2024 IEEE International Conference on Web Services (ICWS 2024)

Shenzhen, China 7-13 July 2024

Pages 1-706



IEEE Catalog Number: CFP24CWS-POD **ISBN:**

979-8-3503-6856-7

Copyright © 2024 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number: ISBN (Print-On-Demand): ISBN (Online): ISSN: CFP24CWS-POD 979-8-3503-6856-7 9798350368550 2836-3876

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400 Fax: (845) 758-2633 E-mail: curran@proceedings.com Web: www.proceedings.com



2024 IEEE International Conference on Web Services (ICWS) ICWS 2024

Table of Contents

Congress Steering Committee Chair Message	xxx
Congress General Chair Message	xxxi
Congress Program Chairs Message	xxxiii
TCSVC Chair Message	
ICWS 2024 Chairs Message	
ICWS 2024 Program Committee	
IEEE Symposium on Graph Data Mining for Services (GDMS) Chair Message	xlii
IEEE Symposium on Services for Data & Model Ecosystems (SDMEs) Chair Message	xliii
ICWS Workshop on Services Regulation & Governance (SRG) Chairs Message	xlv
ICWS Workshop on Services Regulation & Governance (SRG) Program Committee	xlvi
ICWS Workshop on Internet of Intelligent Service Systems (IISS) Chairs Message	xlvii
ICWS Workshop on Internet of Intelligent Service Systems (IISS) Program Committee	xlviii
ICWS 2024 Reviewers	xlix

ICWS Symposium on Services for Data & Model Ecosystems (SDME)

Ecosystem-Based Data Product and DaaS: Complexity Analysis and Design Considerations Vincent Chen (Wespac Bank Corporation), Perry Chen (DataEco Lab), and Amin Beheshti (Macquarie University)
Towards Automating Federated Data Governance
 Towards Collecting Royalties for Copyrighted Data for Generative Models
Assessing adversarial attacks in real-world fraud detection

GCPN: A Group Connected based Method for Continual Vertical Federated Recommender Systems
Haochen Yuan (Harbin Institute of Technology, China), Xiang He (Harbin Institute of Technology, China), Ruihan Hu (Harbin Institute of Technology, China), Zhongjie Wang (Harbin Institute of Technology, China), Jun Zhou (Shanghai Pudong Development Bank, China), Yunqing Feng (Shanghai Pudong Development Bank, China), and Lecheng Gong (Shanghai Pudong Development Bank, China)
Data-Product Catalogues: Envisioning with Knowledge-aware Natural Language Processing
Towards a policy tuning method for data ecosystems
Governance of Data Service Marketplace Under Service Ecosystem
 Multimodal Archival Data Ecosystems
 Transforming Data Product Generation through Federated Learning: An Exploration of FL Applications in Data Ecosystems

ICWS Workshop on Internet of Intelligent Service Systems (IISS)

Energy- and Cost-Oriented Optimization of Hybrid Coded Storage in Edge Caching Systems Haojuan Zhang (Henan Normal University, China), Yali Wang (Suzhou City University, China), Peiyan Yuan (Henan Normal University, China), and Junna Zhang (Henan Normal University, China)	92
Meta data retrieval for data infrastructure via RAG	100
Zhuofan Shi (Peking University, China), Kun Liu (Advanced Institute of	
Big Data, China), Shan Bai (Advanced Institute of Big Data, China),	
Yuntao Jiang (Peking University, China), Tong Huo (Advanced Institute	
of Big Data, China), Xiang Jing (Peking University, China), Ruizhi Li	
(Peking University, China), and Xinjian Ma (Peking University, China)	

A Unified Data Ontology for Demand-driven Data Sharing in the DOA-based Data Ecosystem 108 Fan Li (Advanced Institute of Big Data, China), Shenghao Wang (Advanced Institute of Big Data, China), Kun Liu (Advanced Institute of Big Data, China), Xiang Li (Advanced Institute of Big Data, China), Guo Li Yang (Advanced Institute of Big Data, China), and Qiang Wang (Advanced Institute of Big Data, China)
Risk Matrix and D-S Theory Based Trustworthiness Assessment Method for Cloud Services 116 Tilei Gao (Yunnan Key Laboratory of Service Computing, Yunnan University of Finance and Economics), Ming Yang (Yunnan Key Laboratory of Service Computing, Yunnan University of Finance and Economics), Rong Jiang (Yunnan Key Laboratory of Service Computing, Yunnan University of Finance and Economics), Tao Zhang (School of Information, Yunnan University of Finance and Economics), and Leijin Long (Yunnan Key Laboratory of Service Computing)
Bidirectional Choice for Many-to-many Online Task Assignment in Mobile Crowdsourcing
A Lithium-ion Battery SOH Estimation Method Based on WT-EMD-Informer Model
 UAV-as-a-Service for Robotic Edge System Resilience
Lightweight Decentralized Federated Learning Framework for Heterogeneous Edge Systems 149 Jianran Wang (Guilin University of Electronic Technology)
MedSync: A Multi-layered Medical Resource Management System with Cloud-edge Synergy 157 Can Wang (Chinese PLA General Hospital), Zibo Gao (Peking University), Lindsay Wang (Beijing Huaxing Changtai IoT Technology Research Institute Co., Ltd), Yuejia Zhang (Beijing Huaxing Changtai IoT Technology Research Institute Co., Ltd), Hao Sun (Chinese PLA General Hospital), Yue Tong (Chinese PLA General Hospital), and Ting Lyu (Chinese PLA General Hospital)
 Proactive Detection of Physical Inter-rule Vulnerabilities in IoT Services Using a Deep Learning Approach
Biased Random Walk based Web API Recommendation in Heterogeneous Network

