

# **2023 20th Annual IEEE International Conference on Sensing, Communication, and Networking (SECON 2023)**

**Madrid, Spain  
11-14 September 2023**



**IEEE Catalog Number: CFP23SCN-POD  
ISBN: 979-8-3503-0053-6**

**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:	CFP23SCN-POD
ISBN (Print-On-Demand):	979-8-3503-0053-6
ISBN (Online):	979-8-3503-0052-9
ISSN:	2155-5486

**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

## TABLE OF CONTENTS

A SAM-Based Method for Large-scale Crop Field Boundary Delineation.....	1
<i>Xuanyu Liu</i>	
ACIGS: An Automated Large-Scale Crops Image Generation System Based on Large Visual Language Multi-modal Models .....	7
<i>Bolong Liu, Hao Zhang, Jie Liu, Qiang Wang</i>	
Segmentation and Grading Method of Potato Late-Blight on Field by Improved Mask R-CNN.....	14
<i>Jie Gao, Mei Guo, Xiangqian Yin, Ling Wang</i>	
Optimizing Crop Recommendations for Sustainable Agriculture: Leveraging Bayesian Networks in a Smart Crop Recommendation System .....	20
<i>Nazia Sharmin, Christopher Kiekintveld</i>	
Crop Planting Layout Generative Adversarial Network Model.....	27
<i>Wenlong Chen, Meiling Liu, Yameng Zhen, Lin Guo, Ying Zeng</i>	
MAKBQA: Multi-Hop Knowledge Base Question Answering System Based on Sensors and Internet Agricultural Data.....	33
<i>Jiaming Li, Liang He, Lei Wang, Shaolei Wang, Hanhan Ma, Kan Feng</i>	
LSTM-Driven Scheduling for Energy-Efficient Crop Monitoring in Wireless Networks.....	41
<i>Ziyue Dang, Fan Dang, Yankun Yuan</i>	
CAS: Crop Aerial Sensing Simulation in Smart Farming .....	48
<i>Jingyu Liu, Yang Zhao, Xinrui Xiao, Ran Meng, Jie Liu</i>	
Early-Season Mapping of Winter Canola Using Satellite Optical and SAR Data.....	54
<i>N/A</i>	
Making Wines Smarter: Evidence from an Interpretable Learning Paradigm .....	60
<i>Miao He, Weiwei Jiang, Weixi Gu</i>	
Satellite Internet of Things for Smart Agriculture Applications: A Case Study of Computer Vision .....	66
<i>Jiahua Liu, Weiwei Jiang, Haoyu Han, Miao He, Weixi Gu</i>	
Poster: Empower Smart Agriculture with RFID Reference Infrastructure .....	72
<i>Bo Liang, Xingyuming Liu, Yucheng Wan, Siyao Cheng, Jie Liu, Chenren Xu</i>	
Drought Level Prediction Based on Meteorological Data and Deep Learning .....	74
<i>Jiahua Liu, Weiwei Jiang, Haoyu Han, Miao He, Weixi Gu</i>	
Semantic Communication Protocol: Demystifying Deep Neural Networks Via Probabilistic Logic.....	76
<i>Sejin Seo, Jihong Park, Seung-Woo Ko, Jinho Choi, Mehdi Bennis, Seong-Lyun Kim</i>	
Semantic Slicing Across the Distributed Intelligent 6G Wireless Networks .....	79
<i>Lauri Lovén, Hafiz Faheem Shahid, Le Nguyen, Erkki Harjula, Olli Silvén, Susanna Pirttikangas, Miguel Bordallo López</i>	
Enabling the Wireless Metaverse Via Semantic Multiverse Communication.....	85
<i>Jihong Park, Jinho Choi, Seong-Lyun Kim, Mehdi Bennis</i>	

