

IEEE INTERNET OF THINGS JOURNAL

A JOINT PUBLICATION OF THE IEEE SENSORS COUNCIL 

THE IEEE COMMUNICATIONS SOCIETY 

THE IEEE COMPUTER SOCIETY 

THE IEEE SIGNAL PROCESSING SOCIETY 

AUGUST 2020

VOLUME 7

NUMBER 8

IITJAU

(ISSN 2327-4662)

INVITED PAPERS

Signal Detection for Underwater IoT Devices With Long and Sparse Channels	S. Jing, J. Hall, Y. R. Zheng, and C. Xiao	6664
Internet of Video Things: Next-Generation IoT With Visual Sensors	C. W. Chen	6676

REVIEW PAPERS

Mobility Management With Session Continuity During Handover in LPWAN	W. Ayoub, F. Nouvel, A. E. Samhat, M. Mroue, and J.-C. Prévotet	6686
Reliability in Internet of Things: Current Status and Future Perspectives	L. Xing	6704
Toward Edge Intelligence: Multiaccess Edge Computing for 5G and Internet of Things	Y. Liu, M. Peng, G. Shou, Y. Chen, and S. Chen	6722

EXPANDED CONFERENCE PAPERS

WiFi and Vision-Integrated Fingerprint for Smartphone-Based Self-Localization in Public Indoor Scenes	G. Huang, Z. Hu, J. Wu, H. Xiao, and F. Zhang	6748
A Spatiotemporal Model for Peak AoI in Uplink IoT Networks: Time Versus Event-Triggered Traffic	M. Emara, H. ElSawy, and G. Bauch	6762
Energy-Efficient Analog Sensing for Large-Scale and High-Density Persistent Wireless Monitoring	V. Sadhu, X. Zhao, and D. Pompili	6778
Improving Performance of Distributed Collaborative Beamforming in Mobile Wireless Sensor Networks: A Multiobjective Optimization Method	G. Sun, X. Zhao, G. Shen, Y. Liu, A. Wang, S. Jayaprakasam, Y. Zhang, and V. C. M. Leung	6787
LIDOR: A Lightweight DoS-Resilient Communication Protocol for Safety-Critical IoT Systems	M. Stute, P. Agarwal, A. Kumar, A. Asadi, and M. Hollick	6802
A Privacy-Preserving Scheme for Interactive Messaging Over Online Social Networks	Y. Cai, S. Zhang, H. Xia, Y. Fan, and H. Zhang	6817
iTLS: Lightweight Transport-Layer Security Protocol for IoT With Minimal Latency and Perfect Forward Secrecy	P. Li, J. Su, and X. Wang	6828

(Contents Continued on Page ii)

