

# **2022 CCF International Conference on Service Science (CCF ICSS 2022)**

**Zhuhai, China  
13-15 May 2022**



**IEEE Catalog Number: CFP2255J-POD  
ISBN: 978-1-6654-9862-3**

**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:	CFP2255J-POD
ISBN (Print-On-Demand):	978-1-6654-9862-3
ISBN (Online):	978-1-6654-9861-6

**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

# 2022 CCF International Conference on Service Science (CCF ICSS) CCF ICSS 2022

## Table of Contents

Message from the Program Chairs .....	xii
Organizing Committee .....	xiii
Technical Program Committee .....	xv
Steering Committee .....	xix
Sponsors .....	xx

### Research on Service Ecosystem and Its Evolution

Congestion Detection and Link Control via Feedback in RDMA Transmission .....	1
<i>Tianshi Wang (Beijing University of Posts and Telecommunications, China), Hongwei Kan (Guangdong Inspur Intelligent Computing Technology Co., Ltd, China), Qibo Sun (Beijing University of Posts and Telecommunications, China), Shan Xiao (Fiberhome Telecommunication Technologies Co., LTD, China), and Shangguang Wang (Beijing University of Posts and Telecommunications, China)</i>	
A Non-Standardized Chinese Express Delivery Address Identification Model Based on Enhanced Representation .....	5
<i>Zi Ye (Harbin Institute of Technology, China), Xuefeng Piao (Harbin Institute of Technology, China), Fanchao Meng (Harbin Institute of Technology, China), Bo Cao (Harbin Institute of Technology, China), and Dianhui Chu (Harbin Institute of Technology, China)</i>	
An Open-Source Repository Retrieval Service Using Functional Semantics for Software Developers .....	12
<i>Jiawei Wu (Peking University, China), Yanchun Sun (Peking University, China), and Jiaqi Zhang (Peking University, China)</i>	
The Processing Method of the Message Based on the In-Band Network Telemetry Technology .....	21
<i>Congcong Min (Guangdong Communications and Networks Institute, China), Dongcheng Zhao (Guangdong Communications and Networks Institute, China), and Hua Lu (Guangdong Communications and Networks Institute, China)</i>	
A Study on Sentiment Analysis for Smart Tourism .....	25
<i>Zhiwei Ma (Hainan University, China), Chunyang Ye (Hainan University, China), and Hui Zhou (Hainan University, China)</i>	

## Blockchain Technology and Applications

Ring-Overlap: A Storage Scaling Mechanism For Consortium Blockchain .....	33
<i>Wenxuan Liu (Yantai University, China), Donghong Zhang (Yantai University, China), and Jindong Zhao (Yantai University, China)</i>	
Security Evaluation of Smart Contracts Based on Code and Transaction - A Survey .....	41
<i>Jianzhong Su (Sun Yat-sen University, China), Jiyi Liu (Taiyuan University of Technology, China), Yuhong Nan (Sun Yat-sen University, China), and Yin Li (Institute of Software Application Technology, China)</i>	
A Worker Selection Scheme for Vehicle Crowdsourcing Blockchain .....	49
<i>Xinran Ma (Qingdao University of Science and Technology, China), Shulin Sun (Qingdao University of Science and Technology, China), Zehua Liu (Qingdao University of Science and Technology, China), and Lijun Sun (Qingdao University of Science and Technology, China)</i>	
Fast Probabilistic Consensus Protocol (FPC) Under Different Network Topologies .....	57
<i>Fu Chen (Central University of Finance and Economics, China), Huizhu Li (Central University of Finance and Economics, China), Zhiyuan Sui (Central University of Finance and Economics, China), Kun Liu (Central University of Finance and Economics, China), and Wenying Tang (Central University of Finance and Economics, China)</i>	

