

# **2023 IEEE International Conference on Joint Cloud Computing (JCC 2023)**

**Athens, Greece  
17-20 July 2023**



**IEEE Catalog Number: CFP23W31-POD  
ISBN: 979-8-3503-2856-1**

**Copyright © 2023 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:    | CFP23W31-POD      |
| ISBN (Print-On-Demand): | 979-8-3503-2856-1 |
| ISBN (Online):          | 979-8-3503-2855-4 |

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# 2023 IEEE International Conference on Joint Cloud Computing (JCC) JCC 2023

## Table of Contents

Committees ..... viii

### Invited Paper

OLM2: Automatic Optimal Strategy Generating for Large-Scale Model Training with Limited-Memory ..... 1  
*Zhilin Yang (National University of Defense Technology, China), Yu Tang (National University of Defense Technology, China), Linbo Qiao (National University of Defense Technology, China), Xi Yang (National University of Defense Technology, China), and Zhen Huang (National University of Defense Technology, China)*

### Session 1 (JCC01): ML in Joint Cloud Computing

Bi-level Multi-agent Actor-Critic Methods with Transformers ..... 9  
*Tianjiao Wan (National University of Defense Technology, China), Haibo Mi (National University of Defense Technology, China), Zijian Gao (National University of Defense Technology, China), Yuanzhao Zhai (National University of Defense Technology, China), Bo Ding (National University of Defense Technology, China), and Dawei Feng (National University of Defense Technology, China)*

An Empirical Study on the Structure Evolution of Deep Learning Models: Taking SAR Image Processing a Case Study ..... 17  
*Huanxi Liu (National University of Defense Technology, China), Xiang He (National University of Defense Technology, China), Dawei Feng (National University of Defense Technology, China), and Han Bao (National University of Defense Technology, China)*

FedH2L: A Federated Learning Approach with Model and Statistical Heterogeneity ..... 25  
*Yiyang Li (Artificial Intelligence Research Center, DII, Academy of Military Sciences, China), Wei Zhou (China Xi'an Satellite Control Center, China), Haibo Mi (National University of Defense Technology, China), Yijie Wang (National University of Defense Technology, China), and Huaimin Wang (National University of Defense Technology, China)*

Filtering Alerts on Cloud Monitoring Systems ..... 34  
*Fotios Voutsas (Netdata Inc., USA), John Violos (École de Technologie Supérieure, Canada), and Aris Leivadeas (École de Technologie Supérieure, Canada)*

|  |    |
|--|----|
| MDP: Privacy-Preserving GNN Based on Matrix Decomposition and Differential Privacy .....   | 38 |
| <i>Wanghan Xu (Xi'an Jiaotong University, China), Bin Shi (Xi'an Jiaotong University, China), Jiqiang Zhang (Xi'an Jiaotong University, China), Zhiyuan Feng (Xi'an Jiaotong University, China), Tianze Pan (Xi'an Jiaotong University, China), and Bo Dong (Xi'an Jiaotong University, China)</i> |    |
| Scout: An Efficient Federated Learning Client Selection Algorithm Driven by Heterogeneous Data and Resource .....  | 46 |
| <i>Ruilin Zhang (Tsinghua University, China), Zhenan Xu (Tsinghua University, China), and Hao Yin (Tsinghua University, China)</i>   |    |

## Session 2 (JCC02): Resilience in Joint Cloud Computing

|   |    |
|---|----|
| Fault Tolerance of Stateful Microservices for Industrial Edge Scenarios .....   | 50 |
| <i>Yuke Jia (Beihang University, China), Tiejun Wang (Beihang University, China), Tianbo Qiu (Beihang University, China), Xiaohan Zhang (Beihang University, China), Rui Wang (Beihang University, China), and Tianyu Wo (Beihang University, China)</i>  |    |
| A Parallel Memory Defect Detection Method Based on Sparse-Value-Flow Graph .....  | 57 |
| <i>Rulin Xu (National University of Defense Technology, China), Xiaoguang Mao (National University of Defense Technology, China), Luohui Chen (National University of Defense Technology, China), and Yue Yu (National University of Defense Technology, China)</i>   |    |
| Crop Enclave Interface for SGX Programs .....   | 66 |
| <i>Yaqi Fan (State Key Laboratory of Mathematical Engineering and Advanced Computing, China), Zhifeng Chen (State Key Laboratory of Mathematical Engineering and Advanced Computing, China), Qingbao Li (State Key Laboratory of Mathematical Engineering and Advanced Computing, China), and Wenbo Deng (State Key Laboratory of Mathematical Engineering and Advanced Computing, China)</i> |    |

## Session 3 (JCC03): Resource management optimization

|  |    |
|--|----|
| Optimization Strategies for Data Placement in Satellite Cloud-Oriented Distributed File Systems .....  | 70 |
| <i>Ying Zhang (Beihang University), Tianyu Wo (Beihang University), Kun Fan (Beihang University), Tianyu Ye (Beihang University), Jiwei Zhang (Beihang University), Junhua Zhang (Beihang University), and Xiao Feng (China Electronics Technology Taiji Group Corporation Limited, China)</i> |    |
| Predictive Disk Provisioning for Adjustable Cloud Storage Solutions .....  | 78 |
| <i>Xuerong Wan (University of Delaware, USA) and Stephan Bohacek (University of Delaware, USA)</i>   |    |
| HyCU: Hybrid Consistent Update for Software Defined Network .....  | 86 |
| <i>Xudong Mou (Beihang University, China), Jie Sun (Zhongguancun Laboratory, China), Yingying Zhong (Gusu Laboratory of Materials, China), and Tianyu Wo (Beihang University, China)</i>   |    |

## Posters

|   |           |
|---|-----------|
| FCloudless: A Performance-Aware Collaborative Mechanism for JointCloud Serverless .....   | 93        |
| <i>Jianfei Liu (National University of Defense Technology, China),<br/>Huaimin Wang (National University of Defense Technology, China),<br/>Peichang Shi (National University of Defense Technology, China),<br/>Yaojie Li (National University of Defense Technology, China), Penghui<br/>Ma (National University of Defense Technology, China), and Guodong Yi<br/>(Xiangjiang Lab; Hunan University Of Technology and Business, China)</i> |           |
| Secure and Efficient Runtime Environment for Smart Contracts on JointCloud .....  | 95        |
| <i>Yuhao Xue (Shanghai Jiao Tong University, China), Dong Du (Shanghai<br/>Jiao Tong University, China), Lei Zhang (Nanhu Laboratory, China), and<br/>Yubin Xia (Shanghai Jiao Tong University, China)</i>  |           |
| <b>Author Index .....</b>   | <b>97</b> |