 Privacy Leakage Defense in Federated Learning Using Gradient Perturbation-based Dynamic Clipping	;
 An Incentive Algorithm for Cross-region Task Allocation based on Worker Coalition Under Mobile Crowdsourcing	;
 Enhancing the Reliability of Microservice Workflows through Concurrent Artifact Anomaly Detection	;

ICWS Workshop on Services Regulation & Governance (SRG)

 HEDGE: Heterogeneous Semantic Dynamic Graph Framework for Log Anomaly Detection in Digital Service Network
FastGCL: Fast Self-Supervised Graph Learning for Service Understanding
EE blockchain: End-to-end service regulation and efficient retrieval and categorization on the underlying level
D-PoA: A Consensus Algorithm for Medical Data SharingBased on Dynamic Scoring

Deployment perspective of service pattern: Solve dynamic services with heterogeneous	
carrier description	234
Xiaohua Pan (Zhejiang University), Yechen Jin (Zhejiang University),	
Meng Xi (Zhejiang University), and Ying Li (Zhejiang University)	
Horae: A Domain-Agnostic Modeling Language for Automating Multimodal Service Regulation	244
Yutao Sun (Zhejiang University, China), Mingshuai Chen (Zhejiang	
Yutao Sun (Zhejiang University, China), Mingshuai Chen (Zhejiang University, China), Kangjia Zhao (Zhejiang University, China), and	

IEEE International Conference on Web Services

ICWS 1: Service Discovery, Selection and Recommendation

 Enhancing Attributed Graph Networks with Alignment and Uniformity Constraints for Session-based Recommendation	247
A General Complementary API Recommendation Framework based on Learning Model	258
User Profiling for Personalized Service Recommendation with Dual High-order Feature 2 Learning 2 Guobing Zou (Shanghai University, China), Liangrui Wu (Shanghai 2 University, China), Shengxiang Hu (Shanghai University, China), Song 2 Yang (Shanghai University, China), Chenyang Zhou (Shanghai University, China), Song 2 Kanghai University, China), Chenyang Zhou (Shanghai University, China), Song 2 Yang (Shanghai University, China), Chenyang Zhou (Shanghai University, China), Yanglan Gan (Donghua University, China), and Bofeng Zhang 2 (Shanghai Polytechnic University, China) 2	269

ICWS 3: Service Discovery, Selection and Recommendation

Computer and Software, Nanjing University of Information Science and Technology), and Xuyun Zhang (School of Computing, Macquarie University) Location-aware Collaborative Filtering and Feature Interaction Learning for QoS Prediction........291

Qinjing Wang (Tianjin University of Technology, China), Cairui Yan (Tianjin University of Technology, China), Jinyu Wang (Tianjin University of Technology, China), Wenguang Zheng (Tianjin University of Technology, China), and Yingyuan Xiao (Tianjin University of Technology, China)

Hierarchical Reinforcement Learning for Long-term Fairness in Interactive Recommendation 300 Chongjun Xia (Chongqing Institute of Green and Intelligent Technology, Chinese Academy of Sciences; Chongqing School, University of Chinese Academy of Sciences, China), Xiaoyu Shi (Chongqing Institute of Green and Intelligent Technology; Chinese Academy of Sciences, China), Hong Xie (University of Science and Technology of China, China), Quanliang Liu (Chongqing Institute of Green and Intelligent Technology, Chinese Academy of Sciences; Chongqing School, University of Chinese Academy of Sciences, China), and Mingsheng Shang (Chongqing Institute of Green and Intelligent Technology, Chinese Academy of Sciences, China)

ICWS 2: Service Discovery, Selection and Recommendation

DiffGCL: Diffusion model-based Graph Contrastive Learning for Service Recommendation Xiuqi Yang (Beijing Institute of Technology, China), Xiaojun Xu (Beijing Institute of Technology, China), Zhuofan Xu (Beijing Institute of Technology, China), Jing Chu (Beijing Institute of Technology, China), and Jingjing Hu (Beijing Institute of Technology, China)	. 310
DISS-CF: Direct Item Session Similarity Enhanced Collaborative Filtering Method for	
Recommendation	. 320
Cheng Chen (Nanjing University), Xiaoxiao Chi (Macquarie University),	
Amin Beheshti (Macquarie University), Jinjun Chen (Swinburne	
University of Technology), and Wanchun Dou (Nanjing University)	
DST: Personalized Charging Station Recommendation for Electric Vehicles Based on Deep	
Reinforcement Learning and Spatio-Temporal Preference Analysis	. 330
Xiaoying Fan (College of Computer Science, Inner Mongolia University),	
Yongqiang Gao (College of Computer Science, Inner Mongolia	
University), and Fujun Zhang (College of Computer Science, Inner	
Mongolia University)	

ICWS 4: Datasets & Benchmarking for Service Computing Community

RealWeb: A Benchmark for Universal Instruction Following in Realistic Web Services Navigation	342
Bolin Zhang (Harbin Institute of Technology, China), Shiyun Xiong (Harbin Institute of Technology, China), Dianbo Sui (Harbin Institute	
(Harbin Institute of Technology, China), Dianbo Sui (Harbin Institute	
of Technology, China), YunZhe Xu (Shanghai Jiao Tong University, China), Zhining Tu (Harbin Institute of Technology, China), and	
Ćhina), Zhiying Tu (Harbin Institute of Technology, China), and Dianhui Chu (Harbin Institute of Technology, China)	
WebverseTest: A Standardized Benchmarking Framework for Web-Metaverse Integration	352
Yunkai Fu (School of Software Engineering, Tongji University, China),	
Xinyao Wei (School of Software Engineering, Tongji University, China),	
Zhicheng Liu (School of Software Engineering, Tongji University,	
China), Nanxi Chen (Shanghai Institute of Microsystems and Information	
Technology, CAS, China; University of Chinese Academy of Sciences,	
China), and Jinyuan Jia (School of Game, Jilin Animation Institute,	
China)	

