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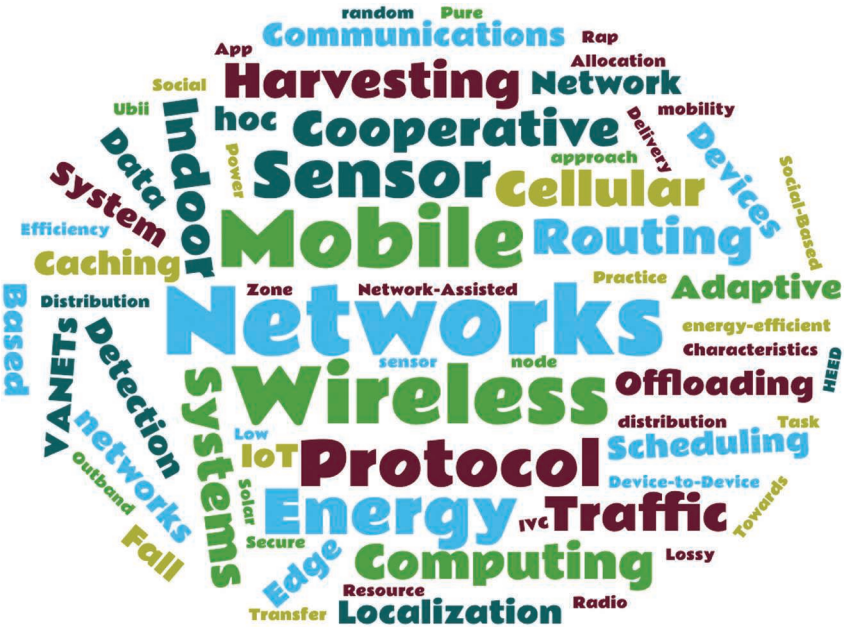
Each "Reader's Choice" column focuses on a different publication of the IEEE Signal Processing Society. In this issue of *IEEE Signal Processing Magazine*, we highlight papers in *IEEE Transactions on Mobile Computing* (*T-MC*).

T-MC is a bimonthly journal for publishing archival research results related to mobility of users, systems, data, and computing as well as issues in information organization and access, services, management, and applications. Research areas for these results include, but are not restricted to, nomadic computing, multimedia applications, mobile data and knowledge management, and mobile communication systems and networking.

This issue's "Reader's Choice" column lists the 15 *T-MC* papers most downloaded from January 2017 to October 2019. Your suggestions and comments are welcome and should be sent to Associate Editor H. Vicky Zhao (vzhao@tsinghua.edu.cn).



RT-Fall: A Real-Time and Contactless Fall Detection System With Commodity Wi-Fi Devices

Wang, H.; Zhang, D.; Wang, Y.; Ma, J.; Wang, Y.; Li, S.

This paper proposes RT-Fall, a real-time, contactless, low-cost yet accurate indoor fall-detection system using Wi-Fi devices. First, the channel state information phase difference over two antennas is found to be more sensitive than amplitude for activity recognition and enables reliable segmentation of fall and fall-like activities. Second, the sharp power profile decline pattern of the fall in the time-frequency domain is used for new feature extraction and accurate fall segmentation and detection.

2017

WiFall: Device-Free Fall Detection by Wireless Networks

Wang, Y.; Wu, K.; Ni, L.M.

The correlation between different signal variations and activities is studied, and an obtrusive fall-detection system named *WiFall* is proposed. It employs physical layer channel state information as the indicator of activities and detects human falls without hardware modification, extra environmental setup, or any wearable devices. WiFall is implemented on desktop computers with commodity 802.11n network interface controllers, and its performance is evaluated in three typical indoor scenarios with several layouts of transmitter–receiver links.

2017

HEED: A Hybrid, Energy-Efficient, Distributed Clustering Approach for Ad Hoc Sensor Networks

Younis, O.; Fahmy, S.

