**IEEE PERCOM Conference**

**Attendance Report**

By Muhammad Niswar

**Summary:**

I have attended the Seventh Annual IEEE PerCom Conference that had held in Galveston, Texas, US for 5 days. This conference focuses on area of pervasive computing and communication including mobile sensor network, pervasive application & system, middleware, networking and privacy. Most of accepted papers talk about application of Wireless Sensor Network (WSN) for medical/health care, disaster detection, human movement detection and performance evaluation of WSN. Furthermore, I have presented a paper in Workshop on Pervasive Wireless Networking (PWN 2009)

The following are summary of presented paper which I attended and participated in presentation session.

* IQ2S 2009: The 1st International Workshop on Information Quality and Quality of Service for Pervasive Computing
* Main Conference: the 7th Annual IEEE International Conference on Pervasive Computing and Communications (PerCom 2009)
* PWN 2009: The 5th IEEE PerCom Workshop on Pervasive Wireless Networking

**IQ2S 2009: The 1st International Workshop on Information Quality and Quality of Service for Pervasive Computing**

[A Bandwidth Management Approach for Quality of Service Support in Mobile Ad Hoc Networks](file:///E:\PerCom2009\pdfs\091.pdf)  
Adnan Agbaria, Gidon Gershinsky, Nir Naaman, Konstantin Shagin

[Implementation of a MAC Protocol for QoS Support in Wireless Sensor Networks](file:///E:\PerCom2009\pdfs\092.pdf)  
Petcharat Suriyachai, Utz Roedig, Andrew Scott

The author claims that the existing MAC protocol unable to support WSN applications that　require deterministic data transport performance. The author developed a MAC protocol delivering data to the sink with node2node bounds on delays. The author implements a new WSN MAC protocol that is able to give deterministic bounds for message transfer　delay and reliability. The protocol is implemented on TinyOS 2.x for a Tmote Sky node using the CC2420 transceiver. The protocol is based on TDMA & retransmission. The protocol shows that a deterministic MAC protocol with reasonable energy consumption patterns is practical. However, this protocol only works on Pre-determined Tree Topology

[Online Algorithms for Maximizing Link Transmission Quality over a Jammed Wireless Channel](file:///E:\PerCom2009\pdfs\093.pdf)  
Rajgopal Kannan, Shuangqing Wei, Costas Busch, Athanasios Vasilakos

Author proposed an algorithm for maximizing wireless link quality (transmission rate) subject to jamming. The author describes the jamming in Phy and Link layer. The impact of the jammer is to deteriorate the quality of the wireless channel during time slots in which it is present. The author evaluated his proposed Algorithms using mathemathical analysis and no implementation issue is discussed.

[An Efficient Distributed Synchronization Method for TD/CDMA based Mobile Ad Hoc Networks](file:///E:\PerCom2009\pdfs\094.pdf)  
Dhadesugoor Vaman, Ashwin Ashok

Author designs a simple distributed sync method for MANET achieving Sync efficiently for MANET. The Author proposed an algorithm considering the area coverage problem for variable sensing radius. using a first order Digital Phase locked loop (DPLL) which performs the ‘local locking’ at each receiver radio in a cluster of radios. The author claims that the proposed algorithm provides complete coverage for all the cases as well as energy-efficient

[Delaunay-triangulation based complete coverage in wireless sensor networks](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\095.pdf)  
Chinh Vu, Yingshu Li

Author　improve the work of Wang and Medidi (J. Wang, S. Medidi, ”Energy Efficient Coverage with Variable Sensing Radii in Wireless Sensor Networks”, Wireless and Mobile Computing,　Networking and Communications, 2007 - WiMOB 2007, White Plains, NY, USA.), which cannot always provide complete surveillance for the whole network due to boundary effect. A theorem confirms that our　improved algorithm provides complete coverage for all the cases. In addition, the simulation further shows that our energy-efficient algorithm has an obvious improvement on coverage status with　very small compensation of network lifetime.

[Optimal k-support Coverage Paths in Wireless Sensor Networks](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\096.pdf)  
ShaoJie Tang, XuFei Mao, Xiang-Yang Li

Author proposed an optimal polynomial-time algorithm and they claims that their proposed algorithm is the first polynomial time algorithm finding an optimum k-coverage path in sensor networks with general sensing radius

and general k to deal with fundamental coverage problem in WSN

[Cross-Layer Design for Adaptive Data Reporting in Wireless Sensor Networks](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\097.pdf)  
Hyun Jung Choe, Preetam Ghosh, Sajal Das

Author proposes an integrated cross-layer data reporting scheme focusing on communication protocols in wireless sensor networks. The author focuses on the QoS-aware data reporting tree construction scheme, called QRT, and the QoS-aware node scheduling scheme, called QNS. The author demonstrated simulation experiment to evaluate performance of proposed scheme and simulation results show that these schemes provide good throughput performance while providing stable data reporting that is not affected by network density.