REGULAR PAPERS

OCD: Online Crowdsourced Delivery for On-Demand Food	<i>W. Tu, T. Zhao, B. Zhou, J. Jiang, J. Xia, and Q. Li</i>	6842
Missing Value Imputation for Industrial IoT Sensor Data With Large Gaps	<i>Y. Liu, T. Dillon, W. Yu, W. Rahayu, and F. Mostafa</i>	6855
Efficient and Secure Outsourcing Scheme for RSA Decryption in Internet of Things	<i>H. Zhang, J. Yu, C. Tian, L. Tong, J. Lin, L. Ge, and H. Wang</i>	6868
Passban IDS: An Intelligent Anomaly-Based Intrusion Detection System for IoT Edge Devices	<i>M. Eskandari, Z. Haider Janjua, M. Vecchio, and F. Antonelli</i>	6882
Multi-UAV-Enabled Load-Balance Mobile-Edge Computing for IoT Networks	<i>L. Yang, H. Yao, J. Wang, C. Jiang, A. Benslimane, and Y. Liu</i>	6898
MobileDA: Toward Edge-Domain Adaptation	<i>J. Yang, H. Zou, S. Cao, Z. Chen, and L. Xie</i>	6909
Agent-Based Modeling for Distributed Decision Support in an IoT Network	<i>M. M. Butt, I. Dey, M. Dzaferagic, M. Murphy, N. Kaminski, and N. Marchetti</i>	6919
A Rigid-Flex Wearable Health Monitoring Sensor Patch for IoT-Connected Healthcare Applications	<i>T. Wu, F. Wu, C. Qiu, J.-M. Redouté, and M. R. Yuce</i>	6932
Adversarial Learning-Enabled Automatic WiFi Indoor Radio Map Construction and Adaptation With Mobile Robot	<i>H. Zou, C.-L. Chen, M. Li, J. Yang, Y. Zhou, L. Xie, and C. J. Spanos</i>	6946
PADL: Privacy-Aware and Asynchronous Deep Learning for IoT Applications	<i>X. Liu, H. Li, G. Xu, S. Liu, Z. Liu, and R. Lu</i>	6955
Lightweight and Fault-Resilient Implementations of Binary Ring-LWE for IoT Devices	<i>S. Ebrahimi and S. Bayat-Sarmadi</i>	6970
Learning Effective Spatial-Temporal Features for sEMG Armband-Based Gesture Recognition	<i>Y. Zhang, Y. Chen, H. Yu, X. Yang, and W. Lu</i>	6979
Multiobjective UAV Path Planning for Emergency Information Collection and Transmission	<i>Z. Huang, C. Chen, and M. Pan</i>	6993
Broad Reinforcement Learning for Supporting Fast Autonomous IoT	<i>X. Wei, J. Zhao, L. Zhou, and Y. Qian</i>	7010
Detection of Fake IoT App Based on Multidimensional Similarity	<i>P. Wu, D. Liu, J. Wang, B. Yuan, and W. Kuang</i>	7021
AI-Based Joint Optimization of QoS and Security for 6G Energy Harvesting Internet of Things	<i>B. Mao, Y. Kawamoto, and N. Kato</i>	7032
Load-Balancing Algorithm for Multiple Gateways in Fog-Based Internet of Things	<i>F. Banaie, M. H. Yaghmaee, S. A. Hosseini, and F. Tashtarian</i>	7043
Distributed Error Correction Coding Scheme for Low Storage Blockchain Systems	<i>H. Wu, A. Ashikhmin, X. Wang, C. Li, S. Yang, and L. Zhang</i>	7054
A Deep-Learning-Based Self-Calibration Time-Reversal Fingerprinting Localization Approach on Wi-Fi Platform	<i>L. Zheng, B.-J. Hu, J. Qiu, and M. Cui</i>	7072
Noise Removal in the Presence of Significant Anomalies for Industrial IoT Sensor Data in Manufacturing	<i>Y. Liu, T. Dillon, W. Yu, W. Rahayu, and F. Mostafa</i>	7084
Reliable Computation Offloading for Edge-Computing-Enabled Software-Defined IoV	<i>X. Hou, Z. Ren, J. Wang, W. Cheng, Y. Ren, K.-C. Chen, and H. Zhang</i>	7097
On the Resilience of DAG-Based Distributed Ledgers in IoT Applications	<i>A. Cullen, P. Ferraro, C. King, and R. Shorten</i>	7112
Automatic Content Inspection and Forensics for Children Android Apps	<i>Q. Luo, J. Liu, J. Wang, Y. Tan, Y. Cao, and N. Kato</i>	7123
Model-Free Output Consensus Control for Partially Observable Heterogeneous Multivehicle Systems	<i>Y. Sun, X. Chen, W. Wang, H. Fu, and M. Wu</i>	7135
Long-Term and Extensive Monitoring for Bee Colonies Based on Internet of Things	<i>W. Hong, B. Xu, X. Chi, X. Cui, Y. Yan, and T. Li</i>	7148
Dynamic Component Placement and Request Scheduling for IoT Big Data Streaming	<i>Y. Zhang, J. Yan, L. Pu, and S. Chen</i>	7156
Analysis and Enhancement of the LoRaWAN Adaptive Data Rate Scheme	<i>J. Finnegan, R. Farrell, and S. Brown</i>	7171
Vehicular Networking-Enabled Vehicle State Prediction via Two-Level Quantized Adaptive Kalman Filtering	<i>L. P. Qian, A. Feng, N. Yu, W. Xu, and Y. Wu</i>	7181
Joint Task Offloading and QoS-Aware Resource Allocation in Fog-Enabled Internet-of-Things Networks	<i>X. Huang, Y. Cui, Q. Chen, and J. Zhang</i>	7194