Sequential Semantic Generative Communication for Progressive Text-To-Image Generation .....	91
<i>Hyelin Nam, Jihong Park, Jinho Choi, Seong-Lyun Kim</i>	
Obtaining Security Characteristics Through Simultaneous Reception of LoRaWAN Packets in Redundant Gateways .....	95
<i>Sobhi Alfayoumi, Xavier Vilajosana</i>	
Grid-Level Performance Evaluation for 5G Vertical Networks with High Resolution: A Deep Learning-Based Scheme .....	101
<i>Qing Zhang, Taoye Zhang, Bin Chen, Ji Yan, Meng Ran</i>	
Federated Learning with Partial Gradients Over-The-Air .....	107
<i>Wendi Wang, Zihan Chen, Nikolaos Pappas, Howard H. Yang</i>	
Generative Adversarial Network-Based Network Anomaly Detection with Unlabeled Data.....	112
<i>Qing Zhang, Chao Cai, Xiaofei Qin, Yuzhu Wang, Kang Cao</i>	
Privacy-Preserving Mobility-Aware Federated Collaborative Filtering Framework for Caching Prediction in Vehicular Networks .....	118
<i>Xinzhi Ouyang, Chenyuan Feng, Daquan Feng, Howard H. Yang</i>	
Revisiting Backscatter Frequency Drifts for Fingerprinting RFIDs: A Perspective of Frequency Resolution.....	124
<i>Qingrui Pan, Zhenlin An, Xiaopeng Zhao, Lei Yang</i>	
Learning-Based Techniques for Transmitter Localization: A Case Study on Model Robustness .....	133
<i>Frost Mitchell, Neal Patwari, Aditya Bhaskara, Sneha Kumar Kasera</i>	
DPDA: Distributed Probability-Adaptive Direction Adjustment for Magnetic Wireless Power Transfer .....	142
<i>Weiming Guo, Zhan Wang, Hao Zhou, Wangqiu Zhou, Xiang Cui, Jianhui Zhang</i>	
MmYodar: Lightweight and Robust Object Detection Using mmWave Signals .....	151
<i>Chang Yuance, Han Ding, Dachao Han, Teng Zhang, Ge Wang, Cui Zhao, Fei Wang, Wei Xi, Jizhong Zhao</i>	
Data-Driven Spatial Super-Resolution for FMCW mmWave Sensing Systems.....	160
<i>Ran Guan, Yishuo Zhang, Yun Zhang, Qianqian Zhu, Lin Chen</i>	
Characterizing Real-Time Radar-assisted Beamforming in mmWave V2V Links .....	168
<i>Hansol Ku, Jinyue Song, Ding Zhang, Prasant Mohapatra, Parth Pathak</i>	
ProSpire: Proactive Spatial Prediction of Radio Environment Using Deep Learning .....	177
<i>Shamik Sarkar, Dongning Guo, Danijela Cabric</i>	
LeakThief: Stealing the Behavior Information of Laptop Via Leakage Current .....	186
<i>Dian Ding, Yi-Chao Chen, Xiaoyu Ji, Guangtao Xue</i>	
A Game Theoretical Model Addressing Misbehavior in Crowdsourcing IoT .....	195
<i>Runbo Su, Arbia Riahi Sfar, Enrico Natalizio, Pascal Moyal, Ye-Qiong Song</i>	
Class-Aware Neural Networks for Efficient Intrusion Detection on Edge Devices .....	204
<i>Mohammed Ayyat, Tamer Nadeem, Bartosz Krawczyk</i>	
PalmEcho: Multimodal Authentication for Smartwatch Via Beating Gestures .....	213
<i>Qing Guo, Gaolei Duan, Lei Xie, Jingyi Ning, Chuyu Wang, Baoliu Ye, Sanglu Lu</i>	