ICWS 5: Services Security, Privacy and Trust

Privacy-preserving Searchable Encryption Based on Anonymization and Differential privacy 371 Caixia Ma (Nankai University), Chunfu Jia (Nankai University), Ruizhong Du (Hebei University), Guanxiong Ha (Nankai University), and Mingyue Li (Hebei University) Guixun Luo (Beijing Jiaotong University, China), Yonghan Lin (University of Birmingham, United Kingdom), Huilin Ai (Beijing Jiaotong University, China), Zhiyuan Zhang (Beijing Jiaotong University, China), Naiyue Chen (Beijing Jiaotong University, China), and Li Duan (Beijing Jiaotong University, China) Privacy-Preserving Artificial Intelligence on Edge Devices: A Homomorphic Encryption Muhammad Jahanzeb Khan (University of Nevada, USA), Bo Fang (Pacific Northwest National Laboratory, USA), Gaetano Cimino (University of Salerno, Italy), Stefano Cirillo (University of Salerno, Italy), Lei Yang (University of Nevada, USA), and Dongfang Zhao (University of

ICWS 8: Services Security, Privacy and Trust

Washington, USA)

Enhancing Predictive Process Monitoring with Sequential Graphs and Trace Attention Yi Deng (Wuhan University, China), Jian Wang (Wuhan University, China), Chong Wang (Wuhan University, China), Chao Zheng (Wuhan University, China), Maodong Li (Wuhan University, China), and Bing Li (Wuhan University, China)	
RegGPT: A Tool for Cross-Domain Service Regulation Language Conversion Zhaowen Wang (Central South University, China), Qi Xie (Central South University, China), Huan Zhang (Central South University, China), Weihuan Min (Central South University, China), Li Kuang (Central South University, China), and Lingyan Zhang (Central South University, China)	416
Towards Cross-Domain Multimodal Automated Service Regulation Systems Jianwei Yin (Zhejiang University), Tiancheng Zhao (Binjiang Institute	426

of Zhejiang University), and Li Kuang (Central South University)

ICWS 6: Services Security, Privacy and Trust

A Blockchain-Based Trust Framework for Service-Oriented Architecture Hanlin Chen (Fuzhou University, China), Yan Chen (Fuzhou University, China), Bing Lin (Fujian Normal University, China), Xing Chen (Fuzhou University, China), Yun Ma (Peking University, China), and Gang Huang (Peking University, China)	. 437
A Secure and Lightweight Aggregation Method for Blockchain-based Distributed Federated Learning <i>He Huang (BeiJingJiaotong University), Li Duan (BeiJingJiaotong</i> <i>University), Chao Li (BeiJingJiaotong University), and Wei Ni (Data61</i> <i>Business Unit, CSIRO)</i>	447
IBC: An Integrated framework combining blockchain with BPMN choreography to enhance multi-party collaboration Xinzhe Shen (Harbin Institute of Technology, China), Zhongjie Wang (Harbin Institute of Technology, China), Jiale Luo (Harbin Institute of Technology, China), Haoqi Ruan (Harbin Institute of Technology, China), Hanchuan Xu (Harbin Institute of Technology, China), and Mingyi Liu (Harbin Institute of Technology, China)	457

ICWS 9: Services Security, Privacy and Trust

TLSCG: Transfer Learning-Based Efficient Anomalous Smart Contract Generation to Empower Unknown Vulnerability Detection Chunhong Liu (Henan Normal University), Zihang Sang (Henan Normal University), Li Duan (Beijing Jiaotong University), Wei Ni (Data61, CSIRO, Australia), Wei Wang (Beijing Jiaotong University), and Chao Li (Beijing Jiaotong University)	468
I Can Retrieve More than Images: Contrastive Stealing Attack against Deep Hashing Models Xiaoyu You (Fudan University), Mi Zhang (Fudan University), Jianwei Xu (Fudan University), and Min Yang (Fudan University)	479
KAVe: A Knowledge-Based Multi-Agent System for Web Vulnerability Detection Rafael Ramires (LASIGE, Faculdade de Ciências Universidade de Lisboa, Portugal), Ana Respício (LASIGE, Faculdade de Ciências Universidade de Lisboa, Portugal), and Ibéria Medeiros (LASIGE, Faculdade de Ciências Universidade de Lisboa, Portugal)	489

ICWS 7: Services Security, Privacy and Trust

A Transparent Certification Scheme Based on Blockchain for Service-Based Systems Nicola Bena (Università degli Studi di Milano, Italy), Marco Pedrinazzi (Università degli Studi di Milano, Italy), Marco Anisetti (Università degli Studi di Milano, Italy), Omar Hasan (INSA Lyon, France), and Lionel Brunie (INSA Lyon, France)	501
TuneChain: An Online Configuration Auto-Tuning Approach for Permissioned Blockchain	512
Systems Junxiong Lin (Fudan University, China), Ruijun Deng (Fudan University, China), Zhihui Lu (Fudan University, China), Yiguang Zhang (Fudan	. 512
University, China), and Qiang Duan (Pennsylvania State University, America)	