[OceanSense: A Practical Wireless Sensor Network on the Surface of the Sea](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\098.pdf)  
Mingxing Jiang, Zhongwen Guo, Feng Hong, Yutao Ma, Hanjiang Luo

Author presents a practical wireless sensor network for environmental monitoring (OceanSense) deployed on the sea. The system is mainly composed of TelosB motes, which are deployed on the surface of the sea collecting environmental data, such as temperature, light and RSSI from the testbed. The motes communicate with a base station, which transmits collected data to a visualization system running on a database server. The data can be accessed using a browser-based web application. The OceanSense has been running for more than half a year, providing environmental monitoring data for further study.

[QoS enabled mobility support for mesh networks](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\099.pdf)  
Dario Gallucci, Silvia Giordano

Author proposed a heuristic service classification approach and a correspondent traffic classification algorithm for handling the multimedia traffic at the network and the application layer, in order to better characterize the traffic. The preliminary simulation results show that the approach is able to classify a large part of the traffic and, consequently, to handle it appropriately. This is confirmed by the encouraging preliminary results where the worst case is managed fairly in comparison to the average case. However, in the simulation result table shows that MOS value of proposed assignment for VoIP is less than random assignment. The proposed algorithm for realtime application is still remain questioned.

**Panel**

Discussing about Quality of Information (QoI) and what is the main difference with QoS.Panelist are come from both academic and industrial institution

**Main Conference**

**the 7th Annual IEEE International Conference on Pervasive Computing and Communications (PerCom 2009).**

[A Dynamic Platform for Runtime Adaptation](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\001.pdf)  
Hubert Pham, Justin Mazzola Paluska, Umar Saif, Christopher Stawarz, Chris Terman, Steve Ward

Author presents a middleware platform for assembling pervasive applications that demand fault-tolerance and adaptivity in distributed, dynamic environments. They claims that applications are written as simple, single-threaded programs that assemble and monitor a set of distributed components.

[Programmable Presence Virtualization for Next-Generation Context-Based Applications](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\002.pdf)   
Arup Acharya, Nilanjan Banerjee, Dipanjan Chakraborty, Koustuv Dasgupta, Archan Misra, Shachi Sharma, Xiping Wang, Charles Wright

Author present a novel middleware architecture for presence virtualization that allows applications to consume and compose real–time presence from various sources, specify their computation needs using XSLT–based transformations on the presence data, and compute responses to these queries using scalable XML processing technology.

[Distributed Policy Resolution Through Negotiation in Ubiquitous Computing Environments](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\003.pdf)   
Venkatraman Ramakrishna, Peter Reiher, Leonard Kleinrock

Author describe the modeling, design, and implementation of a general purpose negotiation protocol for cross-domain service access agreements between entities that do not share trust agreements or application level protocols. This protocol resolves the constraints and needs of the participants, described in the form of declarative logical policies, in a fully distributed manner, avoiding the need for a third party. The author tested the system and show how negotiation performance was evaluated against an optimal case computed by a centralized oracle.

[TileTrack: Capacitive Human Tracking using Floor Tiles](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\004.pdf)  
Miika Valtonen, Jaakko Mäentausta, Jukka Vanhala

 Author develops an unobtrusive two-dimensional human positioning system based on low-frequency electric fields. The system’s operation is based on measuring the capacitance between multiple floor tiles and a receiving electrode. The presented system is invisible to the user and uses a single-chip solution to measure the capacitances. The implemented system is evaluated with two different types of receiving electrodes and the results are presented. With the used tiles, the system can locate a standing human with at least 15 cm accuracy and track a walking person with at least 41 cm accuracy. The update rate of the system is 10 Hz. However, this system requires many cabling system to connect with many tiles when it implemented in large space

[NoShake: Content Stabilization for Shaking Screens of Mobile Devices](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\005.pdf)   
Ahmad Rahmati, Clayton Shepard, Lin Zhong

Author develops a system for screen content stabilization called NoShake. NoShake utilizes a single accelerometer, now　present in numerous consumer electronics and mobile devices.　The core of NoShake is a physics inspired model that dynamically　compensates for the device shaking by shifting the screen　content opposite the direction of the shake. The model is efficient,　parametric, and can be fine tuned based on shaking　pattern detection. The authors implement a prototype of NoShake on　an Apple iPhone and conduct user studies in a number of scenarios,　which highlight the strengths as well as limitations of　NoShake in coping with shaking devices. The author also presents the system in demo session.