## Service-Based Integration of IoT and Business Processes

A Short Survey on Inductive Biased Graph Neural Networks .....	64
<i>Yuqi Zhang (Auckland University of Technology, New Zealand), Nancy Wang (Auckland University of Technology, New Zealand), Jian Yu (Auckland University of Technology, New Zealand), Sira Yongchareon (Auckland University of Technology, New Zealand), and Mo Nguyen (Auckland University of Technology, New Zealand)</i>	
Service-Based Event Penetration from IoT Sensors to Businesses: a Case Study .....	72
<i>Guiling Wang (Beijing Key Laboratory on Integration and Analysis of Large-scale Stream Data, China; North China University of Technology, China), Jun Fang (Beijing Key Laboratory on Integration and Analysis of Large-scale Stream Data, China; North China University of Technology, China), Jing Wang (Beijing Key Laboratory on Integration and Analysis of Large-scale Stream Data, China; North China University of Technology, China), Jian Yu (Auckland University of Technology, New Zealand), Liang Zhang (Fudan University, China; Shanghai Key Laboratory of Data Science, China; Shanghai Institute of Intelligent Electronics &amp; Systems, China), and Yanbo Han (Beijing Key Laboratory on Integration and Analysis of Large-scale Stream Data, China; North China University of Technology, China)</i>	
On the Uncertainty in IoT-Enabled Business Processes Using Artificial Intelligence Components .....	80
<i>Marc Hesenius (University of Duisburg-Essen, Germany), Nils Schwenzfeier (University of Duisburg-Essen, Germany), Ole Meyer (University of Duisburg-Essen, Germany), and Volker Gruhn (University of Duisburg-Essen, Germany)</i>	

IoTDM4BPMN: An IoT-Enhanced Decision Making Framework for BPMN 2.0 .....	88
<i>Yusuf Kirikkayis (Ulm University, Germany), Florian Gallik (Ulm University, Germany), and Manfred Reichert (Ulm University, Germany)</i>	
Modeling, Executing and Monitoring IoT-Aware Processes with BPM Technology .....	96
<i>Florian Gallik (Ulm University, Germany), Yusuf Kirikkayis (Ulm University, Germany), and Manfred Reichert (Ulm University, Germany)</i>	
Generalizing STNU to Model Non-Functional Constraints for Business Processes .....	104
<i>Jun Peng (Fudan University, China), Jingwei Zhu (Fudan University, China), and Liang Zhang (Fudan University, China)</i>	

## Technologies for Computing Force Network Service

Multifunctional Module Design Based on Hybrid CMOS-Memristor Logic Circuit .....	112
<i>Chao Ji (State Key Laboratory of High-End Server &amp; Storage Technology; Shandong Inspur Artificial Intelligence Research Institute Co., Ltd, China), Tuo Li (State Key Laboratory of High-End Server &amp; Storage Technology; Shandong Inspur Artificial Intelligence Research Institute Co., Ltd, China), and Xiaofeng Zou (State Key Laboratory of High-End Server &amp; Storage Technology; Shandong Inspur Artificial Intelligence Research Institute Co., Ltd, China)</i>	
Multi-Granularity Decomposition Based Task Scheduling for Migration Cost Minimization .....	117
<i>Ziliang Wang (Beijing University of Posts and Telecommunications, China), Tingting Zhang (China Mobile Research Institute, China), Ying Li (China Mobile Research Institute, China), Sheng Wang (China Mobile Research Institute, China), Fanqin Zhou (Beijing University of Posts and Telecommunications, China), Lei Feng (Beijing University of Posts and Telecommunications, China), and Wenjing Li (Beijing University of Posts and Telecommunications, China)</i>	
Service Information Informing in Computing Aware Networking .....	125
<i>Zongpeng Du (China Mobile Research Institute, China), Zhiqiang Li (China Mobile Research Institute, China), Xiaodong Duan (China Mobile Research Institute, China), and Jing Wang (China Mobile Research Institute, China)</i>	
Mobile Computing Force Network (MCFN): Computing and Network Convergence Supporting Integrated Communication Service .....	131
<i>Xiaonan Shi (China Mobile Research Institute, China), Qin Li (China Mobile Research Institute, China), Dan Wang (China Mobile Research Institute, China), and Lu Lu (China Mobile Research Institute, China)</i>	
A Computing-Aware Routing Protocol for Computing Force Network .....	137
<i>Huijuan Yao (China Mobile Research Institute, China), Xiaodong Duan (China Mobile Research Institute, China), and Yuexia Fu (China Mobile Research Institute, China)</i>	