ICWS 10: Services Security, Privacy and Trust

Secure Service-Oriented Contract Based Incentive Mechanism Design in Federated Learning via Deep Reinforcement Learning Bowen Ma (China University of Petroleum, China), Zihan Feng (China University of Petroleum, China), Yuzhou Gao (China University of Petroleum, China), Ying Chen (Beijing Information Science and Technology University, China), and Jiwei Huang (China University of Petroleum, China)	535
Detection and Defense of Cache Pollution Attack Using State Transfer Matrix in Named Data Networks	545
Hanbo Wang (Harbin Engineering University, China), Dapeng Man (Harbin Engineering University, China), Shuai Han (Harbin Engineering University, China), Huanran Wang (Harbin Engineering University, China), and Wu Yang (Harbin Engineering University, China)	
Secure Causal Reasoning on Coarsened Graph for Privacy-aware Social Web Services Yang Liu (Academy of Mathematics and Systems Science), Chuan Zhou (Academy of Mathematics and Systems Science), Huang Fang (Baidu Research), Peng Zhang (Guangzhou University), Yiling Pang (Xiamen University), Qingzhao Zhang (Xiamen University), Zhao Li (Hangzhou Yugu Technology Co., Ltd), and Hongyang Chen (Zhejiang Lab)	557

ICWS 11: Service Applications beyond the Web

Accurate Anomaly Detection Leveraging Knowledge-enhanced GAT Yi Li (China University of Geosciences, China), Zhangbing Zhou (China University of Geosciences, China), Shuiguang Deng (Zhejiang University, China), Xiao Sun (Tsinghua University, China), Xiao Xue (Tianjin University, China), Sami Yangui (University of Toulouse, France), and Walid Gaaloul (University of Paris-Saclay, France)	568
Efficient Log-based Anomaly Detection with Knowledge Distillation Huy-Trung Nguyen (People's Security Academy, Vietnam), Lam-Vien Nguyen (People's Security Academy, Vietnam), Van-Hoang Le (The University of Newcastle, Australia), Hongyu Zhang (Chongqing University, China), and Manh-Trung Le (Independent Researcher, Vietnam)	578
Anomaly Detection and Root Cause Analysis of Microservices Energy Consumption Maximilian Stefan Floroiu (Vrije Universiteit Amsterdam), Stefano Russo (Università di Napoli Federico II), Luca Giamattei (Università di Napoli Federico II), Antonio Guerriero (Università di Napoli Federico II), Ivano Malavolta (Vrije Universiteit Amsterdam), and Roberto Pietrantuono (Università di Napoli Federico II)	590

ICWS 13: Service Applications beyond the Web

Learning Dynamic Knowledge Graph Embedding in Evolving Service Ecosystems via Meta-Learning Hongliang Sun (Harbin Institute of Technology, China), Jinlan Liu (Harbin Institute of Technology, China), Can Wang (Harbin Institute of Technology, China), Dianbo Sui (Harbin Institute of Technology, China), Zhiying Tu (Harbin Institute of Technology, China), and Xiaofei Xu (Harbin Institute of Technology, China) Beyond Traditional Metrics: The Power of Value Entropy in Multidimensional Evaluation of	601
Beyond Traditional Metrics: The Power of Value Entropy in Multidimensional Evaluation of the Service Ecosystem	. 611
A Two-level Learning Approach for Achieving the Sustainable Development of Service Ecosystem Chao Peng (Tianjin University, China), Xiao Xue (Tianjin University, China), Xuwen Zhang (Tianjin University, China), Peilin Ji (Tianjin University, China), Yifan Shen (Tianjin University, China), Fang Li (Xi'an University of Finance and Economics, China), and Zhiyong Feng (Tianjin University, China)	622

ICWS 12: Service Applications beyond the Web

Timeliness-Selective Incentive Federated Crowdsourcing	532
Decentralized PKI Framework for Data Integrity in Spatial Crowdsourcing Drone Services	543
QoE-Aware Online Auction Mechanism for UAV-enabled Crowd-sensing	554

ICWS 14: Service Applications beyond the Web

Resource Aware Multi-User Task Offloading In Mobile Edge Computing	565
User Privacy-aware Computation Offloading in Mobile Edge Computing Systems Hongyue Wu (Tianjin University), Zhiwei Chen (Tianjin University), Shizhan Chen (Tianjin University), and ZhiYong Feng (Tianjin University)	576
Deep Reinforcement Learning based Reliability-aware Resource Placement and Task Offloading in Edge Computing	686

Petroleum, China), Ying Chen (Beijing Information Science and Technology University), Jiwei Huang (China University of Petroleum, China), and Hong-linh Truong (Aalto University)

ICWS 15: Service Applications beyond the Web

 Profit-Aware Task Allocation in Satellite Computing	696	
Moirai: Optimizing Quantum Serverless Function Orchestration via Device Allocation and Circuit Deployment	707	
A Novel Structured Task Scheduling Approach in Satellite Edge Computing Environments	'18	

ICWS 20: Services Security, Privacy and Trust

 Yunfei Luo (Tianjin University), Hongyue Wu (Tianjin University), Dandan Li (Tianjin University), Shizhan Chen (Tianjin University), and ZhiYong Feng (Tianjin University) Adaptive Clipping and Distillation Enabled Federated Unlearning Zhiqiang Xie (State Key Laboratory of Networking and Switching Technology, Beijing University of Posts and Telecommunications), Zhipeng Gao (State Key Laboratory of Networking and Switching Technology, Beijing University of Posts and Telecommunications), Zhipeng Gao (State Key Laboratory of Networking and Switching Technology, Beijing University of Posts and Telecommunications), Yijing Lin (State Key Laboratory of Networking and Switching 	. 728
Dandan Li (Tianjin University), Shizhan Chen (Tianjin University), and	. 737
Technology, Beijing University of Posts and Telecommunications), Zhipeng Gao (State Key Laboratory of Networking and Switching Technology, Beijing University of Posts and Telecommunications),	. 748

