

Editorial

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This, the first issue of Volume 23 of the Computer Science and Information Systems journal in 2026 gathers together 16 regular articles and two special sections, “Advances in Databases, Information Systems, and Database Engineered Applications – Recent Trends, and Open Issues” and “Advances on Information Communication Technologies and Intelligent Systems and their Applications”, featuring 4 and 7 articles, respectively. As always, we are grateful for the efforts and enthusiasm of our authors, reviewers, and guest editors, without whom the current issue and the publication of the journal itself would not be possible.

The first regular article, “Optimizing Cell-Based Software Architecture Through Heuristic Community Detection Approach” by Miloš Milić et al., investigates cell-based software architectures, where a software system is viewed as a network of interconnected cells, each comprising multiple elements. Community detection is employed to identify closely connected elements, with the goal of optimizing the architecture by determining the optimal number of cells and their internal organization. A heuristic approach is developed to facilitate solving large-scale optimization problems.

In the second regular article, “Comparing Novice Programmers Performance with Block-Based, Text-Based, and Both Notations: A Study from Two Countries,” Tomaž Kosar et al. explore different notation approaches for learning fundamental programming concepts, with the objective of assessing how notation choice influences beginners’ performance. A controlled experiment during short-term visits aimed at promoting programming in primary schools indicated that the choice of notation did not significantly impact the performance of the participants, suggesting that educators can confidently use different notations (Python, Poliglot, or a combination). However, students’ performance may improve when training sessions are extended over a longer period.

“Review of Architectures in IoT Remote Patient Monitoring Systems,” by Lan Sovinc and Marko Bajec, identifies four different classification categories, each with their own strengths and weaknesses: fog-based, cloud-based, hybrid, and blockchain-enabled. The article summarized results from 11 original publications, describing the characteristics of the identified approaches by examining common and unique concepts used by the solutions in the same classification category based on prior analysis.

In their article entitled “DomiCom: Discovery of Top-k Dominant Communities in Networks with Node Attributes,” Nikolaos Georgiadis et al. incorporate node attributes to construct more meaningful communities that reflect both structural connections and attribute information, by introducing the concept of dominance relationships between nodes. Experimental evaluation on real-world attributed networks demonstrated the efficiency and effectiveness of the proposed approach, with the reported communities shown to be meaningful and robust based on their significance and structural coherence.

Chao Wang and Wenbin Li, in “ASD-RRT*: An Enhanced Path Planning Algorithm Based on Rrt* for Multi-Obstacle Environments,” propose a novel algorithm, Adaptive Sampling and Densification RRT* (ASD-RRT*), for path planning in multi-obstacle environments. The method extends RRT*-based sampling methods by incorporating adaptive sampling to enhance performance in complex environments. The adaptive sampling approach allows the algorithm to focus on effective regions, reducing sampling of irrelevant points and finding feasible solutions with fewer samples while maintaining the asymptotic optimality of RRT*.

“ADN-YOLO: An Improved Ship Detection Model Based on YOLOv,” authored by Tao Li et al, proposes an improved You Only Look Once (YOLO) based model for ship target detection in infrared images named ADN-YOLO. The model introduces a Dynamic Upsampler (Dysample) to integrates semantic information across different layers, then a lightweight downsampling module (ADown) to reduce the parameter count, and finally a new loss function that combines the Normalized Wasserstein Distance (NWD) with the Complete Intersection over Union (CIoU) to enhance the model’s ability to accurately localize small targets.

The article “A Method for Representing Stock Time Series Features Based on Trend and Inclination Angle Turning Points,” by Lei Han, Xuedong Gao, proposes a stock time series feature representation method based on a combination of slope angle changes and trend turning point screening which alleviates the limitations of single methods, such as local feature overfitting, loss of global trends, and sparse long-segment features, through a multi-level collaborative mechanism of screening, filtering, and supplementation.

Christos Troussas et al., in their article “An ANN-WSM Hybrid Framework for Sustainable Personalized Learning in Smart Education,” present an adaptive learning system integrated with ANNs and WSM that recommends particular learning activities to students based on their cognitive styles. The system classifies learners according to the Gregorc Mind Styles Model and, through the ANN, provides probabilities of predefined learning activities. Experimental evaluation involving 70 undergraduate students demonstrated significant improvements in terms of engagement, retention, and performance.