[A Mobile Product Recommendation System Interacting with Tagged Products](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\006.pdf)   
Felix von Reischach, Florian Michahelles, Dominique Guinard, Elgar Fleisch

Author develops a concept that enables consumers to access and share product recommendations using their mobile phone called APriori. Author describes the architecture, implementation, and evaluation of APriori. However, many open issues must be discussed and addressed regarding implementation APriori in real world such as quality management and business model

[Talk to Me! On Interacting with Wireless Sensor Nodes](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\007.pdf)  
Matthias Gauger, Olga Saukh, Pedro José Marrón

Author present and discuss three different approaches for this node interaction problem based on gestures, on light signals and on information provided by the sensor nodes using their LEDs. They claim that all three mechanisms are effective in solving the sensor node interaction problem. Sensor Node Lamp interaction, in particular, has been shown to be a very efficient and easy-to-use solution for indoor scenarios.

[TreeMAC: Localized TDMA MAC Protocol for Real-time High-data-rate Sensor Networks](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\012.pdf)   
Wen-Zhan Song, Renjie Huang, Behrooz Shirazi, Richard LaHusen

Author proposed a new sensor network protocol called TreeMAC which is an innovative localized TDMA MAC protocol and designed to achieve high throughput and low congestion with low overhead, by utilizing unique characteristics of data collection network. They have showed the nice properties of TreeMAC in theory and demonstrated that it achieves much better throughput and energy efficiency than CSMA and Funneling-MAC in a real sensor network test bed.

[Persistent Content-based Information Dissemination in Hybrid Vehicular Networks](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\013.pdf)   
Ilias Leontiadis, Paolo Costa, Cecilia Mascolo

 Author proposed a protocol for content based information dissemination in hybrid (i.e., partially structureless) vehicular networks. The protocol allows content to “stick” to areas where vehicles need to receive it. The protocol takes advantage of both the infrastructure (i.e., wireless base stations), if this exists, and the decentralized vehicle-to-vehicle communication technologies. They evaluate the protocol by simulation over a number of realistic vehicular traces based scenarios. Results show that the protocol achieves high message delivery while introducing low overhead, even in scenarios where no infrastructure is available. However, they should re-consider the assumption that users are cooperative and willing to insert their destination because this assumption is only partly verified in practice as users tend to avoid using navigation systems for known routes

[uWave: Accelerometer-based Personalized Gesture Recognition and Its Applications](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\014.pdf)   
Jiayang Liu, Zhen Wang, Lin Zhong, Jehan Wickramasuriya, Venu Vasudevan

Author proposed an efficient recognition algorithm for such interaction using a single three-axis accelerometer called uWave. They evaluate uWave using a large gesture library with over 4000 samples collected from eight users over an elongated period of time for a gesture vocabulary with eight gesture patterns identified by a Nokia research. They claim that uWave achieves 98.6% accuracy, competitive with statistical methods that require significantly more training samples.

[FollowMe! Mobile Team Coordination in Wireless Sensor and Actuator Networks](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\018.pdf)   
Stephan Bosch, Mihai Marin-Perianu, Raluca Marin-Perianu, Hans Scholten, Paul Havinga

Author develops a coordinated team of autonomous vehicles. They implement their prototype in toy cars. Each vehicle is augmented with a wireless　sensor node with movement sensing capabilities. One of the　vehicles is the *leader* and is manually controlled by a remote　controller. The rest of the vehicles are autonomous *followers*controlled by wireless actuator nodes. The leader periodically transmits these　measures to the followers, which implement a lightweight fuzzy　logic controller for imitating the leader’s movement pattern. However, this prototype does not support dynamic tilt compensation (e.g. when moving on inclined terrain). The main limitation is the lack of any　information and subsequently control of the relative distance　between the vehicles

[A Novel Communications Protocol Using Geographic Routing for Swarming UAVs Performing a Search Mission](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\019.pdf)  
Robert Lidowski, Barry Mullins, Rusty Baldwin

Author develops a novel communications protocol for autonomous swarms of unmanned aerial vehicles (UAVs) searching a 2-dimensional grid. The search protocol, the UAV Search Mission Protocol (USMP), combines inter-UAV communication with geographic routing to improve search efficiency in terms of total searches, distance traveled by UAVs, and the minimization of UAV direction changes. Author conduct simulation experiments using OPNET Modeler 12.0. Overall, The author claims that USMP improves performance by as much as 188% compared to scenarios without inter-UAV communication.