The Hybrid Energy-Efficient Distributed (HEED) clustering protocol is

Digital Object Identifier 10.1109/MSP.2019.2959635
Date of current version: 26 February 2020

proposed for ad hoc sensor networks to balance load on sensor nodes and to increase network scalability and lifetime. It periodically selects cluster heads according to the node residual energy and a secondary parameter, e.g., node proximity to its neighbors and node degree. It incurs low message overhead and achieves fairly uniform cluster head distribution across the network. HEED is proved to asymptotically almost surely guarantee connectivity of clustered networks with appropriate bounds on node density and transmission ranges.

2004

EABS: An Event-Aware Backpressure Scheduling Scheme for Emergency Internet of Things

Qiu, T.; Qiao, R.; Wu, D.O.

An event-aware backpressure scheduling (EABS) scheme for emergency Internet of Things is proposed. A backpressure queue model with emergency packets is derived based on the analysis of the arrival process of different packets. The proposed scheme combines the shortest path with backpressure scheme in the process of next-hop node selection. It forwards emergency packets in the shortest path and avoids network congestion according to the queue backlog difference. Experimental results verify the effectiveness of EABS in reducing the average end-to-end delay and increasing the average forwarding percentage.

2018

Cooperative Edge Caching in User-Centric Clustered Mobile Networks

Zhang, S.; He, P.; Suto, K.; Yang, P.; Zhao, L.; Shen, X.

Delay-optimal cooperative edge caching in large-scale user-centric mobile networks is investigated. A greedy content placement algorithm is proposed based on the optimal bandwidth allocation. In addition, the optimal user-centric cluster size is studied, and the explicit form of the condition constraining the maximal cluster size is given, which reflects the tradeoff between caching diversity and spectrum efficiency. Extensive simulations are conducted to validate the performance of the proposed method, and the impact of system parameters on clustering is also discussed.

2018

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Received-Signal-Strength-Based Indoor Positioning Using Compressive Sensing

Feng, C.; Au, W.S.A.; Valaee, S.; Tan, Z.

This paper proposes an accurate received-signal-strength-based indoor positioning system using compressive sensing. A coarse localizer first compares the received signal strength to a number of clusters to find the cluster to which it belongs. Then, a compressive sensing-based fine localization step is used to further refine the location. Different coarse localization schemes and access point selection approaches are investigated to improve the accuracy. The proposed positioning system is implemented on a Wi-Fi-integrated device to evaluate its performance.

2012

Edge Computing Assisted Adaptive Mobile Video Streaming

Mehrabi, A.; Siekkinen, M.; Ylä-Jääski, A.

This paper presents an optimized solution for network-assisted bit-rate adaption targeting mobile streaming in multiaccess edge computing environments. An integer nonlinear programming optimization model is proposed for video bit-rate selection to jointly maximize the quality of experience of clients and proportional fairness of the bit-rate allocation. A near-optimal self-tuning greedy-based scheduling algorithm is designed to efficiently solve the client-to-edge-server mapping and the bit-rate selection problems.

2019

Bidirectionally Coupled Network and Road Traffic Simulation for Improved IVC Analysis

Sommer, C.; German, R.; Dressler, F.

The need for bidirectional coupling of network simulation and traffic microsimulation for evaluation of intervehicle communication protocols is discussed. A hybrid simulation framework including the network simulator OMNeT++ and the road traffic simulator SUMO is developed, allowing dynamic interaction between both simulators. A proof-of-concept study is used to demonstrate its advantages based on the evaluation of two protocols for incident warning over vehicular ad hoc networks.

2011

Load Balancing Under Heavy Traffic in RPL Routing Protocol for Low Power and Lossy Networks

Kim, H.-S.; Kim, H.; Paek, J.; Bahk, S.

The load-balancing and congestion problem of the standardized IPv6 routing protocol for low power and lossy networks (RPL) is studied. Experimental study of RPL shows that most packet losses under heavy traffic are due to congestion, and there exists a serious

load balancing problem in RPL in terms of routing parent selection. To address this issue, a simple yet effective queue utilization RPL (QU-RPL) is proposed, which improves the end-to-end packet delivery performance by balancing the traffic load within a routing tree. Experimental results show that QU-RPL significantly reduces the queue loss and improves the packet delivery ratio.