ICWS 16: Service Applications beyond the Web

Collect Fresh Data@Edge: with Freshness-Sensitive Server Placement & Traffic Management	
Strategies	. 757
Strategies Yimin Jiao (Hangzhou City University), Yue Yang (Hangzhou City University), Honghao Gao (Shanghai University), Dezhi Wang (Alibaba	
University), Honghao Gao (Shanghai University), Dezhi Wang (Alibaba	
Group), Zhengzhe Xiang (Hangzhou City University), and Yufei Zhang	
(Hangzhou City University)	
Flexible Shadow: Enhancing Service Reliability in Resource-Constrained Edge Computing	767
Lipei Yang (Beijing University of Posts and Telecommunications), Ao	
Zhou (Beijing University of Posts and Telecommunications), Xiao Ma	
(Beijing University of Posts and Telecommunications), Yiran Zhang	
(Beijing University of Posts and Telecommunications), Yuanzhe Li	
(Tsinghua University), and Shangguang Wang (Beijing University of	
Posts and Telecommunications)	

A Hybrid Method to Interest-informed and Mobility-aware Mobile Service Migration in Edge

omputing	778
mpating	//

Mengxuan Dai (College of Computer Science, Chongqing University, China), Yunni Xia (College of Computer Science, Chongqing University, China), Xu Wang (College of Mechanical and Vehicle, Chongqing University, China), Lei Yu (College of Computer Science, Inner Mongolia University, China), Xingli Zhong (CISDI RD co. Ltd Chongqing University, China), Hui Liu (School of Computer Science and Technology, Beijing Institute of Technology, China), Qing Xia (Chongqing Key Laboratory of Smart Electronics Reliability Technology, China), QingLan Peng (School of Artificial Intelligence, Henan University, China), Xiaoning Sun (School of Computer and Information Science, Chongqing Normal University; Yunnan Key Laboratory of Service Computing Yunnan University of Finance and Economics, China), and Jiajun Su (School of Digital Industry, Jiangxi Normal University, China)

ICWS 21: Generative AI in Web Services

OptLLM: Optimal Assignment of Queries to Large Language Models Yueyue Liu (The University of Newcastle), Hongyu Zhang (Chongqing University), Yuantian Miao (The University of Newcastle), Van-Hoang Le (University of Newcastle), and Zhiqiang Li (Shaanxi Normal University)	. 788
Edge-LLM: A Collaborative Framework for Large Language Model Serving in Edge Computing Fenglong Cai (Shandong University), Dong Yuan (University of Sydney), Zhe Yang (Shandong University), and Lizhen Cui (Shandong University)	. 799
LLM-MHR: A LLM-Augmented Multimodal Hashtag Recommendation Algorithm Zhijie Tan (Peking University), Yuzhi Li (Peking University), Xiang Yuan (Peking University), Shengwei Meng (Beijing University of Posts and Telecommunications), Weiping Li (Peking University), and Tong Mo (Peking University)	. 810

ICWS 17: Service Applications beyond the Web

 TEDC: Temporal-aware Edge Data Caching with Specified Latency Preference Guobing Zou (Shanghai University, China), Ya Liu (Tongji University, China; Shanghai University, China), Song Yang (Shanghai University, China), Shengxiang Hu (Shanghai University, China), Yanglan Gan (Donghua University, China), and Bofeng Zhang (Shanghai Polytechnic University, China) 	322
Bio-CEC: A Secure and Efficient Cloud-Edge Collaborative Biometrics System using	
Cancelable Biometrics	333
Xuefei Chen (Anhui University, Hefei, China), Xiao Liu (Deakin	
University, Geelong, Australia), Frank Jiang (Deakin University,	
Geelong, Australia), Aiting Yao (Anhui University, Hefei, China), Jia	
Xu (Anhui University, Hefei, China), Hui Zhang (Anhui University,	
Hefei, China), Xiang Wu (Anhui University, Hefei, China), and Xuejun	
Li (Anhui University, Hefei, China)	

ICWS 22: Generative AI in Web Services

Enabling Efficient Batch Serving for LMaaS via Generation Length Prediction	353
VELO: A Vector Database-Assisted Cloud-Edge Collaborative LLM QoS Optimization Framework . 865	

Zhi Yao (Beijing Normal University), Zhiqing Tang (Beijing Normal University), Jiong Lou (Shanghai Jiao Tong University), Ping Shen (Beijing Normal University), and Weijia Jia (Beijing Normal University)

LLM-powered Zero-shot Online Log Parsing 8	377
Chen Zhi (Zhejiang University, China), Liye Cheng (Zhejiang	
University, China), Meilin Liu (Zhejiang University, China), Xinkui	
Zhao (Zhejiang University, China), Yueshen Xu (Xidian University,	
China), and Shuiguang Deng (Zhejiang University, China)	

ICWS 18: Service Applications beyond the Web [IoT Services]

Multi-vision Services Acceleration Framework for IoT Devices Jianhang Xie (Beijing Jiaotong University, China), Chuntao Ding (Beijing Jiaotong University, China), Shenyuan Ren (Beijing Jiaotong University, China), and Yidong Li (Beijing Jiaotong University, China)	888
Dynamic Optimization for Trade-off in Hyperledger Fabric towards Latency-Sensitive IoT	
	. 899
Hao Ding (Harbin Institute of Technology), Xuefeng Piao (Harbin	
Institute of Technology), Yuxi Hong (Harbin Institute of Technology),	
Yizhou Liu (Harbin Institute of Technology), Huihui Song (Harbin	
Institute of Technology), Meng Liu (Electric Power Research	
Institute), and Song Gao (Electric Power Research Institute)	
Impact Conflict Detection of IoT Services in Multi-resident Smart Homes	910
Dipankar Chaki (The University of Sydney), Athman Bouguettaya (The	
University of Sydney), and Abdallah Lakhdari (The University of	
Sydney)	

