensor time-series data. Their integrated spatiotemporal approach outperforms many deep learning baselines on real metro-station datasets.

Turning to enterprise knowledge systems, Article 7 by *Li-ming Huang (2025)* introduces a multimodal RAG framework that brings together text, images, and tables using adaptive

[7] https://dl.acm.org/doi/proceedings/10.1145/3207677

attention. The system delivers notable improvements in retrieval accuracy and overall responsiveness. This is followed by Article 8, in which *Siyuan Jiang, Zhexue Ge, and Yongli Qiao (2025)* present a decision-making framework for choosing between multiple LRU division schemes during equipment development. Their AHP-SPA approach brings greater consistency and clarity to early-stage design decisions.

In Article 9, *Xiangping Chen, Lingyi He, Yirou Zou, Ye Yuan, Shengnan Cai, and Cuiying Zou (2025)* explore how machine translation handles traditional Chinese auspicious pattern names. Their study points out key challenges in translating culturally rich terms and offers practical suggestions to improve translation quality. The next contribution, Article 10, comes from *Jiahao Mei, Shuangwu Chen, Yuanyi Ma, and Huizi Song (2025)*. They present AutoPen, an autonomous penetration-testing system powered by LLM-based agents and RAG-supported reasoning. Tests on vulnerable hosts show that AutoPen performs strongly and consistently.

The volume concludes with Article 11, where *Xing Liu, Fuzhi Wang, Kewei Ding, Ziyan Xiong, and Wei Zhang (2025)* introduce GeoRisk-LLM, a multimodal modelling framework for geological assessment and risk detection in underground hydrogen storage. Their approach outperforms mainstream LLMs and strengthens safety strategy generation.

Overall, this proceedings showcases a diverse set of contributions that reflect the expanding influence of modern computational research. The papers span artificial intelligence, industrial automation, software engineering, cybersecurity, data-driven social analysis, and advances in knowledge engineering and large language models. Together, they illustrate how computational methods address real-world challenges while advancing foundational research, capturing the breadth and depth of work presented at CSAE 2025 and the conference's role in driving both scientific innovation and practical technological progress.

We extend our gratitude to the reviewers for their thoughtful and constructive comments and suggestions, which were invaluable in maintaining the high quality of this publication. We also sincerely thank the authors for their valuable contributions to the conference. A special note of appreciation goes to ACM Publishing for their cooperation and support during the preparation of the conference proceedings. Additionally, we

acknowledge the efforts of the organizing committee, whose dedication ensured the success of CSAE 2025.

We hope this collection of articles inspires further research and collaboration in computer science and application engineering. We look forward to welcoming you to future editions of the CSAE conference series and invite you to actively engage with the vibrant research community shaped in this event.

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