Base Station Computing Force Resource Load Balancing Strategy for Distributed Machine Learning .....	142
<i>Mingkang Song (China United Communications Co., Ltd., China), Mengke Yao (China United Communications Co., Ltd., China), Xiaobin Wang (China United Communications Co., Ltd., China), Jianming Zhou (China United Communications Co., Ltd., China), Tenghui Ke (China United Communications Co., Ltd., China), Peng Dai (China United Communications Co., Ltd., China), Weidong Li (China United Communications Co., Ltd., China), and Xiaolong Zhou (China United Communications Co., Ltd., China)</i>	
Optimization of Service Scheduling in Computing Force Network .....	147
<i>Yongqiang Dong (Southeast University, China), Chenchen Guan (Southeast University, China), Yunli Chen (Southeast University, China), Kun Gao (Southeast University, China), Lu Lu (China mobile Research Institute, China), and Yuexia Fu (China mobile Research Institute, China)</i>	
Automatic Scheduling Technology of Computing Power Network Driven by Knowledge Graph ...	154
<i>Yanheng Bi (Harbin Institute of Technology, China), Yingchi Long (Harbin Institute of Technology, China), Yanzheng Jin (Harbin Institute of Technology, China), Shengwen Zheng (Harbin Institute of Technology, China), Huaiyuan Liu (Harbin Institute of Technology, China), and Hongzhi Wang (Harbin Institute of Technology, China)</i>	

## Service Scheduling and Management

Overbooking-Enabled Virtual Machine Deployment Approach in Mobile Edge Computing .....	161
<i>Bingyi Hu (Henan Polytechnic University, China), Jixun Gao (Henan Polytechnic University, China; Henan University of Engineering, China), Quanzhen Huang (Henan University of Engineering, China), Huaichen Wang (Anyang Normal University, China), Yanxin Hu (Anyang Normal University, China), Jialei Liu (Anyang Normal University, China), and Yanmin Ge (Anyang Institute of Science and Technology Information, China)</i>	
Cache Replacement Algorithm Based on Dynamic Constraints in Microservice Platform .....	167
<i>Liwen Li (Hainan University, China), Chunyang Ye (Hainan University, China), and Hui Zhou (Hainan University, China)</i>	
SUAM: A Service Unified Access Model for Microservice Management .....	175
<i>Yu Jiang (Zhejiang University, China), Chengkai Li (Zhejiang University, China), and Ying Li (Zhejiang University, China)</i>	

Task-Role Performance Evaluation via Business Process Monitoring with BPMN Extension .....	181
<i>Hangyu Cheng (Hunan University of Science and Technology, China; Hunan Provincial Key Lab. for Services Computing and Novel Software Technology, China), Guosheng Kang (Hunan University of Science and Technology, China; Hunan Provincial Key Lab. for Services Computing and Novel Software Technology, China), Jianxun Liu (Hunan University of Science and Technology, China; Hunan Provincial Key Lab. for Services Computing and Novel Software Technology, China), Yiping Wen (Hunan University of Science and Technology, China; Hunan Provincial Key Lab. for Services Computing and Novel Software Technology, China), Buqing Cao (Hunan University of Science and Technology, China; Hunan Provincial Key Lab. for Services Computing and Novel Software Technology, China), and Bowen Liang (Hunan University of Science and Technology, China; Hunan Provincial Key Lab. for Services Computing and Novel Software Technology, China)</i>	
eBPF-Based Working Set Size Estimation in Memory Management .....	188
<i>Zhilu Lian (Sun Yat-sen University, China), Yangzi Li (Sun Yat-sen University, China), Zhixiang Chen (Sun Yat-sen University, China), Shiven Shan (Sun Yat-sen University, China), Baoxin Han (Sun Yat-sen University, China), and Yuxin Su (Sun Yat-sen University, China)</i>	

## Service Recommendation and Prediction

A Novel Science and Technology Resource Recommendation Service Based on Knowledge Graph and Collaborative Filtering .....	196
<i>Xinyu Zhao (North China University of Technology, China), Chen Liu (North China University of Technology, China), Shuo Zhang (North China University of Technology, China), and Xin You (North China University of Technology, China)</i>	
HRET: Heterogeneous Information Network for Recommendation in Testing and Inspection .....	203
<i>Liwen Zhang (Peking University, China), Weiping Li (Peking University, China), Tong Mo (Peking University, China), and Weijie Chu (Peking University, China)</i>	
MRNN-SA: A Multi-Dimensional Time Series Fault Prediction Service for Power Equipment Through Self-Attention Network .....	209
<i>Yongyan Yang (Beijing China-Power Information Technology Co., LTD., China), Lihong Yang (Beijing China-Power Information Technology Co., LTD., China), and Mengda Xing (Beijing China-Power Information Technology Co., LTD., China)</i>	
A Process Evaluation Method for Crossover Service Recommendation .....	217
<i>Yushuang Fang (Nanjing Normal University, China), Min Yuan (Nanjing Normal University, China), Hangrui Zhang (Nanjing Normal University, China), and Ruzhen Wang (Nanjing Normal University, China)</i>	