ICWS 23: Services Composition

DDRM: Distributed Drone Reputation Management for Trust and Reliability in Crowdsourced Drone Services Junaid Akram (The University of Sydney) and Ali Anaissi (The University of Sydney)	. 921
ProSwats: A Proxy-based Scientific Workflow Retrieval Approach by Bridging the Gap between Textual and Structural Semantics Yang Gu (Shanghai Jiao Tong University, China), Jian Cao (Shanghai Jiao Tong University, China), Shiyou Qian (Shanghai Jiao Tong University, China), Nengjun Zhu (Shanghai University, China), and Wei Guan (Shanghai Jiao Tong University, China)	. 932
Is it Worth Migrating from Monolith to Microservices? An Experience Report on Performance, Availability and Energy Usage Vincent Berry (Polytech Engineering School, LIRMM Universite Montpellier, CNRS, France), Arnaud Castelltort (Polytech Engineering School, LIRMM Universite Montpellier, CNRS, France), Benoit Lange (INRIA & LIRMM, France), Joan Teriihoania (Polytech Engineering School Universite Montpellier, France; Lizard Global, The Netherlands), Chouki Tibermacine (Polytech Engineering School, LIRMM Universite Montpellier, CNRS, France), and Catia Trubiani (Gran Sasso Science Institute, Italy)	944

ICWS 19: Service Applications beyond the Web

Providing Sustainable Unmanned Facial Detection and Recognition Service on Edge	55
 FunLess: Functions-as-a-Service for Private Edge Cloud Systems	061
 Parallelism-Aware Service Function Chain Placement for Delay-sensitive IoT Applications with VNF Reuse in Mobile Edge Computing	68

ICWS 24: Machine Learning and AI in Service Systems

Efficient User Sequence Learning for Online Services via Compressed Graph Neural Networks 980 Yucheng Wu (Peking University, China), Liyue Chen (Peking University, China), Yu Cheng (Alipay (Hangzhou) Information & Technology Co. Ltd., China), Shuai Chen (Alipay (Hangzhou) Information & Technology Co. Ltd., China), Jinyu Xu (Alipay (Hangzhou) Information & Technology Co. Ltd., China), and Leye Wang (Peking University, China)

MT4SC: A User-Behavior-Sequence-Aware Metamorphic Testing Approach for Smart Contracts ... 992 Yuan-rui Ji (University of Science and Technology Beijing, China), Chang-ai Sun (University of Science and Technology Beijing, China), Xin-hui Zheng (University of Science and Technology Beijing, China), and Huai Liu (Swinburne University of Technology, Australia)

ICWS 25: Services QoS Management

SFSM: A Serverless Function Scheduling Method for FaaS Applications over Edge Computing 1015 Hao Tian (Nanjing University, China), Cheng Chen (Nanjing University, China), Fei Dai (Southwest Forestry University, China), and Wanchun Dou (Nanjing University, China)

ICWS 30: Service Adaptability and Management

Self-Adaptive Service Selection for Machine Learning Continuous Delivery)48
Mostafa Hadadian Nejad Yousefi (University of Groningen, The	
Netherlands), Victoria Degeler (University of Amsterdam, The	
Netherlands), and Alexander Lazovik (University of Groningen, The	
Netherlands)	
Information Diffusion Prediction Based on User Behavior Characteristics)57
Hongyun Cai (Hebei University, China), Ao Zhao (Hebei University,	
China), Chuan Feng (Hebei University, China), and Xun Li (Hebei	
University, China)	

ICWS 26: Services QoS Management

Less: Large-scale Workload Forecasting Model Based on Multiple Sequence Compression 1078 Zeyuan Ding (Shaanxi Normal University, China), Binbin Feng (Tongji University, China), Wangyang Yu (Shaanxi Normal University, China), and Bolan Zhang (Shaanxi Normal University, China)

Optimized MARL for Latency-Sensitive Collaborative Service Placement in Edge Computing 1089 Guoqiang Liu (Nanjing University of Information Science and Technology), Xiaolong Xu (Nanjing University of Information Science and Technology), Xiyuan Xu (Nanjing University of Information Science and Technology), Xinyue Ji (Nanjing University of Information Science and Technology), Lianyong Qi (China University of Petroleum (East China)), and Xuyun Zhang (Macquarie University)

ICWS 31: Hybrid

LogRAG: Semi-Supervised Log-based Anomaly Detection with Retrieval-Augmented Generation 1100

Wanhao Zhang (Tsinghua University), Qianli Zhang (Zhongguancun Laboratory, Tsinghua University), Enyu Yu (Advance Computing and Storage Lab, Huawei Technologies), Yuxiang Ren (Advance Computing and Storage Lab, Huawei Technologies), Yeqing Meng (Tsinghua University), Mingxi Qiu (Tsinghua University), and Jilong Wang (Zhongguancun Laboratory, Tsinghua University)
 Mitigating the Data Communication Overhead in Microservice-based Data-intensive Systems 1103 Puwei Wang (Renmin University of China, China), Ruiheng Liu (Renmin University of China, China), Bo Liu (Renmin University of China, China), Keman Huang (Renmin University of China, China), and Xiaoyong Du (Renmin University of China, China)
Adaptive Selecting Algorithm for Runtime Types of Microservices
A Framework for QoS of Integration Testing in Satellite Edge Clouds
 ServiceCoder: A Service Computing Code Generation Model

ICWS 27: Services Composition

COMB: Interconnected Transformers-Based Autoencoder for Multi-Perspective Business Process Anomaly Detection	.5
 MDD: Process Drift Detection in Event Logs Integrating Multiple Perspectives	:5
 F2C2T: A Freeze-Free Cross-chain Transfer Consistency Guarantee Mechanism for Data Asset with Associations	\$5

