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Guest editorial

# Special Issue on Pervasive Computing and Communications (PerCom) 2010

It gives us great pleasure to present to you this special issue that contains the extended versions of selected papers presented at the Eighth Annual IEEE International Conference on Pervasive Computing and Communications (PerCom 2010) that was held in Mannheim, Germany, March 29–April 2, 2010.

PerCom 2010 received 227 submissions, and following a thorough review process the Technical Program Committee selected 26 regular papers and 2 concise papers for presentation at the conference, and inclusion in its proceedings. Among the 26 regular papers, we selected 11 papers and invited their authors to submit an extended version of conference paper for possible publication in the special issue. After an additional and accurate review process, we finally selected the seven papers contained in this special issue, all of which provide excellent contributions to various aspects of pervasive computing and communications research: energy consumption of mobile devices, pervasive applications, localization, route prediction, middleware for pervasive applications, participatory sensing.

In the first paper of the special issue, ''Measuring mobile phone energy consumption for 802.11 wireless networking'', Andrew Rice and Simon Hay investigate fine grained power consumptions of mobile phone applications. Their measurement framework provides annotated traces of a phone's energy usage based on which understanding of particular aspects of an application's energy usage can be developed. Their large set of experiments reveal that optimal choices of data transmission strategy are heavily dependent on handsets, operating systems, and device context.

In the second paper, ''ChunkStream: Interactive streaming of structured data'', Justin Mazzola Paluska, Hubert Pham, and Steve Ward present a system for efficient streaming and interactive editing of online video. Rather than using a specialized protocol and stream format, ChunkStream makes use of a generic mechanism employing chunks. Chunks are fixed-size arrays that contain a mixture of scalar data and references to other chunks, allowing programmers to expose large, but fine-grained, data structures over the network. Benchmarks show that ChunkStream uses less bandwidth than HTTP Live Streaming while providing better support for editing primitives.

In the third paper, ''Map Estimation using GPS-equipped mobile wireless nodes'', Shinichi Minamimoto, Sae Fujii, Hirozumi Yamaguchi, and Teruo Higashino propose an algorithm to estimate 2D shapes and positions of buildings, simultaneously using GPS logs and wireless communication logs of mobile nodes. The algorithm only utilizes general wireless devices like smart phones and hence is easy to implement. The results from the experiments conducted assuming rescue operation scenarios have shown that the proposed method could quickly generate a map with 85% accuracy.

In the fourth paper, ''FM radio for indoor localisation with spontaneous recalibration'', Aleksandar Matic, Andrei Papliatseyeu, Venet Osmani, Oscar Mayora-Ibarra employ FM radio signal to perform user localization in environments not covered with Wi-Fi signal or environments with only single Wi-Fi access point. The authors present a comparison of FM versus Wi-Fi positioning systems and a combination of both systems, exploiting their strengths for indoor positioning. A novel concept of spontaneous recalibration is also introduced to combat signal degradation due to the environmental factors affecting signal propagation.

In the fifth paper, ''A system for destination and future route prediction based on trajectory mining'', Ling Chen, Mingqi Lv, and Gencai Chen propose an approach to predict both the intended destination and the future route of a person in an integrated way based on user trajectories collected by GPS. The proposed approach first detects the significant places where the person may depart from or go to using a clustering-based algorithm called FBM (Forward–Backward Matching), then abstracts the trajectories based on a space partitioning method, and finally extracts movement patterns from the abstracted trajectories using an extended CRPM (Continuous Route Pattern Mining) algorithm. A number of experiments were conducted to evaluate the performance of the system, where high accuracy is achieved.

In the sixth paper, ''Scheduling and development support in the scavenger cyber foraging system'', Mads D. Kristensena and Niels O. Bouvina presents Scavenger, a cyber foraging system supporting easy development of mobile cyber foraging

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applications, while still delivering efficient, mobile use of remote computing resources through the use of a custom built mobile code execution environment and a new adaptive, dual-profiling scheduler.

In the final paper of the special issue, "Dynamic pricing incentive for participatory sensing", Juong-Sik Lee and Baik Hoh address user participation problem in participatory sensing applications, studying underlying economic model of user participation incentive. The authors design and evaluate a novel reverse auction based dynamic pricing incentive mechanism where users can sell their sensing data to a service provider with users' claimed bid prices. The proposed incentive mechanism focuses on minimizing and stabilizing incentive cost while maintaining adequate level of participants by preventing users from dropping out of participatory sensing applications.

We congratulate the authors of the above outstanding papers for the excellent work and their contributions in advancing the state-of-the-art in pervasive computing and communications.

In conclusion, we would like to thank the journal's editor-in-chief for special issues, Prof. Behrooz A. Shirazi, for the continuous help and guidance during the preparation of this special issue. We would also like to thank the publishing staff at PMC for the hard work and support they provided till the very end of the issue's preparation. Last but not least, we would like to thank all the authors for their paper contributions and all our colleagues who volunteered plenty of their precious time and energy for their valuable, insightful and timely feedback during the review process that helped make this special issue a reality.

We have really enjoyed this experience, and we hope that you will find this issue informative and useful!

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