[A Policy-Based Management Architecture for Mobile Collaborative Teams](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\020.pdf)   
Eskindir Asmare, Anandha Gopalan, Morris Sloman, Naranker Dulay, Emil Lupu

Author proposed a policy-based distributed self-management framework for mobile collaborative teams of UAVs. They use three levels of specifications policy, mission class and mission instance to enable reuse of both policies and mission classes. The architecture has been tested on devices ranging from small laptops to body area networks. Initial evaluation shows the distributed architecture is scalable and outperforms a centralized mission management scheme. However, proposed framework need to be improved in terms of the role assignment process and configuration planning to attain more optimal team configurations.

[REDFLAG: A Run-timE, Distributed, Flexible, Lightweight, And Generic Fault Detection Service for Data-Driven Wireless Sensor Applications](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\021.pdf)  
Iñigo Urteaga, Kevin Barnhart, Qi Han

Author proposed a fault detection service called REDFLAG, a Run-timE, Distributed, Flexible, fault detection service, that is also Lightweight And Generic. REDFLAG aims to reduce data uncertainty in data-driven wireless sensor applications. It implemented between Application and network layer of each node.

[Auction-Based Congestion Management for Target Tracking in Wireless Sensor Networks](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\023.pdf)   
Lei Chen, Boleslaw Szymanski, Joel Branch

Author describe the use of a distributed auction-based approach to locally manage network bandwidth allocation in the described context providing congestion-management for a shared wireless sensor network based target tracking system. They use the Second Price Auction mechanism (to ensure incentive compatibility) in which the congested node acts as the auctioneer and the packets carrying target updates act as bidders. Their bid values are defined by the *loss of information utility* to the applications associated with the packets. The winning packet receives the current transmission slot of the auctioneer node. The Author describe analytical approach and demonstrate through simulation that the resulting auction allocates bandwidth efficiently, maximizing the collective applications’ goals, even when the application priorities change dynamically.

[Practical Rate Adaptation in Mobile Environments](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\024.pdf)  
Xi Chen, Prateek Gangwal, Daji Qiao

Author proposes a practical rate adaptation scheme called RAM (Rate Adaptation in Mobile environments) and implement it in the Madwifi device driver. RAM uses a receiver-based approach to handle channel asymmetry and a conservative SNR prediction algorithm to deal with high channel fluctuation. The effectiveness of RAM is demonstrated through experimental evaluation in indoor static and mobile environments and outdoor vehicular environments, as well as simulation study based on SNR traces collected from the experiments. The author should describe more details of simulation parameters using in ns2

[Searching for Content in Mobile DTNs](file:///E:\PerCom2009-Proceedings\PerCom2009\pdfs\026.pdf)  
Mikko Pitkanen, Teemu Kärkkäinen, Janico Greifenberg, Jörg Ott

Author introduces a search algorithm for content in Mobile DTN that makes no assumptions about the underlying routing protocols and the format of search requests. The author evaluates different algorithms for forwarding and terminating search queries, using simulations with different classes of DTN routing protocols for different mobility scenarios.

**PWN 2009: The 5th IEEE PerCom Workshop on Pervasive Wireless Networking**

**Session I: PHY Layer Issues in Wireless Networks**

[Markov Chain Existence and Hidden Markov Models in Spectrum Sensing](file:///E:\PerCom2009\pdfs\118.pdf)  
Chittabrata Ghosh, Carlos Cordeiro, Dharma Agrawal, Bhaskara Rao

Author have validated the assumption of the existence of Markov chain in the spectrum occupancy by PUs using real-time measurements collected in the paging band (928-948 MHz).

[Dynamic Hard Fractional Frequency Reuse for Mobile WiMAX](file:///E:\PerCom2009\pdfs\119.pdf)  
Soumaya Hamouda, Choongil Yeh, Jihyung Kim, Shin Wooram, Dong Seung Kwon

Author proposes a hard Fractional Frequency Reuse scheme that dynamically adjusts the size of each zone according to the system load. The approach is based on either a partial or a full coordination between the base stations. The author demonstrated the simulation to see the effectiveness of scheme is particularly proved when a non-uniform distribution of the users in the cell is considered. However, Cell pattern is limited to only hexagonal pattern. Interesting to know in many cell patterns

[Reliable Ranging Technique based on Statistical RSSI Analyses for an Ad-Hoc Proximity Detection System](file:///E:\PerCom2009\pdfs\120.pdf)  
Keiichi Nakamura, Masato Kamio, Tetsushi Watanabe, Shinsuke Kobayashi, Noboru Koshizuka, Ken Sakamura

Author proposed four simple statistical RSSI filtering methods and a packet exchange protocol for reducing the fading effect in ad-hoc proximity detection system. Their simulation results show that the variation of detecting distance is successfully reduced to 4 meters for particular combinations. However, this study is limited on static scheme, not in mobile scheme.