ICWS 32: Services Security, Privacy and Trust

FedPartial: Enabling Model-Heterogeneous Federated Learning via Partial Model Transmission and Aggregation Changkun Jiang (Shenzhen University, China), Jiahao Chen (Shenzhen University, China), Lin Gao (Harbin Institute of Technology (Shenzhen), China), and Jianqiang Li (Shenzhen University, China)	. 1145
A novel backdoor scenario target the vulnerability of Prompt-as-a-Service for code intelligence models	1153
FuzzFabric: A Scalable Grey-box Fuzzing Framework for Polymorphic Network Services Bo Yu (College of Computer Science and Technology, National University of Defense Technology) and Lei Zhou (College of Computer Science and	1161

Technology, National University of Defense Technology	Technology,	National	University	of Defense	Technology
---	-------------	----------	------------	------------	------------

ICWS Symposium on Graph Data Mining for Services

Transformer-based Graph Neural Networks for Battery Range Prediction in AIoT Battery-Swap Services Zhao Li (Hangzhou Yugu Technology Co., Ltd), Yang Liu (Chinese Academy of Sciences), Chuan Zhou (Chinese Academy of Sciences), Xuanvu Liu (Hangzhou Yugu Technology Co., Ltd), Xuming Pan (Hangzhou Yugu Technology Co., Ltd), Buqing Cao (Hunan University of Science and Technology), and Xindong Wu (Hefei University of Technology)	1168
The Open Story Model (OSM): Transforming Big Data into Interactive Narratives Fariba Lotfi (Macquarie University, Australia and Sharif University of Technology, Iran), Amin Beheshti (Macquarie University, Australia), Mansour Jamzad (Sharif University of Technology, Iran), Hamid Beigy (Sharif University of Technology, Iran), Jia Wu (Macquarie University, Australia), and Philip S. Yu (University of Illinois Chicago, United States)	1177
Graph Anomaly Detection in Programmable Logic Controllers Based on Service Computing Huifeng Wu (Key Laboratory of Discrete Industrial Internet of Things of Zhejiang Province Hangzhou, China), Junjie Hu (Key Laboratory of Discrete Industrial Internet of Things of Zhejiang Province Hangzhou, China), Xi Tian (Key Laboratory of Discrete Industrial Internet of Things of Zhejiang Province Hangzhou, China), Zeyun Xiao (Key Laboratory of Discrete Industrial Internet of Things of Zhejiang Province Hangzhou, China), Danfeng Sun (Key Laboratory of Discrete Industrial Internet of Things of Zhejiang Province Hangzhou, China), and Rene Simon (Harz University of Applied Sciences, Germany)	. 1188

ICWS 28: Services Composition

A Debiased Graph Clustering Approach Using Dual Contrastive Learning	1198
"How Can I Be of Service?"A Comprehensive Analysis of Web Service Integration	
Practices Siddhi Baravkar (University of Michigan at Dearborn), Olivia Pellegrini (University of Michigan at Dearborn), Pratiksha Gaikwad (University of Michigan at Dearborn), Eli Tilevich (Virginia Tech), and Zheng Song (University of Michigan at Dearborn)	1206
VPCS: Verifiable Query Scheme for Privacy-preserving Constrained Shortest Path over	
Encrypted Graph Data Shiyun He (Guizhou University of Finance and Economics, China), Hongfa Ding (Guizhou University of Finance and Economics, China), Tian Tian (Guizhou University of Finance and Economics, China), Hai Liu (Guizhou University of Finance and Economics, China), and Heling Jiang (Guizhou University of Finance and Economics, China)	1217
Edge-Mapping of Service Function Trees for Sensor Event Processing Babar Shahzaad (Queensland University of Technology, Australia), Alistair Barros (Queensland University of Technology, Australia), and Colin Fidge (Queensland University of Technology, Australia)	1227
ICWS 33: Services Optimization	
Signal-Based Approach for Reliable Drone Swarm Delivery Balsam Alkouz (The University of Sydney), Athman Bouguettaya (The University of Sydney), Abdallah Lakhdari (The University of Sydney), and Sami Yangui (LAAS-CNRS, Université de Toulouse)	1238
A Self-organizing Collaborative Crowdsourcing Framework for Improving Service Utility Shipeng Wang (Shandong University, China), Qingzhong Li (Shandong University, China), Xudong Lu (Shandong University, China), and Lizhen Cui (Shandong University, China)	1245
FlowRCA: Enhancing Microservice Reliability with Non-invasive Root Cause Analysis Zhikang Wu (Beijing University of Posts and Telecommunications, China)	1251
 Scalable Complex Scene Understanding for Edge Computing Nanxi Chen (Shanghai Institute of Microsystems and Information Technology, Chinese Academy of Sciences), Lili Liu (Shanghai Institute of Microsystems and Information Technology, Chinese Academy of Sciences), Xu Wang (Shanghai Institute of Microsystems and Information Technology, Chinese Academy of Sciences), Jiamao Li (Shanghai Institute of Microsystems and Information Technology, Chinese Academy of Sciences), and Xiaolin Zhang (Shanghai Institute of Microsystems 	1259

and Information Technology, Chinese Academy of Sciences)

ICWS 29: Services Security, Privacy and Trust

Spherical Projection Based Clustering Algorithm for Cooperative Sweep Coverage in Crowdsourcing	1266
Length Controllable Model for Images and Texts Summarization Yu Weng (Minzu University of China), Xiangyu Qu (Minzu University of China), Xuan Liu (Minzu University of China), Xuming Ye (Minzu University of China), Zheng Liu (Minzu University of China), and Guixian Xu (Minzu University of China)	1273
MeDiC: Metasearch Service on Distributed Confidential Data Wenchun Jing (National Key Laboratory of Data Space Technology and System, China), Jingru Yang (National Key Laboratory of Data Space Technology and System, China), Yun Ma (Peking University, China), Yi Liu (Advanced Institute of Big Data, Beijng, China), and Chaoran Luo (National Key Laboratory of Data Space Technology and System, China)	1279

