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Editorial
Mobile Sensing and Actuating with Ubiquitous Computing

Mo Li,[1] Yunhao Liu,[2] and Xiang-Yang Li[3]

[1] *School of Computer Engineering, Nanyang Technological University, Singapore 639798*
[2] *TNLIST, Tsinghua University, Beijing 100084, China*
[3] *Department of Computer Science, Illinois Institute of Technology, Chicago, IL 60616, USA*

Correspondence should be addressed to Mo Li, limo@ntu.edu.sg

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Advanced wireless sensing and networking techniques enable mobile sensing and actuating with ubiquitous computing on numerous smart sensors, mobile devices, RFIDs, and so forth, which revolutionize a variety of application areas with unprecedented pervasive physical world instrumentation. The development and deployment of such mobile sensing and actuating systems has become significant across a variety of application domains, including environmental surveillance, traffic and logistics, personal area networks, smart buildings, and emergent navigation. The major challenges come with the required system sustainability, mobility, scalability, and fault resilience in ensuring constant services across dynamic application environment. In this special issue, we have accepted a few papers that address the above key aspects in providing mobile sensing and actuating services.

The paper "*InContexto: multisensor architecture to obtain people context from smartphones*" describes a distributed architecture, called inContexto, to recognize user context information using mobile phones. The proposed framework targets at inferring physical actions performed by users such as walking, running, and still.

The paper "*Statistically bounding detection latency in low-duty-cycled sensor networks*" studies the problem of bounding event detection delays when the sensor network works in low-duty-cycled mode. A novel approach for statistically bounding event detection latency is proposed, and key issue like the wakeup scheduling of sensor nodes as well as minimization of wakeup activity is addressed in this paper.

The paper "*Spatial and temporal correlations-based routing algorithm in intermittent connectivity human social network*" proposes the idea of trip history model (THM) which establishes a model on a single person's mobility, and then a spatial and temporal correlations-based routing algorithm (STC) to efficiently transmit data. In STC, the node delivery probability is calculated according to both a node's current moving prediction and its history record to give guidance for message transmission.

The paper "*Dynamic key-updating: privacy-preserving authentication for RFID systems*" proposes a strong and lightweight RFID private authentication protocol, SPA. By designing a novel key updating method, SPA achieves the forward secrecy with an efficient key search algorithm.

The paper "*Improving accuracy for 3D RFID localization*" develops an indoor 3D RFID localization system based on active tag array. The geometric mean is used in this paper to filter the explicit 3D location information with high accuracy. The experimental results demonstrate the system efficiency in tracking objects and improving the localization accuracy.

The paper "*An extended virtual force-based approach to distributed self-deployment in mobile sensor networks*" aims at overcoming the connectivity maintenance and node stacking problem of the traditional virtual force-based algorithms (VFAs). The paper investigates an extended virtual force-based approach for achieving the ideal node deployment.

The paper "*Time-independent data collection protocol in mobility-assistant wireless sensor networks with duty cycles*" studies the MS discovery mechanism as well as the factors that affect the efficiency of data collection in duty-cycled sensor networks. The paper provides a solution to the control problem of how to optimally adjust the system parameters of the sleep/wake scheduling protocol to maximize the network lifetime, subject to a constraint on the expected residual contact time.

The paper "*An energy-efficient CKN algorithm for duty-cycled wireless sensor networks*" investigates the unexplored energy consumption of the CKN algorithm. By building

a probabilistic node sleep model, this paper computes the probability that a random node goes to sleep and obtains a lower epoch bound that keeps the network more energy efficient with longer lifetime when running the CKN algorithm.

The paper "*Rendezvous data collection using a mobile element in heterogeneous sensor networks*" studies the rendezvous data collection problem for the mobile element (ME) in heterogeneous sensor networks where data generation rates of sensors are distinct. An $O(n \log n)$ algorithm is proposed to approach the optimal rendezvous points (RPs) to collect global sensory data as well as the optimal data collection trajectory for the mobile relay to gather the cached data from RPs.

The paper "*Hybrid position-based and DTN forwarding for vehicular sensor networks*" addresses data delivery challenge in the possible intermittently connected vehicular sensor networks by combining position-based forwarding strategy with store-carry-forward routing scheme from delay-tolerant networks. The proposed routing method makes use of vehicle driving direction to determine whether holding or forwarding the packet.

Mo Li
Yunhao Liu
Xiang-Yang Li