PSPL: A Generalized Model to Convert Existing Neighbor Discovery Algorithms to Highly Efficient Asymmetric Ones for Heterogeneous IoT Devices	L. Wei, Y. Chen, Y. Zhang, L. Zhao, and L. Chen	7207
HAtt: Hybrid Remote Attestation for the Internet of Things With High Availability	M. N. Aman, M. H. Basheer, S. Dash, J. W. Wong, J. Xu, H. W. Lim, and B. Sikdar	7220
Regional-Centralized Content Dissemination for eV2X Services in 5G mmWave-Enabled IoV	J. Hu, C. Chen, T. Qiu, and Q. Pei	7234
Smart Meter Data Obfuscation Using Correlated Noise	A. S. Khwaja, A. Anpalagan, M. Naeem, and B. Venkatesh	7250
On the Outage Performance of Ambient Backscatter Communications	Y. Ye, L. Shi, X. Chu, and G. Lu	7265
DRL-Based Energy-Efficient Resource Allocation Frameworks for Uplink NOMA Systems	X. Wang, Y. Zhang, R. Shen, Y. Xu, and F.-C. Zheng	7279
Detecting Behavioral Change of IoT Devices Using Clustering-Based Network Traffic Modeling	A. Sivanathan, H. H. Gharakheili, and V. Sivaraman	7295
FreeScatter: Enabling Concurrent Backscatter Communication Using Antenna Arrays	Q. Huang, G. Song, W. Wang, H. Dong, J. Zhang, and Q. Zhang	7310
Uplink Performance of NOMA-Based Combined HTC and MTC in Ultradense Networks	M. Kamel, W. Hamouda, and A. Youssef	7319
Secure and Lightweight Authentication With Key Agreement for Smart Wearable Systems	J. Li, N. Zhang, J. Ni, J. Chen, and R. Du	7334
A Hybrid Machine Learning Model for Demand Prediction of Edge-Computing-Based Bike-Sharing System Using Internet of Things	T. Xu, G. Han, X. Qi, J. Du, C. Lin, and L. Shu	7345
Enhancing Privacy Preservation in Speech Data Publishing	G. Zhang, S. Ni, and P. Zhao	7357
Machine Learning Methods for Monitoring of Quasiperiodic Traffic in Massive IoT Networks	R. B. Sørensen, J. J. Nielsen, and P. Popovski	7368
A Low-Cost Smart Glove System for Real-Time Fitness Coaching	Y. Zou, D. Wang, S. Hong, R. Ruby, D. Zhang, and K. Wu	7377
The Channel as a Traffic Sensor: Vehicle Detection and Classification Based on Radio Fingerprinting	B. Sliwa, N. Piatkowski, and C. Wietfeld	7392
Coverage-Oriented Task Assignment for Mobile Crowdsensing	S. Song, Z. Liu, Z. Li, T. Xing, and D. Fang	7407
An Enhanced Receiver to Decode Superposed LoRa-Like Signals	M. A. Ben Temim, G. Ferré, B. Laporte-Fauret, D. Dallet, B. Minger, and L. Fuché	7419
Temporal Convolutional Networks for Multiperson Activity Recognition Using a 2-D LIDAR	F. Luo, S. Poslad, and E. Bodanese	7432
Mobile-Edge Computing in the Sky: Energy Optimization for Air-Ground Integrated Networks	B. Shang and L. Liu	7443
Edge Intelligence: The Confluence of Edge Computing and Artificial Intelligence	S. Deng, H. Zhao, W. Fang, J. Yin, S. Dustdar, and A. Y. Zomaya	7457
Modeling and Analysis Botnet Propagation in Social Internet of Things	H. Xia, L. Li, X. Cheng, X. Cheng, and T. Qiu	7470
Multicell Edge Coverage Enhancement Using Mobile UAV-Relay	Y. Ji, Z. Yang, H. Shen, W. Xu, K. Wang, and X. Dong	7482
Coexistence of Wi-Fi and IoT Communications in WLANs	H. Pirayesh, P. K. Sangdeh, and H. Zeng	7495
WiPOS: A POS Terminal Password Inference System Based on Wireless Signals	Z. Zhang, N. Avazov, J. Liu, B. Khoussainov, X. Li, K. Gai, and L. Zhu	7506
Accelerating Model-Free Reinforcement Learning With Imperfect Model Knowledge in Dynamic Spectrum Access	L. Li, L. Liu, J. Bai, H.-H. Chang, H. Chen, J. D. Ashdown, J. Zhang, and Y. Yi	7517
Securing Delay-Sensitive CR-IoT Networking Under Jamming Attacks: Parallel Transmission and Batching Perspective	H. Bany Salameh and M. Al-Quraan	7529
Enabling Fine-Grained Shopping Behavior Information Acquisition With Dual RFID Tags	W. Liu, J. Wang, B. Li, and L. Wang	7539
Location Privacy-Preserving Distance Computation for Spatial Crowdsourcing	S. Han, J. Lin, S. Zhao, G. Xu, S. Ren, D. He, L. Wang, and L. Shi	7550
Secure and Efficient Distributed Network Provenance for IoT: A Blockchain-Based Approach	D. Liu, J. Ni, C. Huang, X. Lin, and X. Shen	7564
Subspace Energy Monitoring for Anomaly Detection @Sensor or @Edge	A. Marchioni, M. Mangia, F. Pareschi, R. Rovatti, and G. Setti	7575