ICWS 34: Services Security, Privacy and Trust

A Node Type and Logs Combination-based Recommendations for Business Process Modeling 1286 Yanpan Pei (Tongji University, China), Yuanyuan Zhou (Tongji University, China), Qingyuan Wang (Shanghai University, China), Sheng He (Kingdee Research, Kingdee International Software Group Co., Ltd, China), Yishuang Ning (Kingdee Research, Kingdee International Software Group Co., Ltd, China), and Zhijun Ding (Tongji University, China; Shanghai Artificial Intelligence Laboratory, China)
QueueFlower: Orchestrating Microservice Workflows via Dynamic Queue Balancing
Road Network Enhanced Traffic Flow Prediction Service

Yusheng Mei (North China University of Technology, China) and Zhuofeng Zhao (North China University of Technology, China)

ICWS 35: Generative AI in Web Services

PLANCK: Optimizing LLM Inference Performance in Pipeline Parallelism with Fine-Grained SLO Constraint
VAIDE: Virtual AI Designer for Web3D Exhibition Layout Creation
LogGenius: An Unsupervised Log Parsing Framework with Zero-shot Prompt Engineering 1321 Xian Yu (Computer Network Information Center, China), Shengxi Nong (Harbin Institute of Technology, Shenzhen), Dongbiao He (Sangfor Technologies Inc.), Weijie Zheng (Harbin Institute of Technology, Shenzhen), Teng Ma (Tsinghua University), Ning Liu (School of Software, Shandong University), Jianhui Li (Computer Network Information Center, China), and Gaogang Xie (Computer Network Information Center, China)
Harnessing GPT for Data Transformation Tasks
ICWS 36: Hybrid
Dynamic Provisioning of REST APIs for Model Management
CertRV: an Efficient Certificate Revocation Scheme via Consortium Blockchain, Chameleon Hash and Cuckoo Filter

 DPPR: A Dynamic, Privacy-Preserving Scheme for Reputation-Based Blockchain
EDSS: An Exemplar Dataset Search Service over Encrypted Spatial Datasets
HiDRA: A Hierarchical Decentralized Reactive Autoscaler for Spatio-temporal Bursts of Load 1347 EunChan Park (Korea Advanced Institute of Science and Technology), KyeongDeok Baek (Korea Advanced Institute of Science and Technology), and In-Young Ko (Korea Advanced Institute of Science and Technology)
Multi-interest Awareness Model for Session-based Recommendation

ICWS 37: Service Recommendation & Classification & Prediction

QoS Prediction Method via Multi-Task Learning for Web Service Recommendation
HyLoReF: A Reputation Based QoS Prediction Framework using Hybrid Location Information 1356 Xia Chen (East China Normal University), Yugen Du (East China Normal University), Fan Chen (East China Normal University), Hanting Wang (East China Normal University), Yingwei Luo (East China Normal University), Benchi Ma (East China Normal University), and Guoxing Tang (East China Normal University)
 Wind-Aware Service Provision Strategy for Multi-package Drone Delivery
 How "Like-minded Peers" Enhanced Session-Based Social Recommendation

Studying timed aspects for cloud configuration management tools: validation and	
recommendations for safe execution	365
Evgenii Vinarskii (SAMOVAR, Télécom SudParis / Institut Polytechnique	
de Paris), Natalia Kushik (SAMOVAR, Télécom SudParis / Institut	
Polytechnique de Paris), and Djamal Zeghlache (SAMOVAR, Télécom	
SudParis / Institut Polytechnique de Paris)	
ADSE: Adversarial Debiasing Framework Based on Sinusoidal Embedding for Sequential	
Recommendation	368
Qifeng Bai (Guangdong University of Technology, China), Nankai Lin	
(Guangdong University of Technology, China), Junheng He (Guangdong	
University of Technology, China), Zhijin Chen (Guangdong University of	
Technology, China), Dong Zhou (Guangdong University of Foreign	
Studies, China), and Aimin Yang (Lingnan Normal University, China)	

ICWS 38: Services Security, Privacy and Trust

Personalized Privacy Protection Incentive Mechanism for Mobile Crowdsourcing Based on Homomorphic Encryption and Edge Computing
Non-Subjective Trust Mechanism for Online Ride-Hailing Services
Privacy-Preserving Cross-Organization Process Mining Based on Blockchain and Cryptography . 1384 Shuaipeng Zhang (Shandong University, China), Lanju Kong (Shandong University, China), Yongqing Zheng (Shandong University, China), Cong Liu (Shandong University of Technology, China), and Lizhen Cui (Shandong University, China)
 EclipseFortify: Imperceptible Shuffle-Based Moving Target Defense for Budget-Friendly Web Service DDoS Protection

ICWS 39: Services Security, Privacy and Trust

JointFlow: Optimizing Service Deployment for Large-Scale Model Workflows in JointCloud 1397 Rui Li (National University of Defense Technology, China), Peichang Shi (National University of Defense Technology, China), Huaimin Wang (National University of Defense Technology, China), and Shuen Cheng (National University of Defense Technology, China)

HMUR: A Two-Stage Heuristic for UAV Scheduling in Mobile Edge Computing with Time Window Constraints
Guangrui Liu (Southeast University), Xia Zhu (Southeast University), Long Chen (Southeast University), and Xin Li (Southeast University)
Anomaly Detection Service for Sensor Stream Data based on Lag-correlation Analysis
A Blockchain-based Service for Public Sector Governance
GasTrace: Detecting Sandwich Attack Malicious Accounts in Ethereum

Author Index