PianoWatch: An Intelligent Piano Understanding and Evaluation System Using Smartwatch .....	222
<i>Kaiwen Guo, Hao Zhou, Siyu Jing, Haohua Du, Puhao Luo, Jiahui Hou, Xiang-Yang Li</i>	
RemoteGesture: Room-Scale Acoustic Gesture Recognition for Multiple Users .....	231
<i>Mi Tian, Yanwen Wang, Zheng Wang, Junhua Situ, Xiaoqi Sun, Xiaokang Shi, Chenwei Zhang, Jiaying Shen</i>	
AUDIOSENSE: Leveraging Current to Acoustic Channel to Detect Appliances at Single-Point.....	240
<i>Yijie Li, Xiatong Tong, Qianfei Ren, Qingyang Li, Lanqing Yang, Yi-Chao Chen, Guangtao Xue, Xiaoyu Ji, Jiadi Yu</i>	
ECM: An Energy-Efficient HVAC Control Framework for Stable Construction Environment .....	249
<i>Jin-Sung Ok, Youngeun Chae, Harin Seo, Soon-Do Kwon, Byungchul Tak, Young-Kyoon Suh</i>	
An Online Framework for Joint UAV Trajectory Planning and Intelligent Dependent Task Offloading .....	258
<i>Yifeng Huang, Ruiting Zhou</i>	
MmHawkeye: Passive UAV Detection with a COTS mmWave Radar .....	267
<i>Jia Zhang, Xin Na, Rui Xi, Yimiao Sun, Yuan He</i>	
FloodSFCP: Quality and Latency Balanced Service Function Chain Placement for Remote Sensing in LEO Satellite Network .....	276
<i>Ruoyi Zhang, Chao Zhu, Xiao Chen, Qingyuan Gong, Xinlei Xie, Xiangyuan Bu</i>	
Improving LP-WAN Performance in Dense Environments with Practical Directional Clients.....	285
<i>Artur Balanuta, António Grilo, Bob Iannucci, Anthony Rowe</i>	
VersatileFL: Volatility-Resilient Federated Learning in Wireless Edge Networks .....	294
<i>Jinyi Yoon, Jeewoon Kim, Yeongsin Byeon, Hyungjune Lee</i>	
FedHybrid: Hierarchical Hybrid Training for High-Performance Federated Learning .....	303
<i>Tao Chang, Li Li, Meihan Wu, Wei Yu, Xiaodong Wang</i>	
DynamicFL: Balancing Communication Dynamics and Client Manipulation for Federated Learning .....	312
<i>Bocheng Chen, Nikolay Ivanov, Guangjing Wang, Qiben Yan</i>	
VagueGAN: A GAN-Based Data Poisoning Attack Against Federated Learning Systems .....	321
<i>Wei Sun, Bo Gao, Ke Xiong, Yang Lu, Yuwei Wang</i>	
Dynamic Placement of O-CU and O-DU Functionalities in Open-RAN Architecture.....	330
<i>Hiba Hojeij, Mahdi Sharara, Sahar Hoteit, Véronique Vèque</i>	
Dynamic Interplay Between Service Caching and Code Offloading in Mobile-Edge-Cloud Networks .....	339
<i>Dongho Ham, Yeongjin Kim, Jeongho Kwak</i>	
Optimizing Program Deployment with Libopl in Programmable Networks .....	348
<i>Hongyan Liu, Xiang Chen, Yi Shen, Dong Zhang, Chunming Wu</i>	
Intelligent Communication Planning for Constrained Environmental IoT Sensing with Reinforcement Learning .....	357
<i>Yi Hu, Jinhang Zuo, Bob Iannucci, Carlee Joe-Wong</i>	
Multi-Administrative Domain Service Onboarding in a ZSM-Based Orchestration Architecture .....	366
<i>Jorge Baranda, Luca Vettori, Miquel Payaró, Josep Mangues-Bafalluy, Guillermo Gomez, Sozos Karageorgiou</i>	

5G Network as Key-Enabler for Vehicular Platooning.....	369
<i>Paulo Duarte, Mujdat Soy Turk, Ramiro Robles, Marco Araújo, Berkay Yaman, Adriano Goes, Bruno Mendes, Gowhar Javanmardi, Miguel Gutierrez Gaitan</i>	
Field Experiments: Rear Vehicle Behavior Awareness to Avoid Rear-End Collisions .....	372
<i>Seyhan Ucar, Sachin Sharma, Yongkang Liu, E. Akin Sisbot, Kentaro Oguchi, Richard Meyer</i>	
Pathfinder: End-To-End Automation of Coverage Mapping of 4G/5G Networks at Street Level .....	375
<i>A. Almazi Bipon, Ahmed Osman, Md Shantanu Islam, A. Taufiq Asyhari, Raouf Abozariba</i>	
Goal-Oriented Transport Layer Protocols for Wireless Control.....	378
<i>Polina Kutsevol, Onur Ayan, Nikolaos Pappas, Wolfgang Kellerer</i>	
Pipeline Leak Identification Emergency Robot Swarm (PLIERS).....	381
<i>Ayman Kandil, Ali Darwiche, Reem Qasem, Fatima Matook, Ahmad Younis, Habib Badran, Maryam Bin-Jassem, Ossama Ahmed, Ali Behiry, Mohammed El Abd, Mounib Khanafer</i>	
Incentivizing Edge AI with Accuracy Preserving Via Online Randomized Auctions .....	384
<i>Mingtao Ji, Zhixin Zhang, Yuhan Zhang, Zhuzhong Qian, Tuo Cao, Chenwei Su, Baoliu Ye</i>	
Receiving Resonant Phase-Modulated Signals Using Atomic Magnetometer for Magnetic Communications.....	386
<i>Hyun Joon Lee, Jung Hoon Oh, Jang-Yeol Kim, Kye-Seok Yoon, In-Kui Cho</i>	
Magnetic Induction-Based Test-Bed System for Magnetic Communication in Underground Mines .....	388
<i>Jang-Yeol Kim, Hyun Joon Lee, Jung Hoon Oh, Kye-Seok Yoon, In-Kui Cho</i>	
Calculation of Required System Capacity for Private 5G Using Non-Stationary Queuing Model .....	390
<i>Yunbae Kim, Hyeeyeon Kwon, Seungkeun Park</i>	
A Resource Provisioning Manager for Edge Devices .....	392
<i>Youngwoo Jang, Gap-Joo Na, Illyoung Choi, In-Geol Chun, Dukyun Nam, Young-Kyoon Suh</i>	
A Multi-Domain Testbed for Collaborative Research on the IoT-Edge-Cloud Continuum.....	394
<i>Ivan Vidal, Luis F. Gonzalez, Francisco Valera, Borja Nogales, Raul Martin, Dulce Artalejo, Diego R. Lopez, Jose M. Manjón, Antonio Pastor</i>	
Channel State Information Based Ranging Via EM-ReVAMP Algorithm .....	396
<i>Fangqing Xiao, Zilu Zhao, Dirk Slock</i>	
Multiple Self-Supervised Tiny Neural Networks for mmWave Localization in Complex Indoor Areas.....	398
<i>Anish Shastri, Paolo Casari</i>	
Integration of Radio Environment Map and Smart Phone Measurements in Real World Deployment.....	400
<i>Kyung-Won Kim, Kyung-Yul Cheon, Hyeeyeon Kwon, Seungkeun Park</i>	
FedNaWi: Selecting the Befitting Clients for Robust Federated Learning in IoT Applications.....	402
<i>Ran Zhu, Mingkun Yang, Jie Yang, Qing Wang</i>	
EdgeC3: Online Management for Edge-Cloud Collaborative Continuous Learning .....	411
<i>Shaohui Lin, Xiaoxi Zhang, Yupeng Li, Carlee Joe-Wong, Jingpu Duan, Xu Chen</i>	
Joint Quality Evaluation, Model Splitting and Resource Provisioning for Split Edge Learning.....	420
<i>Shucun Fu, Fang Dong, Dian Shen, Qiang He</i>	