MobiKey: Mobility-Based Secret Key Generation in Smart Home	<i>L. Wang, H. An, H. Zhu, and W. Liu</i>	7590
A Novel OFDM Autoencoder Featuring CNN-Based Channel Estimation for Internet of Vessels	<i>B. Lin, X. Wang, W. Yuan, and N. Wu</i>	7601
Location and 3-D Visual Awareness-Based Dynamic Texture Updating for Indoor 3-D Model	<i>W. Ma, Q. Li, B. Zhou, W. Xue, and Z. Huang</i>	7612
Mean Field Game for Equilibrium Analysis of Mining Computational Power in Blockchains	<i>A. Taghizadeh, H. Kebriaei, and D. Niyato</i>	7625
An Energy-Saving Routing Integrated Economic Theory With Compressive Sensing to Extend the Lifespan of WSNs	<i>D. Lin, W. Min, and J. Xu</i>	7636
Drone-Enabled Internet-of-Things Relay for Environmental Monitoring in Remote Areas Without Public Networks	<i>M. Zhang and X. Li</i>	7648
UAV-Assisted Emergency Communications in Social IoT: A Dynamic Hypergraph Coloring Approach	<i>B. Wang, Y. Sun, Z. Sun, L. D. Nguyen, and T. Q. Duong</i>	7663
Device-Free Human Gesture Recognition With Generative Adversarial Networks	<i>J. Wang, L. Zhang, C. Wang, X. Ma, Q. Gao, and B. Lin</i>	7678
Joint Multioperator Virtual Network Sharing and Caching in Energy Harvesting-Aided Environmental Internet of Things	<i>Y. Cheng, J. Zhang, L. Yang, C. Zhu, and H. Zhu</i>	7689
Task Scheduling With UAV-Assisted Vehicular Cloud for Road Detection in Highway Scenario	<i>J. Li, X. Cao, D. Guo, J. Xie, and H. Chen</i>	7702
Toward Efficient Compressed-Sensing-Based RFID Identification: A Sparsity-Controlled Approach	<i>L. Wu, P. Sun, Z. Wang, Y. Yang, and Z. Wang</i>	7714
6LE-SDN: An Edge-Based Software-Defined Network for Internet of Things	<i>R. K. Das, N. Ahmed, F. H. Pohrmen, A. K. Maji, and G. Saha</i>	7725
Energy- and Time-Aware Data Acquisition for Mobile Robots Using Mixed Cognition Particle Swarm Optimization	<i>M. Xie, Y. Bai, M. Huang, Y. Deng, and Z. Hu</i>	7734
Privacy-Preserving Traffic Flow Prediction: A Federated Learning Approach	<i>Y. Liu, J. J. Q. Yu, J. Kang, D. Niyato, and S. Zhang</i>	7751
Compressed-Sensing-Based Pilot Contamination Attack Detection for NOMA-IoT Communications	<i>N. Wang, W. Li, A. Alipour-Fanid, M. Dabaghchian, and K. Zeng</i>	7764
A Novel Sensor Placement Strategy for an IoT-Based Power Grid Monitoring System	<i>J.-A. Jiang, J.-C. Wang, H.-S. Wu, C.-H. Lee, C.-Y. Chou, L.-C. Wu, and Y.-C. Yang</i>	7773
A Novel Framework for Fog Computing: Lattice-Based Secured Framework for Cloud Interface	<i>G. Kumar, R. Saha, M. K. Rai, R. Thomas, G. Geetha, T.-H. Kim, and J. J. P. C. Rodrigues</i>	7783
Automatic Modulation Classification Using Gated Recurrent Residual Network	<i>S. Huang, R. Dai, J. Huang, Y. Yao, Y. Gao, F. Ning, and Z. Feng</i>	7795
Completion Time and Energy Optimization in the UAV-Enabled Mobile-Edge Computing System	<i>C. Zhan, H. Hu, X. Sui, Z. Liu, and D. Niyato</i>	7808
Channel-Adaptive Transmission Protocols for Smart Grid IoT Communication	<i>S. Tripathi and S. De</i>	7823
Performance Analysis and Optimization of Downlink Transmission in LoRaWAN Class B Mode	<i>D. Ron, C.-J. Lee, K. Lee, H.-H. Choi, and J.-R. Lee</i>	7836