2017

Smartphones Based Crowdsourcing for Indoor Localization

Wu, C.; Yang, Z.; Liu, Y.

Locating in Fingerprint Space (LiFS), a wireless indoor localization system based on off-the-shelf Wi-Fi infrastructure and mobile phones, is proposed. Considering user movements in a building, originally separated received signal strength fingerprints are geographically connected, and they consequently form a high-dimension fingerprint space. The fingerprint space is then automatically mapped to the floor plan. Preliminary experiment results show that LiFS achieves low human cost, rapid system deployment, and competitive location accuracy.

2015

Combining Solar Energy Harvesting With Wireless Charging for Hybrid Wireless Sensor Networks

Wang, L.C.; Li, J.; Yang, Y.; Ye, F.

This paper proposes a hybrid framework that combines the advantages of wireless charging and solar energy harvesting technologies. The network is divided into three hierarchical levels. The first level studies how to deploy solar-powered cluster heads to minimize the overall cost. Second, the energy balance problem is examined, and a distributed head reselection algorithm is proposed to designate some wireless-powered nodes as cluster heads when solar energy is unavailable. Third, a linear-time algorithm is proposed to optimize the joint tour consisting of both wireless charging and data-gathering sites for mobile chargers.

2018

VeMAC: A TDMA-Based MAC Protocol for Reliable Broadcast in VANETs

Omar, H.A.; Zhuang, W.; Li, L.

A novel multichannel time-division-multiaccess media-access-control protocol, VeMAC, is introduced for vehicular ad hoc networks. It provides reliable one-hop broadcast service without the hidden terminal problem and offers efficient multihop broadcast service to disseminate information over the network. It assigns disjoint sets of time slots to vehicles moving in opposite directions and to road side units and reduces transmission collisions on the control channel caused by node mobility. Analysis and simulation results in highway and city scenarios show that VeMAC can provide significantly higher throughput on the control channel.

2013

Ubii: Physical World Interaction Through Augmented Reality

Lin, S.; Cheng, H.F.; Li, W.; Huang, Z.; Hui, P.; Peylo, C.

The presented ubiquitous interface and interaction (Ubii) is an integrated interface system that connects smart devices and allows users to interact with physical objects, such as computers, projector screens, and printers, to complete tasks including document copying, printing, sharing, and so on. Individual augmented reality menu overlays are aligned with physical objects to present their physical affordance. Developed on Google Glass, Ubii enables gesture-based free-hand interaction with greater convenience. A new support vector machine-based detection algorithm and computation offloading is implemented for better performance.

2017

Mode Selection and Resource Allocation in Device-to-Device Communications: A Matching Game Approach

Kazmi, S.M.A.; Tran, N.H.; Saad, W.; Han, Z.; Ho, T.M.; Oo, T.Z.; Hong, C.S.

A distributed scalable solution for a dense device-to-device network is introduced, which jointly addresses the mode selection, resource allocation, and interference management problems. A novel learning framework based on Markov approximation is proposed, where unsupervised learning is used for mode selection, and a two-sided matching game is incorporated to address the resource allocation issue. Simulation results show that the proposed framework converges in probability, achieves interference protection, and closely approaches the optimal solution.

2017

Energy-Efficient Dynamic Computation Offloading and Cooperative Task Scheduling in Mobile Cloud Computing

Guo, S.; Liu, J.; Yang, Y.; Xiao, B.; Li, Z.

An energy-efficient dynamic offloading and resource scheduling policy is proposed to reduce energy consumption and to shorten application completion time in mobile cloud computing. The problem is formulated as an energy-efficiency cost minimization problem with task-dependency requirement and completion time deadline constraint. A distributed algorithm is then proposed that consists of three subalgorithms: computation offloading selection, clock frequency control, and transmission power allocation.

2019

SP