A Crowdsourced Learning Framework to Optimize Cross-Event QoS in AI-powered Social Sensing .....	429
<i>Yang Zhang, Ruohan Zong, Lanyu Shang, Huimin Zeng, Zhenrui Yue, Dong Wang</i>	
Experimental Study of Transport Layer Protocols for Wireless Networked Control Systems .....	438
<i>Polina Kutsevol, Onur Ayan, Nikolaos Pappas, Wolfgang Kellerer</i>	
Listen to Minority: Encrypted Traffic Classification for Class Imbalance with Contrastive Pre- Training .....	447
<i>Xiang Li, Juncheng Guo, Qige Song, Jiang Xie, Yafei Sang, Shuyuan Zhao, Yongzheng Zhang</i>	
BehavSniffer: Sniff User Behaviors from the Encrypted Traffic by Traffic Burst Graphs .....	456
<i>Tiru Wu, Xi Xiao, Qing Li, Qixu Liu, Guangwu Hu, Xiapu Luo, Yong Jiang</i>	
Robust Decentralized Online Learning Against Malicious Data Generators and Dynamic Feedback Delays with Application to Traffic Classification.....	465
<i>Yupeng Li, Dacheng Wen, Mengjia Xia</i>	
RFT: Toward Highly Reliable Flow Data Transmission in Network Measurement .....	474
<i>Xi Sun, Xiang Chen, Di Wang, Zhengyan Zhou, Xinyue Jiang, Wenhai Wang, Chunming Wu, Haifeng Zhou</i>	
Orchestrating Blockchain with Decentralized Federated Learning in Edge Networks .....	483
<i>Yibo Jin, Lei Jiao, Zhuzhong Qian, Ruiting Zhou, Lingjun Pu</i>	
Reliable and Streaming Truth Discovery in Blockchain-Based Crowdsourcing .....	492
<i>Prasanna Siddharth Mukkamala, Haiqin Wu, Boris Düdder</i>	
Phish2vec: A Temporal and Heterogeneous Network Embedding Approach for Detecting Phishing Scams on Ethereum .....	501
<i>Zhutian Lin, Xi Xiao, Guangwu Hu, Bin Zhang, Qixu Liu, Xiapu Luo</i>	
Collaborative Redundancy Reduction for Communication-Based Low-Latency Video Analytics in Autonomous Driving .....	510
<i>Jie Lin, Li Yu, Peng Yang</i>	
QoS-Aware Resource Optimization for Hierarchical Cross-Edge Video Analytics .....	519
<i>Kongyange Zhao, Zhi Zhou, Tao Ouyang, Mingliao Zhao, Hao Wang, Xu Chen</i>	
E-Talk: Accelerating Active Speaker Detection with Audio-Visual Fusion and Edge-Cloud Computing .....	528
<i>Xiaojing Yu, Lan Zhang, Xiang-Yang Li</i>	
EVS2vec: A Low-Dimensional Embedding Method for Encrypted Video Stream Analysis.....	537
<i>Luming Yang, Yongjun Wang, Shaojing Fu, Lin Liu, Yuchuan Luo</i>	

**Author Index**