## AI-Inspired Services

- A Machine Learning Method and Device Based on Programmable Switch ..... 225  
*Congcong Min (Guangdong Communications and Networks Institute, China), Dongcheng Zhao (Guangdong Communications and Networks Institute, China), and Hua Lu (Guangdong Communications and Networks Institute, China)*
- Improve the Performance of CenterNet Through Hybrid Attention Mechanism CBAM ..... 229  
*Tianyang Li (Northeast Electric Power University, China), Tibing Zhang (Northeast Electric Power University, China), Jian Wang (Northeast Electric Power University, China), Zhongjie Wang (Harbin Institute of Technology, China), Ting He (Huaqiao University, China), and Yufeng Zhang (University of Birmingham, UK)*
- Distributed Machine Learning Based Link Allocation Strategy ..... 237  
*Yi Yang (China United Communications Co., Ltd., China), Mingkang Song (China United Communications Co., Ltd., China), Jianming Zhou (China United Communications Co., Ltd., China), Peng Dai (China United Communications Co., Ltd., China), Tenghui Ke (China United Communications Co., Ltd., China), Weidong Li (China United Communications Co., Ltd., China), Zhengguang Wu (China United Communications Co., Ltd., China), Xiayan Zheng (China United Communications Co., Ltd., China), and Xijin Li (China United Communications Co., Ltd., China)*
- Game Difficulty Prediction Algorithm Based on Improved Monte Carlo Tree ..... 241  
*Hu Boqin (Central University of Finance and Economics, China) and Chen Fu (Central University of Finance and Economics, China)*
- A Graph Neural Network-Based Code Recommendation Method for Smart Contract Development ..... 248  
*Xiuwen Tang (Sun Yat-sen University, China), Jiazhen Gan (Sun Yat-sen University, China), and Zigui Jiang (Sun Yat-sen University, China)*

## Data-based Services

- A DTP and SoLiD Based Service for Multi-Source Semantically-Heterogeneous Personal Data Management ..... 255  
*Zhenxiang Zhao (Harbin Institute of Technology, China), Chao Ma (Harbin University of Science and Technology, China), Haochen Yuan (Harbin Institute of Technology, China), and Zhongjie Wang (Harbin Institute of Technology, China)*
- A Smart Contract-Based Service Platform for Trustworthy Crowd Funding and Crowd Innovation 263  
*Wenjie Teng (Harbin Institute of Technology, China), Hanchuan Xu (Harbin Institute of Technology, China), Zhe Huang (Tip Land Co. Ltd., China), Yu Bai (Harbin Institute of Technology, China), and Zhongjie Wang (Harbin Institute of Technology, China)*
- Identifying Prerequisite Relations Between Concepts in Wikipedia ..... 271  
*Kui Xiao (Hubei University, China), Yuming Fu (Hubei University, China), Ying Deng (Hubei University, China), and Lingmei Xia (Hubei University, China)*



Medical Service Oriented Blockchain Data Credibility Evaluation Method .....	277
<i>Meng Wang (Yunnan University of Finance and Economics, China), Rong Jiang (Yunnan University of Finance and Economics, China), Yue Yang (Yunnan University of Finance and Economics, China), Chenguang Wang (Yunnan University of Finance and Economics, China), Lin Zhang (Yunnan University of Finance and Economics, China), Liang Yang (Kunming University of Science and Technology, China), and Xuetao Pu (Kunming University of Science and Technology, China)</i>	

## Service Security and Privacy

Threat Identification Model for Suspected Internet of Things Attack Groups .....	283
<i>Rui Yu (Central University of Finance and Economics, China), Fu Chen (Central University of Finance and Economics, China), Wen-mao Liu (NSFOCUS Technologies Group Co., China), and Hong-qing Sang (NSFOCUS Technologies Group Co., China)</i>	
FSC: File Storage in Coded Blockchain with C-PBFT Consensus Protocol .....	289
<i>Ruize Yu (Zhongyuan University of Technology, China), Changlin Yang (Sun Yat-sen University, China), and Ying Liu (Sun Yat-sen University, China)</i>	
Probing the Mystery of Cryptocurrency Exchange: The Case Study Based on Mt.Gox .....	297
<i>Yuanjun Ding (Sun Yat-sen University, China) and Weili Chen (Guangdong University of Foreign Studies, China)</i>	
Differentially Private Auction for Federated Learning with Non-IID Data .....	305
<i>Kean Ren (Sun Yat-sen University, China)</i>	
<b>Author Index</b> .....	<b>313</b>