**Session II: Localization Technologies**

[HexNet: Hexagon-Based Localization Technique For Wireless Sensor Networks](file:///E:\PerCom2009\pdfs\121.pdf)  
Hady AbdelSalam, Stephan Olariu

Author proposed a new localization protocol for WSN. However, lack of description of simulation parameters and scenario and since the proposed method assume in error free channel, the method could difficult to be implemented in real environment

[On the Accuracy of RFID-based Localization in a Mobile Wireless Network Testbed](file:///E:\PerCom2009\pdfs\122.pdf)  
Vikram Munishwar, Shailendra Singh, Xiaoshuang Wang, Christopher Mitchell

Author demonstrated the implementation and evaluation of two approaches which can be combined to improve the overall accuracy of the RFID-based localization system. The author claims that the proposed approaches improve the accuracy of RFID-based localization mechanisms by up to 58.22% for dense deployment of RFID tags.

[An Energy-Aware Relay Selection Scheme for ALLIANCES](file:///E:\PerCom2009\pdfs\123.pdf)  
Xinhua Yang, Tracy Camp

Author proposed a new MAC protocol called ALLIENCES that exploits the cooperation of source nodes and relay nodes to resolve collusion and further improve throughput. The author implemented and evaluated ALLIENCES in ns2. However, in the simulation scenario, they do not set the different radio model affect, so, implementation in real environment is still remain questioned

**Session III: Relaying and Routing in Wireless Networks**

[Articulation Nodes Based Routing in Delay Tolerant Networks](file:///E:\PerCom2009\pdfs\125.pdf)  
Li Ding, Bo Gu, Xiaoyan Hong, Brandon Dixon

Authors propose a new routing protocol called ANBR (Articulation Node Based Routing) which utilizes graph theory to solve the routing problem in DTN. They simulate the proposed algorithm based on real world data and compare our algorithm to other approaches. Author should address the issues relating to dynamic connection lifetimes, large local sub-graph and the number of copies and acknowledgements.

[An Empirical Analysis of Wi-Fi Activity in Three Urban Scenarios](file:///E:\PerCom2009\pdfs\126.pdf)  
Thomas Claveirole, Mathias Boc, Marcelo Dias de Amorim

Authors analyzed behaviors of Wi-Fi users in three different locations that have distinct social meanings. The author claims that their sniffing technique able to provide a more complete view of the population moving in a given location and highlight important aspects of what can be found in real situations. However, the author should address the issues how to distinguish the population for which the considered location has a social meaning and how the device can understand in what kind of environment it is currently in.

**Session IV: Applications and Mobility in Wireless Networks**

[Seamless VoWLAN Handoff Management based on Estimation of AP Queue Length and Frame Retries](file:///E:\PerCom2009\pdfs\127.pdf)  
Muhammad Niswar, Eigo Horiuchi, Shigeru Kashihara, Kazuya Tsukamoto, Youki Kadobayashi, Suguru Yamaguchi

I present handoff scheme based on estimation of AP queue length & frame retries. There are some questions arise from participant regarding the use of RTS retries and HO algorithm.

[Localizing Jammers in Wireless Networks](file:///E:\PerCom2009\pdfs\128.pdf)  
Hongbo Liu, Wenyuan Xu, Yingying Chen, Zhenhua Liu

We developed Virtual Force Iterative Localization (VFIL) algorithm that utilizes the network topology to iteratively adjust the estimated location of a jammer until it reaches a close approximate of the true location. They claims that VFIL is effective in localizing jammers with high accuracy and achieves the best performance among all the algorithms they studied. They used isotropic jamming model in this paper. However, author should work with more realistic jamming models.

[A social relation aware routing protocol for mobile ad hoc networks](file:///E:\PerCom2009\pdfs\129.pdf)  
Jisun An, Yangwoo Ko, Dongman Lee

The author proposed a novel algorithm for routing in MANETs for supporting content sharing. The author should experiment with the large size of content