

2022 IEEE International Conference on Joint Cloud Computing (JCC 2022)

**Fremont, California, USA
15 – 18 August 2022**



**IEEE Catalog Number: CFP22W31-POD
ISBN: 978-1-6654-6286-0**

**Copyright © 2022 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: | CFP22W31-POD |
| ISBN (Print-On-Demand): | 978-1-6654-6286-0 |
| ISBN (Online): | 978-1-6654-6285-3 |

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

CURRAN ASSOCIATES INC.
proceedings
.com

2022 IEEE International Conference on Joint Cloud Computing (JCC) JCC 2022

Table of Contents

| | |
|--|------|
| Welcome Message from the General Chairs of IEEE JCC 2022 | viii |
| Welcome Message from the TPC Chairs of IEEE JCC 2022 | ix |
| JCC 2022 Organizers | x |

2022 IEEE International Conference on Joint Cloud Computing (JCC)

| | |
|--|----|
| Uncertainty Estimation based Intrinsic Reward for Efficient Reinforcement Learning | 1 |
| <i>Chao Chen (National University of Defense Technology, China), Tianjiao Wan (National University of Defense Technology, China), Peichang Shi (National University of Defense Technology, China), Bo Ding (National University of Defense Technology, China), Zijian Gao (National University of Defense Technology, China), and Dawei Feng (National University of Defense Technology, China)</i> | |
| Resource Usage Prediction Based on BILSTM-GRU Combination Model | 9 |
| <i>Xueting Li (Shenyang Institute of Computing Technology Chinese Academy of Sciences, University of Chinese Academy of Sciences), Hongliang Wang (Shenyang Institute of Computing Technology Chinese Academy of Sciences, University of Chinese Academy of Sciences, Liaoning Province Human-Computer Interaction System Engineering Research Center Based on Digital Twin), Pengfei Xiu (Shenyang Institute of Computing Technology Chinese Academy of Sciences, University of Chinese Academy of Sciences, Liaoning Province Human-Computer Interaction System Engineering Research Center Based on Digital Twin), Xingyu Zhou (Shenyang Institute of Computing Technology Chinese Academy of Sciences, Liaoning Province Human-Computer Interaction System Engineering Research Center Based on Digital Twin), and Fanhua Meng (Shenyang Institute of Computing Technology Chinese Academy of Sciences, Liaoning Province Human-Computer Interaction System Engineering Research Center Based on Digital Twin)</i> | |
| MicroStream: A Distributed In-memory Caching Service for Data Production | 17 |
| <i>Mingming Zhang (Zhejiang University, China), Yunjun Gao (Zhejiang University, China), Chuan He (Advanced Institute of Information Technology, China), and Tianyu Tan (Northeastern University, USA)</i> | |
| Threshold Based Load Balancing Algorithm in Cloud Computing | 23 |
| <i>Shusmoy Chowdhury (Missouri State University) and Ajay Katangur (Missouri State University)</i> | |

| | |
|--|----|
| A Query-Level Distributed Database Tuning System with Machine Learning | 29 |
| <i>Xiang Fang (Institute of Software, Chinese Academy of Sciences; University of Chinese Academy of Sciences), Yi Zou (Institute of Software, Chinese Academy of Sciences; University of Chinese Academy of Sciences), Yange Fang (Institute of Software, Chinese Academy of Sciences), Zhen Tang (Institute of Software, Chinese Academy of Sciences), Hui Li (Institute of Software, Chinese Academy of Sciences), and Wei Wang (Institute of Software, Chinese Academy of Sciences; University of Chinese Academy of Sciences; Nanjing Institute of Software Technology; University of Chinese Academy of Sciences Nanjing College)</i> | |
| Improving Scalability of Multi-agent Reinforcement Learning with Parameters Sharing | 37 |
| <i>Ning Yang (National University of Defense Technology, China), Peichang Shi (National University of Defense Technology, China), Bo Ding (National University of Defense Technology, China), and Dawei Feng (National University of Defense Technology, China)</i> | |
| MRASS: Dynamic Task Scheduling enabled High Multi-cluster Resource Availability in JointCloud | 43 |
| <i>Fei Gao (National University of Defense Technology, China), Huaimin Wang (National University of Defense Technology, China), Peichang Shi (National University of Defense Technology, China), Xiang Fu (National University of Defense Technology, China), Tao Zhong (National University of Defense Technology, China), and Jinzhu Kong (Kylin Software Co.LTD, China; Zhejiang Lab, China)</i> | |
| FSS: A Flexible Scaling Scheme for Blockchain Based on Stale Block Rate | 51 |
| <i>Ming Chen (National University of Defense Technology, China), Peichang Shi (National University of Defense Technology, China), Xiang Fu (National University of Defense Technology, China), Feng Jiang (National University of Defense Technology, China), Fei Gao (National University of Defense Technology, China), Penghui Ma (National University of Defense Technology, China), and Jinzhu Kong (Kylin Software Co.LTD, China; Zhejiang Lab, China)</i> | |
| Two-stage Scheduling of Stream Computing for Industrial Cloud-Edge Collaboration | 57 |
| <i>Tiejun Wang (Beihang University), Xudong Mou (Hangzhou Innovation Institute), Juntao Hu (Beihang University), Rui Wang (Beihang University), and Tianyu Wo (Beihang University)</i> | |
| ProxyDWRR: A Dynamic Load Balancing Approach for Heterogeneous-CPU Kubernetes Clusters .. | 65 |
| <i>Qingkun Wang (National University of Defense Technology, China), Yi Ren (National University of Defense Technology, China), Saqing Yang (National University of Defense Technology, China), Jianbo Guan (National University of Defense Technology, China), Bao Li (National University of Defense Technology, China), Jianfeng Zhang (National University of Defense Technology, China), and Yusong Tan (National University of Defense Technology, China)</i> | |
| An Automatic Scaling System for Online Application with Microservices Architecture | 73 |
| <i>Youmei Song (Beihang University), Chaoran Li (Beihang University), Kuoran Zhuang (Beihang University), Tianjiao Ma (Beihang University), and Tianyu Wo (Beihang University)</i> | |

Towards a Secure Joint Cloud with Confidential Computing 79
Xuyang Zhao (The Institute of Parallel and Distributed Systems (IPADS), China), Mingyu Li (The Institute of Parallel and Distributed Systems (IPADS), China), Erhu Feng (The Institute of Parallel and Distributed Systems (IPADS), China), and Yubin Xia (The Institute of Parallel and Distributed Systems (IPADS), China)

Author Index 89