In “AI-Powered Virtual Assistants in Education: A Systematic Review of Applications and Implications (2014–2025),” Eleni Papachristou et al. examine and synthesize 62 empirical studies published between 2014 and 2025 that examine the role of AI-powered virtual assistants (VAs) in primary, secondary, and tertiary education, addressing four research questions: (1) the educational uses and implications of VAs, (2) the most frequently applied models and algorithms, (3) their contribution to learner motivation and self-determination, and (4) the benefits and challenges of instructional design supported by VAs.

In their article “Meeting Consumer Demand: Supporting Efficient Services Deployment for Cloud-Connected Devices,” Iván Bernabé-Sánchez et al. present a service architecture that can be integrated with network service managers to identify priorities that should be taken into account when deploying virtualized network functions (VNFs) or services in infrastructures. The proposed solution collects information about the network service to be deployed and analyzes and evaluates its requirements by comparing them with operating patterns, obtaining recommendations for the deployment of each service, also providing a provisioning service which helps in automating the deployment.

The article “Weld Proximity Defect Detection Model for Steel Thin Plates Based on EP-YOLOv7,” by Runmei Zhang et al. proposes an industrial detector for steel plate weld proximity defects based on EP-YOLOv7. The detector introduces efficient multi-scale channel attention (EMCA) to strengthen multi-scale feature perception, integrates it into the efficient layer aggregation network to enhance feature fusion and defect representation, and employs a partial-bottleneck decoupling predictor head (P-BD Head) to improve localization accuracy and reduce missed detections of small targets.

Wei Li et al., in “Adaptive Bandwidth Allocation via Uncertainty-Constrained Deep Reinforcement Learning,” propose a novel algorithm named Uncertainty-Constrained Stability-aware Deep Reinforcement Learning (UCS-DRL) for dynamic network service bandwidth allocation, which adopts a dual-policy architecture: a task policy that learns optimal bandwidth allocation decisions, and a stability policy guided by uncertainty-aware value estimation to identify and mitigate potential risky or unstable behaviors during deployment in demanding multi-user, dynamic, and QoS-sensitive applications.

“Robust QoS-aware Network Scheduling for Smart Substations via Multi-Agent Adversarial Reinforcement Learning,” authored by Ping He et al, proposes a Quality-of-Service-driven routing optimization approach based on adversarial reinforcement learning, referred to as Adversarial Critic-Cooperative Actor (ACCA). By introducing adversarial agents that model worst-case perturbations, ACCA establishes a multi-agent game framework that enhances policy robustness and adaptability in dynamic network environments.

In “Transformer Substation Network Disconnection Prediction via Semantic Reasoning with Causal Modeling,” Jie Ren et al. propose a network disconnection prediction approach that integrates prompt-driven semantic reasoning with structured causal analysis. The approach constructs a causal event graph that models semantic, temporal, and topological dependencies across devices, after which an inference module combines causal path analysis, structural causal models, and counterfactual reasoning to assess the influence of events, predict emerging disconnection risks, and identify plausible root causes with coherent and interpretable justification.

“DICYME: Dynamic Industrial Cyber Risk Modelling Based on Evidence,” authored by Javier García-Ochoa et al, introduces a comprehensive system that integrates diverse analytical techniques to identify patterns and characteristics which reveal emerging threat trends. DICYME operates as a pipeline that retrieves data from diverse cyber incident reports, specialized databases, and other relevant sources of cyber-related information, applies specialized techniques for victim identification, indicator computation, threat actor profiling, Common Vulnerability and Exposure (CVE) relationship mapping, and ultimately performs Cyber Risk Quantification (CRQ).

Finally, “FNNMFF: Crop Pests and Diseases Detection Based on Fuzzy Neural Network and Multilevel Feature Fusion in Remote Sensing Images,” by Shoulin Yin et al, proposes a novel detection approach based on the YOLOv5 model and extracts the semantic level information of different depth features from the convolutional neural network, combining the weight aggregation module to learn the weight of each layer feature adaptively. The learned weights are then loaded to the segmentation graphs obtained by sampling on each feature layer to obtain the final segmentation results.

